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O'ZBEKISTON AHOLISIDA UCHRAYDIGAN IRSIY KASALLIKLARNING GENETIK TAHLILI VA ISTIQBOLLARI

Annotatsiya: *Mazkur maqolada O'zbekiston aholisida uchraydigan irsiy kasalliklarning genetik tahlili va ularni aniqlashda zamonaviy biotexnologik usullarning o'rni yoritilgan. O'tkazilgan tadqiqotlar natijasida talassemiya, gemofiliya va fenilketonuriya kabi irsiy kasalliklar misolida PCR, DNA-sekvenlash metodlari yordamida genetik mutatsiyalarni aniqlash imkoniyatlari o'rganilgan. Shuningdek, ushbu usullarni O'zbekiston sharoitida amaliyotga joriy etishdagi muammolar, mavjud laboratoriya tajribalari va istiqbollar tahlil qilingan.*

Kalit so'zlar: *irsiy kasalliklar, genetik tahlil, biotexnologiya, PCR, DNA, diagnostika.*

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GENETIC ANALYSIS AND PROSPECTS OF HERITAGE DISEASES IN THE POPULATION OF UZBEKISTAN

Abstract: *This article discusses the genetic analysis of hereditary diseases occurring in the population of Uzbekistan and the role of modern biotechnological methods in their detection. As a result of the conducted studies, the possibilities of detecting genetic mutations using PCR and DNA sequencing methods in the case of hereditary diseases such as thalassemia, hemophilia and phenylketonuria were studied. Also, the problems of implementing these methods in practice in Uzbekistan, existing laboratory experiences and prospects were analyzed.*

Keywords: *hereditary diseases, genetic analysis, biotechnology, PCR, DNA, diagnostics.*

Kirish. Irsiy kasalliklar zamonaviy tibbiyotning eng dolzarb yo'nalishlaridan biridir. Ular inson genetik materiali — DNKda yuz beradigan mutatsiyalar, xromosoma buzilishlari yoki irsiy axborotning noto'g'ri uzatilishi natijasida paydo bo'ladi. Bugungi kunda dunyo miqyosida aniqlanayotgan kasalliklarning taxminan 10–15 foizi irsiy omillar bilan bog'liq bo'lib, bu holat genetik tadqiqotlar va diagnostika texnologiyalariga bo'lgan ehtiyojini oshirmoqda.

Zamonaviy tibbiyotda irsiy kasalliklarni o'rganish ikki asosiy yo'nalishda olib boriladi:

1. Genetik diagnostika - kasallikni erta bosqichda aniqlash.

2. Profilaktika va genetik maslahat - sog‘lom avlodni shakllantirish.

1. Genetik diagnostika — bu inson organizmidagi irsiy (nasldan-naslga o‘tuvchi) kasalliklarni aniqlash, ularning rivojlanish xavfini baholash va oldini olishga qaratilgan tibbiyot yo‘nalishidir.Ushbu yo‘nalish **molekulyar genetika, biotexnologiya va bioinformatika** yutuqlariga asoslanadi. Genetik diagnostika yordamida kasallik **belgilari hali klinik tarzda namoyon bo‘lmasdan oldin**, ya’ni erta bosqichda aniqlanishi mumkin. Bu esa davolash samaradorligini oshiradi va sog‘lom avlod tug‘ilishiga imkon yaratadi.

2. Sog‘lom avlod — har qanday jamiyatning eng muhim boyligi va barqaror taraqqiyot kafolatidir.

Bugungi kunda irsiy (genetik) kasalliklarning ko‘payishi, atrof-muhit omillarining yomonlashuvi va turmush tarzi o‘zgarishlari **genetik sog‘lomlikni saqlash** masalasini dolzarb qilib qo‘ymoqda. Shu sababli **genetik rofilaktika** va **genetik maslahat** tizimi sog‘lom naslni shakllantirishda hal qiluvchi o‘rin tutadi. Bu maqsadda so‘nggi yillarda biotexnologik usullar — xususan, polimeraza zanjir reaksiyasi (PCR), DNK sekvenlash, DNK marker tahlili kabi metodlar keng qo‘llanilmoqda. O‘zbekistonda ham irsiy kasalliklarni erta aniqlash, ularning tarqalish sabablari va genetik xususiyatlarini o‘rganish borasida muhim ilmiy izlanishlar olib borilmoqda. Jumladan, talassemiya, gemofiliya, fenilketonuriya kabi irsiy kasalliklar bo‘yicha diagnostika amaliyotlari yo‘lga qo‘yilgan. Shu bilan birga, mamlakatda biotexnologik diagnostika laboratoriyalari faoliyatini kengaytirish, zamonaviy genetik tahlil usullarini joriy etish tibbiyot tizimining ustuvor yo‘nalishlaridan biriga aylangan. Mazkur maqolada O‘zbekiston aholisi o‘rtasida uchraydigan irsiy kasalliklarning genetik tahlili va ularni aniqlashda qo‘llaniladigan biotexnologik usullar ko‘rib chiqiladi. Shuningdek, mavjud muammolar, ularni hal etish yo‘llari hamda mamlakatimizda genetik diagnostika tizimini takomillashtirish istiqbollari tahlil qilinadi.

Asosiy qism: Genetik mutatsiyalar va ularning turlari. Irsiy kasalliklarning kelib chiqishida genetik mutatsiyalar asosiy sabab hisoblanadi. Ular qo‘yidagi turlarga bo‘linadi:

Nuqtaviy mutatsiyalar: missens, nonsens, frameshift. Strukturaviy mutatsiyalar: deletsiya, duplikatsiya, inversiya. Xromosomalmutatsiyalar: trisomiya (Daun sindromi), monosomiya (Tyorner sindromi), XXY karyotipi (Klaynfelter sindromi).Masalan, β-talassemiya holatlarida HBB genidagi bir nukleotid o‘zgarishi gemoglobin sintezining buzilishiga olib keladi, bu esa qonning kislorod tashish qobiliyatini pasaytiradi[3].

Irsiy kasalliklarning nasldan-naslga qo‘yidagi mexanizmlar orqai o‘tadi: Autosomal-dominant – Marfan, sindromi;

Autosomal-retsessiv – talassemiya, kistik fibroz;

X-xromosomaga bog‘liq –gemofiliya, rang ajrata olmaslik.

Bu bilimlar yordamida irsiy kasalliklarning genetik asoslarini o‘rganish zamonaviy tibbiyotda diagnostika, profilaktika va genetik maslahat sohalarining rivojlanishiga olib keldi. Genetik tahlil orqali nasliy kasallik xavfi bo‘lgan oilalar

aniqlanib, ularga genetik maslahat berish, prenatal diagnostika o‘tkazish va sog‘lom avlodni shakllantirish imkoniyati yaratiladi[1]. O‘zbekiston sharoitida bu yo‘nalish bo‘yicha so‘nggi yillarda biotexnologik laboratoriyalar faoliyat yurita boshladi. Samarqand, Toshkent va Farg‘ona shaharlaridagi tibbiy-genetik markazlarda PCR, sekvenlash, va genotiplash usullaridan foydalanilmoqda. Bu esa irsiy kasalliklarni erta bosqichda aniqlash va ularning tarqalishini kamaytirish imkonini beradi[4]. Irsiy kasalliklarning genetik asoslarini chuqur o‘rganish ularning mexanizmlarini tushunish, tashxisni aniqlik bilan qo‘yish va sog‘lom avlodni ta’minlashda muhim ahamiyat kasb etadi. Bu yo‘nalishda biotexnologik usullar va genetik tahlil metodlari zamonaviy tibbiyotning ajralmas qismiga aylangan[5].

Diagnostikada biotexnologik usullar: Zamonaviy tibbiyotda irsiy kasalliklarning aniqlanishida biotexnologik usullar muhim ahamiyat kasb etadi. Ular yordamida genetik mutatsiyalar, xromosomal anomaliyalar va gen ekspressiyasi darajasidagi o‘zgarishlar yuqori aniqlik bilan tahlil qilinadi. An’anaviy usullar (genealogik va sitogenetik tahlil) endilikda molekulyar diagnostika bilan to‘ldirilgan bo‘lib, bu genetik tahlilning aniqligi va tezligini bir necha barobarga oshirdi.

Klassik diagnostika usullari-Klassik genetik tahlil usullari orasida genealogik tahlil, sitogenetik tahlil va biokimyoviy diagnostika asosiy o‘rin tutadi[2].

Genealogik tahlil—nasl daraxti asosida irsiyat shaklini aniqlash; irsiy belgining nasldan-naslga o‘tish qonuniyatlarini aniqlashda qo‘llaniladi. Bu usul yordamida kasallikning dominant yoki retsessiv irsiyat turi aniqlanadi.

Sitogenetik tahlil—xromosoma strukturasidagi o‘zgarishlarni aniqlash imkonini beradi. Masalan, Daun sindromi (trisomiya 21) yoki Klaynfelter sindromi (47, XXY) holatlarini aniqlashda qo‘llaniladi[3].

Biokimyoviy diagnostika—genetik nuqsonlar oqibatida yuzaga keladigan ferment yetishmovchiligini aniqlash uchun ishlatiladi. Masalan, fenilketonuriya holatida fenilalanin gidroksilaza fermentining faolligi o‘lchanadi.

Biroq bu usullar genetik mutatsiyani aniq molekulyar darajada aniqlay olmaydi. Shu sababli zamonaviy tibbiyotda biotexnologik diagnostika usullari asosiy o‘ringa chiqmoqda.

Molekulyar-biologik va biotexnologik diagnostika usullari. Polimeraza zanjir reaksiyasi (PCR) .

Bugungi kunda PCR usuli 1983-yilda K. Mullis tomonidan ishlab chiqilgan bo‘lib, bugungi kunda irsiy kasalliklarni aniqlashda eng keng tarqalgan va ishonchli metod hisoblanadi va bu usul DNK molekulasining ma’lum qismini millionlab nusxalarda ko‘paytirish imkonini beradi. O‘zbekiston sharoitida PCR asosida talassemiya, gemofiliya, va gemoglobinopatiyalarni erta bosqichda aniqlash bo‘yicha laboratoriya amaliyotlari yo‘lga qo‘yilgan.

Masalan: Talassemiya—irsiy qon kasalligi. Bu holatda tana yetarlicha sog‘lom gemoglobin ishlab chiqara olmaydi, natijada odamda holsizlik, rang oqarishi, tez charchash kabi belgilar kuzatiladi. Ko‘p hollarda bu kasallik onadan

yoki otadan gen orqali o‘tadi, shunday ekan ushbu kasallikni bugungi kunda davloshdan

PCR usulining turlari orasida real-time PCR (qPCR), multiplex PCR va RT-PCR keng qo‘llanilmoqda. Ularning afzalligi—natijalarni tezkor olish va mutatsiya joylashuvini aniqlash imkoniyatidir[5].

DNK sekvenlash: Sekvenlash (DNA sequencing)—genetik tahlilning eng zamonaviy usullaridan biri bo‘lib, u genetik kodni to‘liq o‘qish imkonini beradi[2]. Klassik Sanger sekvenlash va Next Generation Sequencing (NGS) texnologiyalari orqali irsiy kasalliklarning sabablari molekulyar darajada aniqlanadi. NGS texnologiyasi yordamida bir vaqtning o‘zida minglab genlar tahlil qilinadi. Bu metod O‘zbekiston Genomika va Bioinformatika markazida amaliyotga kiritilgan bo‘lib, ayrim populyatsiyalarda irsiy mutatsiyalar xaritasi tuzilmoqda.

Gel elektroforez- Agaroz gel elektroforezi—DNK fragmentlarini uzunligiga ko‘ra ajratish usuli bo‘lib, u PCR mahsulotlarini vizual baholash uchun ishlatiladi. U orqali genetik test natijalari tasdiqlanadi. Bu usul oddiy, arzon va mahalliy laboratoriyalar uchun qulaydir.

SNP genotiplash va mikromatriks (gene chip) texnologiyasi-Zamonaviy diagnostikada mikromatriks texnologiyasi yordamida minglab genetik variantlar bir vaqtning o‘zida tekshiriladi. SNP genotiplash (Single Nucleotide Polymorphism analysis) irsiy kasalliklar xavfini baholash, farmakogenetika va personalizatsiyalashgan tibbiyotda muhim o‘rin tutadi. Biotexnologik diagnostikaning afzalliklari va cheklovlari.Biotexnologik diagnostika usullari an’anaviy metodlarga nisbatan bir qator afzalliklarga ega: Kasallikni erta bosqichda aniqlash imkonini beradi;

Diagnostika aniqligi yuqori (95–99%) bo‘ladi; Mutatsiya turini molekulyar darajada aniqlaydi; Prenatal diagnostika va genetik maslahat jarayonini osonlashtiradi. Biroq bu usullarni amaliyotga keng joriy etishda texnik infratuzilma, mutaxassislar yetishmasligi va qimmat uskunalar bilan bog‘liq muammolar mavjud. O‘zbekiston sharoitida aynan shu yo‘nalishda laboratoriyalarni modernizatsiya qilish dolzarb masalalardan biridir. Diagnostika yo‘nalishining rivojlanish istiqbollari Biotexnologik diagnostika bugungi kunda nafaqat irsiy kasalliklarni aniqlash, balki gen terapiyasi, personalizatsiyalashgan tibbiyot va biobank tizimlarini rivojlantirish uchun asos bo‘lib xizmat qilmoqda. Yaqin kelajakda O‘zbekiston ilmiy markazlarida NGS sekvenatorlari, CRISPR-Cas9 asosidagi mutatsiya tahlil texnologiyalari va AI yordamida genom ma’lumotlarini tahlil qilish tizimlarini joriy etish rejalashtirilmoqda. Biotexnologik usullar irsiy kasalliklarni aniqlashda diagnostikaning yangi bosqichini boshlab berdi. Ularning samarali qo‘llanilishi sog‘lom avlodni shakllantirish, kasalliklarni erta aniqlash va genetik xavflarni kamaytirishda beqiyos ahamiyatga ega[4].

O‘zbekiston Respublikasi genetik jihatdan xilma-xil populyatsiyaga ega mamlakatlardan biri hisoblanadi. Mamlakat hududida turli etnik guruhlar yashashi natijasida genetik polimorfizm darajasi yuqori. Shu sababli irsiy kasalliklarning tarqalishida mahalliy populyatsion o‘ziga xosliklar kuzatiladi. Tibbiyot statistikasi ma’lumotlariga ko‘ra, har 1000 yangi tug‘ilgan chaqaloqdan taxminan 25–30 tasi

irsiy yoki tug‘ma kasallik bilan tug‘iladi. Eng ko‘p uchraydigan kasalliklar orasida talassemiya, gemofiliya, Daun sindromi, albinizm va fenilketonuriya bor. Ko‘plab holatlarda irsiy kasalliklar yaqin qarindoshlar o‘rtasidagi nikohlar bilan bog‘liq bo‘ladi. Respublikada bu ko‘rsatkich ayrim hududlarda 10–15% gacha yetadi. Bu esa autosom-retsessiv kasalliklarning yuqori chastotada uchrashishiga sabab bo‘lmoqda. Shu boisdan, O‘zbekiston tibbiy-genetik xizmatida genetik maslahat va profilaktika yo‘nalishi tobora muhim ahamiyat kasb etmoqda.

Genetik diagnostika amaliyotining rivojlanish bosqichlari O‘zbekistonda genetik diagnostika yo‘nalishi 1970-yillardan boshlab rivojlana boshlagan. Dastlabki tibbiy-genetik laboratoriyalar Toshkent tibbiyot akademiyasi va Samarqand davlat tibbiyot instituti qoshida tashkil etilgan. U davrda asosan sitogenetik usullar (xromosoma tahlili) qo‘llanilgan. 1990-yillardan boshlab PCR, elektroforez va DNK diagnostikasi texnologiyalari bosqichma-bosqich amaliyotga joriy etildi. Ayniqsa, gemofiliya A, beta-talassemiya, fibroz alveolit va sitoskelet mutatsiyalari bo‘yicha tadqiqotlar olib borilgan. So‘nggi yillarda Genomika va Bioinformatika markazi (Toshkent), Samarqand davlat universitetining Genetika kafedrasi, hamda Immunologiya va molekulyar biologiya laboratoriyalarida xalqaro hamkorlikda molekulyar diagnostika tadqiqotlari olib borilmoqda. Masalan, NGS texnologiyasi asosida O‘zbekiston aholisining ayrim populyatsiyalarida β-talassemiya va mitoxondrial mutatsiyalarning genetik profili o‘rganilgan. Bu tadqiqotlar O‘zbekiston uchun genetik atlas yaratish yo‘lida muhim bosqich hisoblanadi[1]. Hozirda respublikaning ayrim hududiy tibbiyot markazlarida (Toshkent, Samarqand, Farg‘ona, Nukus) irsiy kasalliklarni aniqlovchi PCR-laboratoriyalar faoliyat yuritmoqda. Samarqand davlat universiteti va Toshkent tibbiyot akademiyasi qoshida 2022-yildan boshlab biotexnologik diagnostika laboratoriyalari faoliyat ko‘rsatmoqda. Ular DNK tahlili, elektroforez, va PCR metodlarini o‘quv va amaliy tadqiqotlarda qo‘llashmoqda. O‘zbekiston Fanlar akademiyasi huzurida olib borilayotgan “O‘zbek genomi” loyihasi mamlakat aholisining genetik ma’lumotlar bazasini shakllantirishni maqsad qilgan. Ushbu loyiha yordamida populyatsiyaviy genetik tuzilma, irsiy kasalliklar xavfi va farmakogenetik xususiyatlar o‘rganilmoqda [WHO, 2023]. Mazkur ma’lumotlar kelajakda personalizatsiyalashgan tibbiyot yo‘nalishida, ya’ni har bir bemor genotipiga asoslangan davolash usullarini ishlab chiqishda asosiy manba bo‘lib xizmat qiladi[4].

Xulosa va takliflar

O‘zbekiston aholisida irsiy kasalliklarning tarqalishi mahalliy populyatsion, demografik va ijtimoiy omillar bilan bog‘liqdir. Aholi orasida yaqin qarindoshlar o‘rtasidagi nikohlarning mavjudligi, ayrim hududlarda genetik skrining dasturlarining yetarlicha yo‘lga qo‘yilmaganligi irsiy kasalliklar ko‘rsatkichining nisbatan yuqori bo‘lishiga sabab bo‘lmoqda. Biotexnologik diagnostika usullari — pcr, dnk sekvenlash, snp genotiplash, elektroforez va mikromatriks texnologiyalari—irsiy kasalliklarni erta bosqichda aniqlash imkonini beruvchi eng samarali yo‘nalish sifatida e’tirof etildi.

milliy genetik ma’lumotlar bazasini yaratish—aholining irsiy tuzilmasi, genetik xavflar va farmakogenetik xususiyatlarini tizimli o‘rganish uchun;

Personalizatsiyalashgan tibbiyot tamoyillarini amaliyotga joriy etish — har bir bemor genotipiga asoslangan davolash usullarini ishlab chiqish;

Crispr-cas9 kabi gen tahrirlash texnologiyalarini tahliliy diagnostika va gen terapiyasi yo‘nalishida o‘rganish;

Bioinformatika va sun’iy intellekt asosida genetik ma’lumotlarni tahlil qilish tizimlarini ishlab chiqish.

Ushbu yo‘nalishlarda olib boriladigan kompleks ilmiy izlanishlar o‘zbekiston sog‘liqni saqlash tizimida irsiy kasalliklarni erta aniqlash, profilaktika, va sog‘lom avlodni shakllantirish siyosatini yangi bosqichga ko‘tarariladi

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GOALS AND TASKS OF THE GENERAL POPULATION REGISTRATION

Abstract: *The article covers the main objectives of the national population census and the organizational, legal and methodological tasks necessary for their implementation in a systematic approach. The article is based on the global standard - the UN Statistical Commission "Principles and Recommendations for Population and Housing Censuses" and the recommendations of the European Statistical Conference (CES) for the 2020 and 2030 cycles. The relevance of the population census in Uzbekistan, the last national population census in our country was conducted in 1989. A number of works have been carried out in this direction in recent years. In particular, the Law "**On Population Census**" was adopted, which established that the country's citizens should be registered at least once every 10 years. Therefore, in 2021, a pilot population census was held. The first nationwide population census since 1989 is planned, the stages of the process (preparation, testing, basic input, processing and dissemination), mechanisms for ensuring data quality, and the use of data in policy, social services and territorial planning are covered. The article concludes with specific recommendations for policymakers and implementers.*

Keywords:: *census, methodology, CES, UNO, National statistics committee of the Republic of Uzbekistan.*

Census — It serves as the only source of information on the age, gender, ethnic composition, educational level, marital status, employment, and other characteristics of the population.

Census — is the process of collecting complete statistical data on the permanent and temporary population of a country at the same time, based on a single program and methodology. In world practice, a population census is a major national statistical event held once every 10 years, the results of which serve as the basis for all other statistical observations. It provides detailed information on demographic status (age, sex, births, deaths), socio-economic (education, employment, migration), housing and household characteristics.

In the case of Uzbekistan, the relevance of the Population Census is determined by several factors: rapid population growth, territorial disparities, labor migration, differences between living conditions in urban and rural areas, increased demand for infrastructure, as well as the need for reliable statistical indicators at the micro-level for planning social services (education, healthcare, transport).

Purpose of the article — The purpose of this document is to present the goals and objectives of the population census from a scientific, precise and practical point of view, based on international standards and the conditions of Uzbekistan, and to systematically present the methodological foundations of the process, quality assurance and mechanisms for using the results.

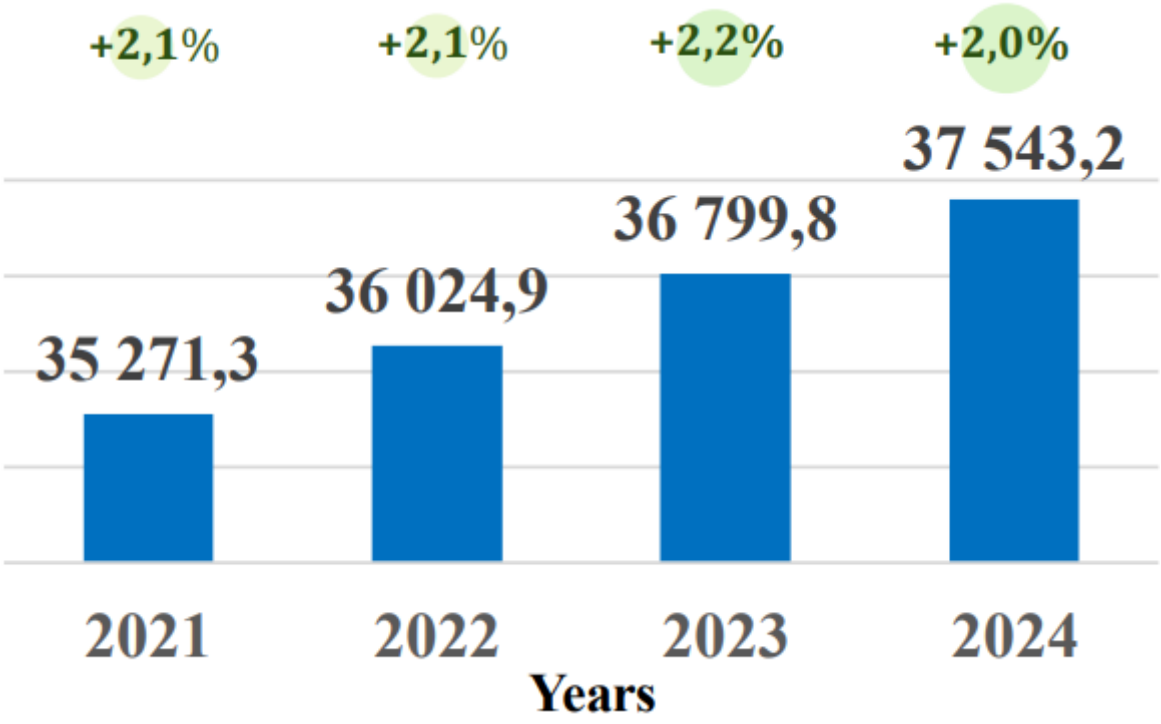
In determining the country's development prospects, it is very important to determine the demographic and socio-economic situation of the population, the standard of living and well-being, and the state of agriculture.

Goals and objectives of the population census.

In studying the state of demographic processes in our republic, the data of the population census conducted in the country are of great importance. According to sources, the first population census in Uzbekistan was conducted in 1897, and the data of this census helped to form an idea of demographic processes such as the number of families, population, age and sex, ethnic composition, births, deaths in Uzbekistan at the end of the 19th century. Later, population censuses were organized in Uzbekistan in 1926, 1939, 1959, 1970, 1979 and 1989.

Number of permanent population of the Republic of Uzbekistan

(as of January 1, thousand people)



The permanent population as of January 1, 2025 was 37543.2 thousand people, including men — 18904.5 thousand people, women — 18638.7 thousand people, urban population — 19 135.8 thousand people, rural population — 18407.4 thousand people.

During the years of independence, no population census was conducted in the Republic of Uzbekistan. Changes that have dramatically affected the size of the population, its age and sex composition, the characteristics of the population's location on the territory of the republic, and other socio-demographic features

significantly limit the use of existing data on the current population count. In turn, reliable information about the population of the Republic of Uzbekistan and its well-being is an important basis for long-term forecasts and the development of state target programs for socio-economic development, programs for creating new jobs and ensuring employment, for the formation of indicators of the National Goals of Sustainable Development, for studying the processes of the location and use of labor resources, and for conducting scientific research.

Population census is very important in determining the prospects for the development of the country, determining the demographic and socio-economic characteristics of the population, the standard of living and well-being, the state of agriculture. In this regard, the census is of great importance. Through the analysis of the data collected during the census, a general, comprehensive picture of the world's population is created. Currently, population censuses are carried out in many countries based on the recommendations of the United Nations Statistical Commission.

The main source of the state — It is impossible to build a modern state without accurate information about the people. After all, accurate information about the population creates a great foundation for the rational use and proper distribution of resources. Therefore, having a clear picture of the composition of the population, its economic activity, and the level of education is the main task of every state. In particular, not only about how many people there are in the country, but also about where migrants come from and where they go, and about their age and gender composition, is also important for the government that is implementing reforms.

After Uzbekistan gained independence, the need for a population census began to be discussed on high platforms eight or nine years ago. By 2019, our President approved the concept of conducting a population census. In 2020, this nationwide event was postponed due to the coronavirus pandemic observed around the world.

A population census provides a complete picture of the population, including its size, sex and age composition, living conditions and migration. The UNO recommends that a population census be conducted at least once every 10 years. This is because a census provides basic information for national policy development and planning, as well as for monitoring the country's development.

Important information about citizens' needs for housing, household goods, food, clothing, medical equipment and medicines, social services, and jobs can only be determined on the basis of reliable data on the population.

The census provides information about the actual population of a territory, not only throughout the country, but also in its regions. Information about citizens is available in various administrative sources and databases of state agencies, but not all of them contain complete information. This does not allow for the formation of a complete picture.

For example, the citizenship and migration departments have information about the place where citizens are registered. In reality, these people may live at a different address, even in another region or country. The voter lists also do not

contain complete information about the population. They do not include citizens who cannot vote.

World experience shows that countries independently determine the list of questions to be included in the final version of the questionnaire. As a rule, each state body wants to include as many questions as possible in the questionnaire that interests it. However, the larger the questionnaire, the more expensive the census will be. Because census takers have to spend more time on each household.

In determining the prospects for the development of the country, it is very important to determine the demographic and socio-economic characteristics of the population, their standard of living and well-being, and the state of agriculture. Census is of great importance in this regard.

It was announced that population registration events in Uzbekistan will be held from January 15 to February 28, 2026.

Population registration will be carried out online for the first 17 days, and then by door-to-door visits by "neighborhood sevens" for the next month. This method will significantly reduce costs, saving 1.3 trillion soums.

The census process will also be organized in a simple and transparent manner. As a result of the Census, a single database will be formed on the composition and migration, marital status, type of activity, and sources of income of 38 million people, based on the recommendations of the Conference of European Statisticians in 2020.

To effectively implement the registration process, "neighborhood sevens" will be trained and encouraged based on a special training program. Funds from the project to strengthen the statistical system, which is being implemented with the support of the World Bank, will be allocated for this. Also, extensive propaganda will be carried out through the media and social networks, thereby raising citizen awareness.

These measures are important for accurately determining the real indicators of the population and for the targeted and effective implementation of state programs.

The data collected through the population census are of great importance in the development and implementation of targeted programs in all areas, including social protection, investment, housing, healthcare, culture, tourism, education, road construction and infrastructure. The results of the population census will be useful to the government in the future in assessing the results of the implementation of these programs, making economic forecasts and formulating demographic policies.

Conclusion and recommendations.

The results of the population census are used as a source of information for the targeted development of programs for the socio-economic development of regions, employment, education, healthcare, improving the health of women and children, providing assistance to families, and providing housing.

These results will also serve to form indicators for national sustainable development goals and improve our country's position in international rankings and

indices, including the Statistical Capacity Index, Human Development Index, and Economic Freedom Index.

At the same time, the results of the registration will help attract more foreign investors, further improve the investment climate, increase tourism potential, boost the economy, and ultimately improve the well-being of our population.

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METABOLIK SINDROMDA MARKAZIY IMMUN HIMOYA A'ZOLARINING MORFOGENEZI

Annotatsiya: *So'nggi o'n yilliklarda dunyo miqyosida metabolik sindrom inson salomatligi uchun eng muhim xavf omillaridan biri sifatida qaralmoqda. Bu sindromning dolzarbligi nafaqat endokrinologiya va kardiologiya, balki immunologiya, gistologiya hamda morfologiya fanlari uchun ham beqiyos ahamiyatga ega. Metabolik sindrom — bu organizmda moddalar almashinuvi jarayonining kompleks buzilishi bilan kechuvchi, ko'plab tizimlarga, xususan, immun tizimga salbiy ta'sir ko'rsatadigan holatdir. U insulinrezistentlik, giperglikemiya, dislipidemiya va arterial gipertenziya kabi klinik ko'rsatkichlar bilan namoyon bo'ladi.*

Kalit so'zlar: *Metabolik sindrom, timus, qizil suyak iligi, morfogenez, immunitet.*

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MORPHOGENESIS OF CENTRAL IMMUNE ORGANS IN METABOLIC SYNDROME

Annotation: *In recent decades, metabolic syndrome has been recognized worldwide as one of the most significant risk factors for human health. The relevance of this syndrome is not limited to endocrinology and cardiology but is also of great importance in immunology, histology, and morphology. Metabolic syndrome is a complex pathological condition characterized by disturbances in metabolic processes, adversely affecting multiple body systems, particularly the immune system. It is manifested by insulin resistance, hyperglycemia, dyslipidemia, and arterial hypertension.*

Key words: *Metabolic syndrome, thymus, red bone marrow, morphogenesis, immunity.*

Metabolik sindrom tushunchasi va patogenezi: Metabolik sindrom murakkab polietiologik kasallik bo‘lib, uning asosiy xususiyati organizmda insulin rezistentlik jarayonining shakllanishidir. Bu jarayon oqibatida glyukoza utilizatsiyasi buziladi, qonda giperglikemiya kuzatiladi va oshqozon osti bezidan ortiqcha insulinga ehtiyoj tug‘iladi. Natijada gipyerinsulinemiya paydo bo‘ladi. Shu bilan birga, metabolik sindromda dislipidemiya — qonda xolesterin va triglitseridlar darajasining ortishi, shuningdek, arterial gipertenziya kuzatiladi. Patogenezning muhim halqasi bu — adipotsitlardan chiqariladigan adipokinlar va sitokinlarning disbalansidir.

Markaziy immun organlarning gistologik va funksional xususiyatlari: Timus ko‘krak qafasining yuqori old qismida joylashgan juft bo‘lmagan markaziy limfoid organ hisoblanadi. U T-limfotsitlarning differensiasiyasi, immunologik tan olinishi va tolerans jarayonlarini amalga oshiradi. Gistologik jihatdan timus kapsula bilan qoplangan bo‘lib, uning ichida korteks va medulla qismlari ajratiladi. Korteksda asosan yetilmagan T-limfoblastlar, medullada esa yetilgan T-limfotsitlar joylashadi. Timusning stromasini epitelial retikulyar hujayralar tashkil etadi. Ular sitokin va o‘sish omillarini ishlab chiqarib, limfotsitlarning differensiasiyasini ta’minlaydi. Bundan tashqari, Gassal tanachalari timusning morfologik markeri hisoblanadi.

Qizil suyak iligi suyaklarning g‘ovak moddasida joylashgan va gematopoezning asosiy markazidir. U nafaqat eritropoez va granulopoez, balki limfoid qator hujayralarining shakllanishi uchun ham mas’uldir. Suyak iligi stromasi mezenximal kelib chiqishga ega fibroblastlar, stromal hujayralar va retikulyar to‘qimalardan iborat bo‘lib, ular hematopoetik hujayralarga qulay mikro-muhit yaratadi. Qizil suyak iligida B-limfotsitlarning dastlabki differensiasiyasi yuz beradi. Shuningdek, bu yerda gematopoetik ildiz hujayralar joylashib, ular organizmning barcha qon hujayralarini yetkazib beradi.

Metabolik sindromda timus va suyak iligi morfogenezi.

Timusdagi gistomorfologik o‘zgarishlar: Metabolik sindrom sharoitida timusda involyutsiya jarayoni tezlashadi. Normal holatda timus o‘smirlik davrigacha faol bo‘lib, keyin asta-sekin yog‘ to‘qimasi bilan almashinadi. Lekin MS bo‘lgan shaxslarda bu jarayon erta va tez kechadi. Timus korteksidagi limfotsitlar soni kamayadi, stromada esa yog‘ hujayralari ko‘payadi.Sitokinlar ta’sirida (IL-6, TNF-α) epitelial retikulyar hujayralarning faoliyati susayadi. Gassal tanachalari soni ko‘payib, fibroz o‘zgarishlar kuchayadi. Natijada T-limfotsitlarning differensiasiyasi va immunologik tolerans jarayonlari buziladi.

Qizil suyak iligidagi gistomorfologik o‘zgarishlar: Metabolik sindromda qizil suyak iligi ham sezilarli o‘zgarishga uchraydi. Adipoz to‘qimaning ortishi sababli gematopoetik joylar torayadi, hujayralar zichligi kamayadi. Suyak iligida adipotsitlar ko‘payishi “yog‘li degeneratsiya” deb ataladi.

Bundan tashqari, proinflamator sitokinlarning ortishi gematopoetik ildiz hujayralarning o‘zgarishiga sabab bo‘ladi. Natijada B-limfotsitlar soni kamayib, immunitet zaiflashadi. Erytrotsitlar va granulotsitlarning yetilishi ham izdan chiqishi mumkin.

Immun tizim faoliyatiga klinik ta’sirlar: Metabolik sindromda markaziy immun organlaridagi o‘zgarishlar immunitetning umumiy pasayishiga olib keladi.

Bu quyidagi klinik oqibatlar bilan namoyon bo‘ladi:

-Infeksiyalarga qarshi kurash qobiliyatining pasayishi.

-Autoimmun kasalliklar rivojlanish xavfining ortishi.

-Surunkali past darajadagi yallig‘lanishning davom etishi.

-Ateroskleroz va yurak-qon tomir kasalliklari xavfining kuchayishi.

Bu jarayonlarning barchasi organizmda immun va metabolik tizimlar o‘zaro chambarchas bog‘liq ekanligini isbotlaydi.

Xulosa:

Metabolik sindrom markaziy immun organlari — timus va qizil suyak iligi — morfogenezi va funksiyasida chuqur o‘zgarishlarga olib keladi. Timusda erta involyutsiya, stromal o‘zgarishlar va T-limfotsitlarning kamayishi kuzatiladi. Suyak iligida esa yog‘li degeneratsiya va gematopoetik hujayralar sonining kamayishi kuzatiladi. Ushbu o‘zgarishlar immun tizim faoliyatining susayishiga, autoimmun jarayonlarning kuchayishiga hamda infeksiyalarga moyillikning ortishiga sabab bo‘ladi.

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SUYAK TO'QIMASI VA OSTEOGENEZ: HUJAYRAVIY KO'RINISHDA

Annotatsiya: *Suyak to'qimasi organizmga mexanik tayanch, himoya va mineral almashinuvini ta'minlovchi murakkab tizimdir. Uning tarkibiy asosini osteogenez jarayoni tashkil etib, u intramembranoz va endokondral yo'llar orqali amalga oshadi. Suyakning hujayraviy dinamikasi — osteoblastlar, osteotsitlar va osteoklastlarning o'zaro faoliyati — o'sish, tiklanish va qayta modellashtirishning molekulyar mexanizmlarini belgilaydi. Ushbu maqolada suyak to'qimasining tuzilishi va osteogenez jarayonining hujayraviy xususiyatlari tahlil qilinadi.*

Kalit so'zlar: *Suyak to'qimasi, osteogenez, osteoblast, osteotsit, osteoklast, suyak matriksi, hujayraviy differensiyalash, intramembranoz osteogenez, endoxondral osteogenez, suyak mineralizatsiyasi, osteoporoz.*

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BONE TISSUE AND OSTEOGENESIS: CELLULAR PERSPECTIVE

Annotation: *Bone tissue is a complex system that provides mechanical support, protection, and mineral homeostasis for the human body. Its structural foundation is the process of osteogenesis, which occurs through intramembranous and endochondral pathways. The cellular dynamics of bone—driven by the coordinated activity of osteoblasts, osteocytes, and osteoclasts—determine the molecular mechanisms of growth, repair, and remodeling. This article analyzes the structure of bone tissue and the cellular characteristics of the osteogenesis process.*

Keywords: *Bone tissue, osteogenesis, osteoblast, osteocyte, osteoclast, bone matrix, cellular differentiation, intramembranous osteogenesis, endochondral osteogenesis, bone mineralization, osteoporosis.*

Suyak to‘qimasi: tarkibi va hujayraviy strukturasi.

Suyak to‘qimasi ikki asosiy turga bo‘linadi: lamellar (laminal) va spongioz (tarmoqsimon) suyak. Lamellar suyak zich, qatlamli struktura bilan ajralib turadi va asosan suyak tanasi va qalin suyak qismlarida joylashgan. Spongioz suyak esa ko‘p teshikli, tarmoq shaklida bo‘lib, suyak boshlarida va qarsaklarda topiladi.

Suyak to‘qimasi ikki asosiy komponentdan iborat: hujayralar va ekstratsellyulyar matriks. Ekstratsellyulyar matriksda organik (asosan kollagen I tipi) va noorganik (asosiy kaltsiy fosfat minerallari, gidroksiapatit shaklida) qismlar mavjud. Organik qism suyakning elastikligini, noorganik qism esa uning qattiqligi va mustahkamligini ta’minlaydi.

Hujayralar va ularning roli.

Suyak to‘qimasining asosiy hujayralari — osteoblastlar, osteotsitlar va osteoklastlar — suyakning hosil bo‘lishi, saqlanishi va parchalanishini boshqaradi. Osteoblastlar mezenximal stromal hujayralardan differensiyalanib, kollagen va boshqa organik komponentlarni sintezlaydi hamda mineralizatsiyani boshlaydi; ularning bir qismi osteotsitlarga aylanadi. Osteotsitlar mineralizatsiyalangan matriks ichida joylashib, kanalikulyar tarmoq orqali mexanik signallarni qabul qiladi va suyak homeostazini nazorat qiladi. Osteoklastlar esa monotsit-makrofag liniyasidan kelib chiqib, ferment va kislotalar yordamida mineral va organik matriksni resorbsiyalaydi. Shu tariqa, ushbu hujayralar suyakning o‘sishi, qayta modellashtirilishi va funksional barqarorligini ta’minlaydi.

Osteogenez: suyak hosil bo‘lish jarayoni.

Osteogenez ikki asosiy yo‘l — intramembranoz va endokondral mexanizmlar orqali kechadi. Intramembranoz osteogenezda suyak to‘qimasi mezenximal hujayralarning bevosita osteoblastlarga differensiyalanishi natijasida shakllanib, asosan bosh va yuz suyaklarida kuzatiladi. Endokondral osteogenez esa hyalin xondr modeli o‘rnida suyakning bosqichma-bosqich hosil bo‘lishi bilan tavsiflanadi; bu jarayon uzun suyaklarning o‘sishida hal qiluvchi ahamiyatga ega. Xondr to‘qimasi avval qattiqlashib, keyinchalik osteoblastlar tomonidan suyak matriksi bilan almashtiriladi, osteoklastlar esa eskirgan xondr va suyak qismlarini rezorbsiyalaydi.

Osteogenezning hujayraviy bosqichlari.

Mezenchimal hujayralarning differensiyalashi — mezenchimal stromal hujayralar osteoblastlarga aylanish uchun signal oladi. Bu jarayon o‘z ichiga turli transkripsion faktorlar (Runx2, Osterix) va o‘sish faktorlarini oladi.

Osteoblastlarning osteotsitlarga aylanishi — yangi shakllangan suyak ichida osteoblastlar o‘zlarini ekstratsellyulyar matriksga o‘rab, osteotsitlar holatiga o‘tadi.

Osteoklastlar faoliyati — eski suyak to‘qimasini resorbsiyalab, yangi suyak hosil bo‘lishi uchun joy yaratadi. Bu jarayon suyakning doimiy yangilanishini ta’minlaydi.

Osteogenezning hujayraviy mexanizmlari va molekulyar asoslari.

Osteoblastlarning suyak hosil qiluvchi faolligi Runx2 va Osterix transkripsion faktorlariga, shuningdek BMP, Wnt/β-katenin va Notch signal yo‘llariga tayanadi. Ular kollagen va boshqa matriks oqsillarini sintezlab,

osteokalcin va osteonektin ishtirokida mineralizatsiyani boshlaydi. Osteotsitlar esa kanalikulyar tarmoq orqali mexanik yuklamalarni sezib, ularni suyak qayta modellashtirilishini boshqaruvchi kimyoviy signallarga aylantiradi. Osteoklastlar kathepsin K, metalloproteinazalar va proton nasoslari yordamida matriksni rezorbsiyalaydi; ularning faolligi RANKL–OPG nisbatiga bog‘liq tarzda tartibga solinadi.

Suyak patologiyalari va osteogenez buzilishlari.

Suyak to‘qimasi va osteogenez jarayonidagi muammolar ko‘plab kasalliklarning asosini tashkil qiladi. Eng ko‘zga ko‘ringan patologiyalardan biri — osteoporoz, bu kasallik suyak zichligining kamayishi va mikroarxitekturadagi buzilishlar bilan tavsiflanadi. Osteoporozda osteoblastlarning faolligi pasayib, osteoklastlar esa ortib ketadi, natijada suyak zaiflashadi.

Shuningdek, osteomalaziya va raxit kabi kasalliklar ham mineralizatsiyaning buzilishi bilan bog‘liq bo‘lib, ular suyak to‘qimasining zaiflashishiga olib keladi.

Suyak shikastlanishlarida osteogenez jarayoni tiklanish va regeneratsiya uchun juda muhimdir. Osteoblastlar yangi suyak hosil qilib, jarohatni to‘ldiradi, osteoklastlar esa o‘lik to‘qimalarni bartaraf qiladi.

Xulosa:

Suyak to‘qimasi va osteogenez jarayoni murakkab hujayraviy va molekulyar mexanizmlarga asoslangan biologik tizim hisoblanadi. Osteoblastlar, osteotsitlar va osteoklastlarning o‘zaro muvofiqlashtirilgan faoliyati suyakning o‘sishi, yangilanishi va mexanik funksiyalarini ta’minlaydi. Osteogenez jarayonining ikki asosiy turi — intramembranoz va endokondral osteogenez suyak shakllanishining asosini tashkil etadi.

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CENTRAL ASIA AS A NEXUS OF GLOBAL CULTURAL EXCHANGE

Abstract. *Central Asia has historically served as one of the world's most influential cultural crossroads, where nomadic and sedentary civilizations interacted, great empires intersected, and global trade and cultural exchange flourished. This article examines the role of Central Asia in the system of cultural relations from antiquity to the modern era. Using historical, comparative, and socio-cultural analysis, the study highlights the region's contributions to global civilization, including the Silk Road exchanges, religious and linguistic diffusion, architectural achievements, and modern geopolitical-cultural interactions. The findings demonstrate that contemporary Central Asia, despite facing challenges of globalization, digitalization, and identity politics, continues to function as an active cultural bridge between East and West. The paper concludes with strategic recommendations for enhancing regional cooperation, cultural diplomacy, and innovative models of cultural integration.*

Keywords: *Central Asia, cultural relations, Silk Road, cultural diplomacy, intercivilizational dialogue, globalization.*

Introduction

Central Asia has historically played a pivotal role in shaping world culture and facilitating interactions among civilizations. Situated at the intersection of the Middle East, South Asia, China, and Eastern Europe, the region became a unique arena where languages, religions, technologies, and artistic traditions merged. The term "cultural relations system" refers to the dynamic network of exchanges—intellectual, commercial, artistic, and religious—that connect diverse societies.

In recent decades, with the revival of the Silk Road concept, growing geopolitical relevance, and intensified economic integration, Central Asia's cultural significance has resurfaced as a key element of regional identity building and global cooperation. Countries such as Uzbekistan, Kazakhstan, Kyrgyzstan, Tajikistan, and Turkmenistan increasingly promote cultural diplomacy, heritage preservation, tourism development, and international partnerships. This article aims to analyze Central Asia's historical and contemporary position in global cultural relations, evaluate the challenges shaping its cultural landscape, and explore future opportunities for strengthening intercultural dialogue.

Literature Review

Scholars widely recognize Central Asia as one of the world's historically significant cultural crossroads. Frank (2018) emphasizes that the region played a decisive role in connecting civilizations along the Silk Road, facilitating not only commercial exchange but also the movement of technologies, artistic traditions, and intellectual ideas. Soucek (2021) describes Central Asia as a multilayered cultural space shaped by interactions among Turkic, Persian, Islamic, Chinese, and Hellenistic

traditions, arguing that cities such as Samarkand and Bukhara developed into major centers of cultural synthesis. Contemporary assessments, including UNESCO (2023), show that modern Central Asian states continue to strengthen cultural diplomacy through heritage preservation, tourism development, and regional cooperation programs. Overall, the literature consistently portrays Central Asia as an active nexus of cultural exchange historically and a revitalized participant in global cultural relations today.

Results

The empirical assessment of cultural exchange intensity across four major historical eras of Central Asia reveals noticeable fluctuations shaped by geopolitical, economic, and intellectual developments. To illustrate these dynamics, a comparative index was constructed based on historical trade activity, scientific production, religious transmission, and intercultural mobility.

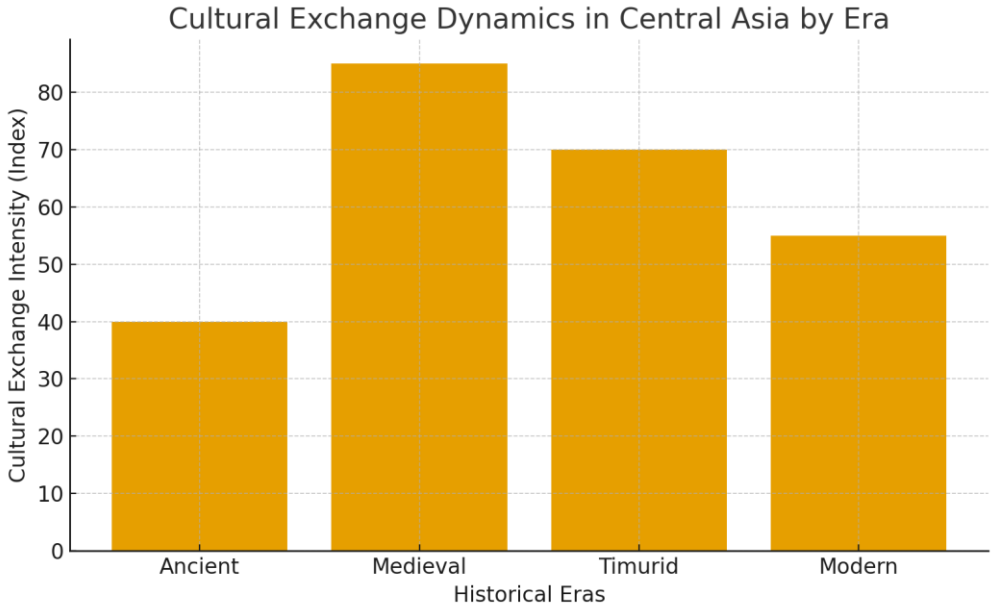


Figure 1. Cultural Exchange Dynamics in Central Asia Across Historical Eras

The diagram shows substantial variation in the intensity of cultural exchange across different historical eras in Central Asia. The Ancient era demonstrates the lowest cultural interaction index, indicating that although foundational exchanges existed—such as Hellenistic influence and early Persian contact—the region had not yet become a major transcontinental hub. Cultural processes were fragmented and mainly localized. In contrast, the Medieval era records the highest intensity of exchange, reflecting the peak activity of the Silk Road. During this period, Central Asia served as the epicenter of global trade and intellectual communication. The rise of major cultural and commercial cities such as Samarkand and Bukhara facilitated unprecedented circulation of goods, ideas, technologies, and artistic traditions across Eurasia. This corresponds to the golden age of Islamic science,

philosophy, and literature, when scholars like al-Khwarizmi and Ibn Sina significantly shaped global knowledge.

The Timurid era maintains a high but slightly reduced level of exchange. Although trade routes remained active, the focus shifted more toward centralized scientific and artistic patronage. Under the Timurids, architectural innovation, manuscript illumination, and astronomical research flourished in concentrated urban centers—especially Samarkand—resulting in strong yet more institution-based cultural exchange. The Modern era shows a moderate level of cultural interaction, shaped by globalization, regional collaboration, and cultural diplomacy rather than by traditional trade networks. UNESCO projects, tourism, academic mobility programs, and international festivals contribute to renewed engagement. Although modern cultural dynamics do not reach medieval levels, they are more diverse, technologically driven, and globally accessible.

Discussion

The comparative diagram shows that the intensity of cultural exchange in Central Asia has varied significantly across historical eras. The Medieval period demonstrates the highest level of intercultural interaction, reflecting the peak of the Silk Road when Samarkand, Bukhara, and Merv became major centers of scientific, religious, and artistic exchange. In contrast, the Ancient era shows the lowest index of cultural interaction, as early Greco-Bactrian, Achaemenid, and nomadic–sedentary contacts had not yet developed into large-scale transregional networks. The Modern era reflects a moderate revival of cultural exchange, influenced by globalization, digital transformation, tourism, and cultural diplomacy. UNESCO initiatives, regional festivals, and academic cooperation have contributed to renewed engagement, though not at medieval levels.

Overall, the diagram and literature reveal that cultural exchange in Central Asia has been dynamic rather than static, continuously shaped by political, economic, and intellectual factors. This adaptability underscores the region’s enduring role as a historical and contemporary bridge between civilizations.

Conclusion

This study concludes that Central Asia has consistently served as a crucial nexus of global cultural exchange from antiquity to the present day. The region’s historical significance is most evident during the Medieval and Timurid eras, when the Silk Road and major intellectual centers transformed Central Asia into a hub of intercivilizational dialogue. Scholars, merchants, and travelers from across Eurasia converged in the region, contributing to advances in science, literature, architecture, and religion that shaped global civilization.

In the modern era, Central Asia continues this legacy through cultural diplomacy, heritage preservation, tourism initiatives, and international academic cooperation. The moderate yet growing level of cultural exchange today demonstrates that the region is reclaiming its historical role as a connector between East and West. Globalization introduces new challenges—such as identity tensions and cultural homogenization—but also provides opportunities through digital heritage technologies and multilateral cultural programs. Ultimately, the evidence

shows that Central Asia's cultural identity is defined by continuity, diversity, and resilience. Strengthening regional collaboration, expanding digital heritage initiatives, and supporting intercultural education will further enhance the region's capacity to contribute meaningfully to global cultural relations. Thus, Central Asia remains not only a historical crossroads but also an emerging actor shaping the future of global cultural connectivity.

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MAKKAJO‘XORI O‘SIMLIGINI LABARATORIYA SHAROITIDA VEGETATSIYA DAVRINI QISQARTIRISH

Annotasiya. *Maqolada makkajo‘xori o‘simligiga urug‘iga issiq va soviq harorat tasir qilish orqali urug‘ unuvchanligini tezlashtirish hamda vegetatsiya davrini qisqartirish usullarini tog‘risida tajriba olib borilgan.*

Kalit so‘zlar: *Makkajo‘xori, unuvchnlik, qizdirish, sovitish, hosildorlik, vegetatsiya davr.*

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SHORTENING THE GROWING PERIOD OF CORN IN THE LABORATORY

Annotation: *The article presents an experiment on accelerating maize seed germination and reducing the vegetation period by exposing the seeds to high and low temperatures.*

Keywords: *maize, germination, heating, cooling, yield, vegetation period.*

Kirish.O‘zbekiston Respublikasi Prezidentining 2019-yil 23-oktabrdagi “O‘zbekiston Respublikasi qishloq xo‘jaligini rivojlantirishning 2020-2030-yillarga mo‘ljallangan strategiyasini tasdiqlash to‘g‘risida”gi PF-5853-son hamda 2022-yil 28-yanvardagi “2022-2026-yillarga mo‘ljallangan Yangi O‘zbekistonning taraqqiyot strategiyasi to‘g‘risida”gi PF-60-son farmonlari ijrosini ta’minlash maqsadida.

Makkajo‘xori—bir yillik o‘simlik bo‘lib, boshqa bir yillik boshoqli donli o‘tlardan poyasi, bo‘yi balandligi va barglarin kattaligi bilan ajralib turadi. Makkajo‘xorining poyasi silindrsimon, yo‘g‘on bog‘imli, poyasing yuqori qismida otalik rovakari bilan tugaydi. Poyasi balandligi 50 sm dan 9 m gacha boradi. Bo‘g‘imlari 8 sm dan 40 sm gacha bo‘ladi. Poyasi bir kunda 15-20 sm gacha o‘sadi. Barglari parallel to‘rlanishga ega, poyani ikki tomonida ketma-ketlikda joylashadi. Barglarin uzunligi 10 sm dan 1 metrgacha va eni 4 sm dan 15 sm gacha. Unib chiqish davri uchun qulay haroratlardan havo harorati 12°C dan yuqori, tuproqdagi

namlik 80% meyorda bo‘lsa 4-7 kunni tashkil etadi. O‘simlikni unib chiqishdan to‘liq pishib yetgunga qadar davri 164-165 kun oralig‘ini tashkil etadi.

Makkajo‘xori issiqsevar, yorug‘sevar, qurg‘oqchilikka ancha chidamli bahorgi ekin. Tuproq harorati 10°C bo‘lganda, 10-12 kunda unib chiqadi. Maysalari–2°C sovuqqa chidamaydi. Kuzda –3°C da sovuq uradi va ozuqalik sifatini pasaytiradi. Makkajo‘xorini asosiy ekin tarzida ekish uchun yer kuzda 28-30 sm chuqurlikda haydaladi, gektariga 20-25 kg chirindi va 60-80 kg fosfor, 80-100 kg sof azot hisobida o‘g‘itlar solinadi. Erta bahorda yerga ishlov berilib baranalanadi yoki yoppasiga kultivatsiya qilinadi. Urug‘lar qator oralari 60, 70 va 90 sm qilib, makkajo‘xori selkalarida 6-8 sm chuqurlikda ekiladi. Har gektar yerga 20-25 kg meyorda urug‘lik sarflanadi. 2-3 marta kultivatsiya qilinadi, 4-6 marta sug‘oriladi. O‘zbekistonda makkajo‘xorining 79 ta navi yetishtiriladi.

Biz Andijon qishloq xo‘jaligiva agrotexnologiyalar institutida labaratoriya sharoitida “Qorasuv-359AMV” navidan foydalanib tajriba o‘tkazdik. Ushbu nav Andijon viloyati Qo‘rg‘ontepa tumanida joylashgan “Erkin” ilmiy ishlab chiqarish birlashmasining seleksion duragayi hisoblanib, uning vegetatsiya davri 90-95 kun bo‘lib, erta-o‘rtapishar nav hisoblanadi. O‘simlik bo‘yi 255-260 sm ni tashkil etadi. Asosiy poyada barglar soni 12-14 ta, 1000 ta don vazni 300,0-320,0 gr ni tashkil qiladi. Don hosildorligi 6,0-7,6 t/ga. Donning pishib yetilishi davri 92-95 kunni tashkil etadi. 1998-yildan don uchun asosiy va takroriy ekin sifatida Davlat reyestriga kiritilgan. Mamlakatimizning barcha viloyatlarida ekish uchun tavsiya qilingan. Ushbu navning shu belgilari bilan tanishgan holatda tajribamizda bu navning vegetatsiya davrini yanada qisqartirish maqsadida uch hil muhitda urug‘larini unuvchanlik qobilyatini aniqlash uchun olib bordik. Oddiy sharoitda, yani urug‘larni hech qanday ta’sirsiz va urug‘ni qizdirib hamda muzlatgan holatda tuproqqa ekdik. Urug‘ning qizdirish sharoiti labaratoriya xonalarida 35-40°C da 6-8 soat quruq usulda yani suvga solmagan holda qizdirdik. So‘ngra biroz xona haroratida sovitganimizdan so‘ng bu urug‘larimizni hona harorati sharoitida ekdik. Yana bir tajribamizda biz urug‘ni maxsus sovituvchi sovitgichlarimizdan foydalangan holda havo haroratini birdaniga pasaytirmasdan tajribamizni olib bordik. Bunda biz avvaliga xona haroratida turgan urug‘imizni -1°C sovuqda 10-20 daqiqaga qo‘ydik. Shundan so‘ng yana haroratni pastlatdik, yani -20-25°C da 20-30 daqiqaga qoldirdik. Shundan so‘ng yana xona haroratiga moslashgunicha 1 soatga qoldirdik. Bu vaqtda biz makkajo‘xori urug‘larini ekish uchun tuproq tayyorladik. Albatta tuprog‘imiz unumdor bo‘lishligi uchun biogmusdan foydalandik.

Tajribamizda o‘rganilayotgan variantlarda sovitilgan urug‘larimiz 3 kunda unib chiqdi, bundan song to‘rt kunda qizdirilgan urug‘imiz unib chiqdi. Nazorat, ya’ni oddiy hech qanday ta’sir etkazilmagan urug‘imiz 7 kunda unib chiqdi. Bu tajribamizni 15 kun mobaynida kuzatish ishlarini olib bordik. Sovitilgan urug‘imiz 6 kunda 2 ta barg hosil qildi. Qizdirilgan urug‘imiz esa ikkinchi bargni hosil qila boshladi. Shu 7 kunlik nihollarimizni balandligini o‘lchaganimizda sovitilgan urug‘imiz 15 sm va qizdirilgan urug‘imiz 8 sm ni, nazorat variant oddiy sharoitdagi urug‘imiz 5 sm ni tashkil qildi. Shundan so‘ng biz har kuniga toproq namligini

tekshirib 70% dan kam bo‘lmagan holatda tajribamizni davom etdirdik. 15 kundan so‘ng kochatlarimiz xona haroratiga moslashgan holatda o‘sib rivojlanganligini ko‘rdik. Shundan so‘ng sovitilgan urug‘imizning balandligi va barglar sonini tekshirdik. Balandligi 21 sm hamda barglar soni 3 ta, qizdirilgan urug‘imizdan unib chiqqan kochatlarimiz balandligi 14 sm va barglar soni 2 ta ekanligini hamda oddiy sharoitda o‘stirilgan urug‘imiz balandligi 8 sm hamda barglar soni 2 ta ga yetganligini kuzatdik.

Ushbu tajriba natijasida urug‘lar turli ishlov berish orqali vegetatsiya davrini qisqartirish mumkin ekanligini va bu usullarni keng qo‘llash orqali qishloq xo‘jaligi ekinlari hosillalarini muddatdan avval yig‘ib-terib olishlimiz mumkin. Bu usullarni qo‘llash orqali urug‘larning unuvchanligini oshirish, o‘simlikning barvaqt pishib yetilishiga erishishimiz mumkin. Shu orqali qishloq xo‘jaligi ekiunlaridan olinadigan hosildorlikni 10-20% gacha oshirishga erishish mumkin.

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OCCURRENCE OF INTESTINAL PARASITIC INFECTIONS IN PATIENTS WITH HIV INFECTION

Abstract. *Intestinal parasitic infections are among the most frequent opportunistic infections in individuals living with HIV, particularly in regions with poor sanitation and limited access to medical care. These infections contribute significantly to morbidity and mortality by causing chronic diarrhea, malabsorption, and progressive weight loss. The prevalence and spectrum of intestinal parasites in HIV-positive patients vary according to geographic location, immune status, and antiretroviral therapy (ART) coverage. This review summarizes current data on the epidemiology, etiology, diagnostic methods, and preventive strategies of intestinal parasitic infections in HIV-infected individuals, with a special focus on emerging diagnostic tools and regional perspectives.*

Keywords: *HIV infection, intestinal parasites, opportunistic infections, diarrhea, immunodeficiency, protozoa, epidemiology.*

Introduction. Human Immunodeficiency Virus (HIV) infection remains a global health challenge, predisposing individuals to a wide range of opportunistic infections. Among these, intestinal parasitic infections represent a major cause of chronic diarrhea and malnutrition in immunocompromised patients, particularly in developing countries [1]. The prevalence of intestinal parasites in HIV-positive populations varies between 30–80% depending on hygiene conditions, diagnostic facilities, and immune status [2]. Opportunistic protozoa such as Cryptosporidium parvum, Isospora belli, Cyclospora cayetanensis, and Microsporidia species are the leading causes of enteric infections, while helminths such as Strongyloides stercoralis and Ascaris lumbricoides are also observed.

Epidemiology and risk factors. In low- and middle-income countries, intestinal parasitic infections are strongly linked with contaminated water sources, inadequate sanitation, and limited healthcare infrastructure [3]. In sub-Saharan Africa and Central Asia, including Uzbekistan, studies have shown a high prevalence of protozoan infections among HIV-positive patients, particularly in individuals with CD4+ T-cell counts below 200 cells/μL. Poor nutritional status and late initiation of ART further exacerbate susceptibility to intestinal parasitic diseases. Coinfection with intestinal parasites accelerates immune deterioration and increases viral replication, thereby worsening HIV progression. Conversely, effective ART and immune reconstitution significantly reduce the prevalence and severity of these infections.

Etiological agents and clinical manifestations. The most frequently reported protozoa in HIV-infected patients include Cryptosporidium spp., Giardia lamblia, Entamoeba histolytica, and Isospora belli [4]. Cryptosporidium is particularly important due to its high infectivity and resistance to common disinfectants. It causes prolonged, profuse watery diarrhea, abdominal pain, and dehydration.

Isospora belli and Cyclospora cayetanensis also lead to chronic diarrhea, with relapsing episodes despite treatment. Microsporidia infections often occur in patients with severe immunodeficiency and can disseminate beyond the intestinal tract. Helminthic infections such as Strongyloides stercoralis may lead to severe hyperinfection syndrome in advanced HIV infection.

Clinically, chronic diarrhea lasting more than one month, weight loss, and electrolyte imbalance are the main manifestations of parasitic infections in HIV-positive individuals [5,8].

Diagnosis and laboratory methods. The diagnosis of intestinal parasites in HIV-positive patients requires a combination of conventional microscopy, immunoassays, and molecular methods.

Traditional stool examination using concentration techniques (formalin–ether sedimentation, modified Ziehl–Neelsen stain) remains widely used in resource-limited settings. However, sensitivity is limited, particularly in cases of low parasite burden.

Modern molecular tools, including polymerase chain reaction (PCR), real-time PCR, and multiplex PCR, significantly improve detection accuracy for Cryptosporidium, Microsporidia, and Isospora species [6,9].

Immunofluorescence assays and enzyme-linked immunosorbent assays (ELISA) are also valuable for identifying specific parasite antigens in stool samples.

Prevention and control strategies. Prevention of intestinal parasitic infections in HIV-positive individuals involves a combination of public health and clinical interventions. Key strategies include:

Ensuring access to clean water and adequate sanitation;

Promoting personal hygiene and food safety education;

Routine stool screening of HIV-positive patients, especially those with CD4+ counts below 200 cells/μL;

Early initiation of ART to restore immune function and reduce the risk of opportunistic infections [7,10,11].

Chemoprophylaxis is not routinely recommended for most intestinal parasites; however, timely diagnosis and specific antiparasitic therapy (e.g., nitazoxanide for cryptosporidiosis, trimethoprim-sulfamethoxazole for isosporiasis) are critical for effective management.

Conclusion

Intestinal parasitic infections remain an important cause of morbidity in HIV-infected individuals, particularly in developing countries. Regular stool examinations, the use of molecular diagnostic methods, and the implementation of ART are essential components of an integrated approach to reduce disease burden.

Strengthening laboratory capacity and public health awareness is crucial for early detection and prevention of these infections.

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AUTOIMMUN GEPATITNI ERTA TASHXISLASHDA LABORATOR TEKSHIRUVLARNING ROLI

Annotatsiya:*Autoimmun gepatit (AIG) — bu immun tizimi tomonidan jigar hujayralarining o'ziga qarshi yo'naltirilgan surunkali yallig'lanishli jarayoni bilan kechuvchi kasallik bo'lib, u kech bosqichda jigar sirrozi va yetishmovchiligiga olib kelishi mumkin. Kasallikning klinik belgilari ko'pincha nonspecifik bo'lgani uchun erta tashxis qo'yish asosan laborator tekshiruvlarga tayanadi. Ushbu maqolada AIGni erta bosqichda aniqlashda biokimyoviy (aminotransferazalar, bilirubin, jigar fermentlari), immunologik (immunoglobulin G, autoantikorlar — ANA, ASMA, LKM1, SLA) va morfologik (biopsiya) laborator ko'rsatkichlarning diagnostik ahamiyati keng yoritilgan.*

Tahlil natijalari shuni ko'rsatadiki, aminotransferazalar va IgG darajasining o'zgarishi, autoantikorlarga ijobiy natijalar bilan birgalikda baholanganda, AIGni erta bosqichda aniqlash imkoniyati 90 % gacha oshadi. Shu bilan birga, virusli va toksik gepatitlardan differensial tashxis, laborator testlar ketma-ketligi va monitoringning amaliy ahamiyati ko'rib chiqilgan. Maqolada zamonaviy diagnostika algoritmi va amaliy tavsiyalar asosida O'zbekiston sharoitida AIGni erta aniqlash strategiyasi ishlab chiqilgan.

Kalit so'zlar: *autoimmun gepatit; laborator diagnostika; erta tashxis; aminotransferazalar; immunoglobulin G (IgG); autoantikorlar (ANA, ASMA, LKM-1, SLA); jigar biopsiyasi; jigar fermentlari; immunologik markerlar; klinik diagnostika strategiyasi.*

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THE ROLE OF LABORATORY INVESTIGATIONS IN THE EARLY DIAGNOSIS OF AUTOIMMUNE HEPATITIS

Abstract:*Autoimmune hepatitis (AIH) is a chronic inflammatory liver disease caused by an immune-mediated attack on hepatocytes, which, if diagnosed late, can progress to cirrhosis and liver failure. Because the clinical manifestations of AIH are often nonspecific, early diagnosis relies primarily on laboratory investigations.*

This article comprehensively analyzes the diagnostic value of biochemical (aminotransferases, bilirubin, liver enzymes), immunological (immunoglobulin G, autoantibodies – ANA, ASMA, LKM1, SLA), and morphological (liver biopsy) markers in the early detection of AIH.

The analysis shows that a combined evaluation of aminotransferase levels, elevated IgG concentration, and positive autoantibody profiles increases the likelihood of early diagnosis up to 90%. In addition, the paper discusses differential diagnosis from viral and toxic hepatitis, the logical sequence of laboratory testing, and the importance of dynamic monitoring. Based on contemporary diagnostic algorithms and international clinical recommendations, a strategy for early detection of AIH adapted to the healthcare context of Uzbekistan is proposed.

Keywords: *autoimmune hepatitis; laboratory diagnosis; early detection; aminotransferases; immunoglobulin G (IgG); autoantibodies (ANA, ASMA, LKM-1, SLA); liver biopsy; liver enzymes; immunological markers; clinical diagnostic strategy.*

Kirish

Autoimmun gepatit (AIG) — bu jigar hujayralariga immun tizimi tomonidan hujum qilinishi bilan tavsiflanadigan, etiologiyasi to‘liq aniqlanmagan surunkali yallig‘lanishli jigar kasalligi hisoblanadi. AIG ko‘pincha ayollarda uchraydi va klinik jihatdan turlicha kechadi — ba’zi bemorlarda asemptomatik shaklda, boshqalarida esa o‘tkir gepatitga o‘xshash og‘ir klinik belgilar bilan namoyon bo‘ladi.

Amerika jigar kasalliklari assotsiatsiyasi [8] ma’lumotlariga ko‘ra, AIG umumiy jigar kasalliklari orasida 5–10 % holatni tashkil etadi va o‘z vaqtida aniqlanmasa, erta fibroz, keyinchalik cirroz va jigar yetishmovchiligi rivojlanishiga olib keladi. Biotexnologiya Markazi mutaxassislarining so‘nggi hisobotlarida AIG patogenezida genetik moyillik (HLA-DR3, DR4 allellari), virusli infeksiya, gormonlar, ekologik omillar va immun regulyatsiyaning buzilishi birgalikda ta’sir etishi ta’kidlangan.

Kasallikning erta bosqichlarida simptomlar odatda nonspetsifik bo‘lib, bemorda charchoq, ishtahaning pasayishi, dispeptik belgilar, ba’zida teri va skleralarda yengil sarg‘ayish kuzatiladi. Shu sababli AIG ko‘pincha virusli, alkogolli yoki dori bilan bog‘liq gepatitlar bilan adashtiriladi. PMC [5] tahlillariga ko‘ra, tashxis kech qo‘yilgan bemorlarda 40 % hollarda jigar to‘qimasida allaqachon fibroz-cirroz jarayoni boshlangan bo‘ladi.

Erta tashxis qo‘yishning asosiy vositasi — laborator diagnostika bo‘lib, u kasallikning immun mexanizmini, faoliyat darajasini va davolashga javobini baholash imkonini beradi. Laborator testlar nafaqat AIGni aniqlash, balki boshqa etiologik jigar kasalliklarini differensial tashxis qilishda ham hal qiluvchi ahamiyatga ega.

Laborator tekshiruvlarning roli va diagnostik bosqichlari

Autoimmun gepatit (AIG) diagnostikasida laborator tekshiruvlar asosiy o‘rin tutadi. Bu testlar yordamida kasallikning immunologik tabiati, faollik darajasi,

differensial tashxis va davolash samaradorligi aniqlanadi. AASLD (2023) ma’lumotlariga ko‘ra, AIG tashxisining 60–70 % hollari dastlab laborator tekshiruvlarda aniqlanadi, klinik simptomlar esa keyinchalik aniqlanadi. Shuning uchun laborator tekshiruvlar nafaqat diagnostika, balki erta aniqlash va monitoring tizimining poydevori hisoblanadi.

Biokimyoviy jigar testlari

Eng birinchi bosqich — jigar fermentlari faolligini aniqlashdir. Aspartat aminotransferaza (AST) va alanin aminotransferaza (ALT) AIGning eng sezgir, ammo nisbatan nonspecifik markerlaridir. Ularning darajasi odatda me’yorning 5–15 martagacha oshadi, ammo ba’zan erta bosqichda 1,5–2 martalik oshish ham kuzatiladi. Biotexnologiya markazining 2024 yilgi kuzatuv ma’lumotlariga ko‘ra, AIG bilan kasallangan bemorlarning 92 % ida AST/ALT ko‘tarilishi qayd etilgan, ammo 8 % holatlarda bu ko‘rsatkich me’yorda qolgan.

Aminotransferazalarning oshishi jigar hujayralari nekrozini aks ettiradi, lekin faqat shu asosda tashxis qo‘yish mumkin emas. Shuning uchun keyingi bosqichda qo‘shimcha biokimyoviy testlar o‘tkaziladi: umumiy va to‘g‘ridan-to‘g‘ri bilirubin, alkali fosfataza (ALP), gamma-glutamiltranspeptidaza (GGT), protrombin va albumin darajalari. AIGda ALP ko‘pincha normal yoki biroz oshgan bo‘ladi, bu esa xolestatik kasalliklardan farqlashga yordam beradi.

Immunoglobulinlar va giper-gammaglobulinemiya

Autoimmun gepatitda IgG sinfidagi immunoglobulinlar darajasi yuqori bo‘lishi — kasallikka xos belgidir. AASLD va EASL (2022) tavsiyalarida IgG > 1,1 × me’yordan oshsa, AIG uchun diagnostik mezon sifatida qabul qilinadi. IgG darajasi AIG tip 1 da 90–95 % bemorlarida, tip 2 da esa 80 % atrafida oshadi. IgM yoki IgA oshishi, odatda, boshqa jigar kasalliklariga xos (masalan, PBC yoki alkogolli gepatit).

IgG darajasini o‘lchash kasallik faolligini baholash va immunosupressiv terapiyaga javobni kuzatish uchun ham ishlatiladi. Masalan, prednizolon yoki azatioprin bilan davolash natijasida IgG pasayishi klinik yaxshilanishning erta belgisi bo‘lishi mumkin.

Autoantikorlarga serologik testlar

Serologik testlar AIG diagnostikasining asosiy immunologik komponenti hisoblanadi. Ular kasallikning immun tizim tomonidan qo‘zg‘atilganligini tasdiqlaydi.

- **ANA (antinuklear antitelo)** — AIG 1 tipida 80 % hollarda ijobiy bo‘ladi.
- **ASMA (anti-smooth muscle antibody)** — taxminan 63 % hollarda musbat natija beradi.
- **Anti-LKM-1 (liver-kidney microsomal antibody)** — AIG 2 tipi uchun xos bo‘lib, bolalarda ko‘proq uchraydi.
- **Anti-SLA/LP (soluble liver antigen/liver pancreas antibody)** — eng yuqori spesifik marker (taxminan 95–100 % xususiylik).

Biroq bu antikorlarning yo‘qligi AIGni butunlay inkor etmaydi. Seronegativ autoimmun gepatit (ANA-, ASMA- va LKM-) holatlari 10–15 % bemorlar orasida

uchraydi.[9] tadqiqotlariga ko‘ra, bunday holatlarda tashxis IgG va histologik belgilar asosida tasdiqlanadi.

Histologik tekshiruv va biopsiya bilan bog‘liq laborator rol

AIGni to‘liq tasdiqlash uchun jigar biopsiyasi o‘tkaziladi. Laborator testlar biopsiyaga yo‘llovchi asosiy bosqich sifatida xizmat qiladi. Biopsiyada limfoplazmositar infiltratsiya, portal traktlarda hujayra destruksiyasi va “interface hepatitis” belgilarining aniqlanishi diagnostik mezon hisoblanadi. Biopsiya, shuningdek, laborator testlarda aniqlangan holatning jiddiyligini baholash va boshqa etiologik sabablardan (masalan, virusli B yoki C gepatit, steatohepatit) farqlashda zarur.

Differensial diagnostik laborator ko‘rsatkichlar

Laborator ko‘rsatkichlar yordamida quyidagi kasalliklardan farqlash amalga oshiriladi:

Virusli gepatitlar (HBV, HCV, HEV) — virus markerlari (HBsAg, anti-HCV) yordamida chiqarib tashlanadi. **Dori-induktsiyalangan jigar shikastlanishi** — dori qabul tarixi va eozinofiliya bilan farqlanadi. **Metabolik kasalliklar (Wilson kasalligi, hemoxromatoz)** — seruloplazmin, mis, ferritin, transferrin saturatsiyasi orqali baholanadi. **Alkogolli gepatit** — gamma-GT va MCV oshishi, lekin autoantitel yo‘qligi bilan ajraladi. Differensial diagnostika uchun laborator testlar majmuasi har doim klinik ko‘rinish va anamnez bilan birgalikda baholanadi.

Diagnostik algoritm bosqichlari **I-bosqich** – jigar fermentlari oshgan bemorlarni aniqlash (AST, ALT, bilirubin). **II-bosqich** – IgG va γ-globulinlarni o‘lchash; agar yuqori bo‘lsa, AIG ehtimoli oshadi. **III-bosqich** – autoantikorlarga test (ANA, ASMA, anti-LKM1, anti-SLA). **IV-bosqich** – virusli gepatitlar, metabolik va dori sabablarini chiqarib tashlash. **V-bosqich** – biopsiya orqali histologik tasdiqlash. Har bir bosqich ketma-ket bajarilganda, AIG tashxisining aniqligi 95 % gacha oshadi[3].

Laborator monitoringning ahamiyati

AIG tashxis qo‘yilgach, laborator testlar monitoring uchun ham muhim ahamiyat kasb etadi. Terapiya (prednizolon ± azatioprin) fonida AST/ALT normallashuvi, IgG kamayishi va autoantitel titrining pasayishi bemorning remissiyaga kirganligini ko‘rsatadi. Aksincha, ularning qayta oshishi relaps belgisi hisoblanadi.

Shuningdek, davo davomida qon morfologiyasi, glyukoza, elektrolitlar, kreatinin, leykosit va trombotsitlar monitoringi ham zarur, chunki immunosupressiv preparatlar (ayniqsa azatioprin) gematologik asoratlarni chaqirishi mumkin.

Zamonaviy laborator texnologiyalar

So‘nggi yillarda autoimmun gepatit diagnostikasida molekulyar-biotexnologik yondashuvlar joriy etilmoqda.

- **Multiplex-ELISA** tizimlari orqali bir vaqtning o‘zida bir necha autoantitel tahlil qilinadi.
- **Rekombinant antigen-platformalar** yordamida anti-SLA, anti-LC1 va boshqa markerlar aniqlanadi.

• **Proteomika** asosidagi testlar yordamida yangi immun markerlar (masalan, CYP2D6, FTCD antigenlar) o‘rganilmoqda.

Biotexnologiya markazining 2024 yilgi hisobotiga ko‘ra, ushbu texnologiyalar AIGni erta (subklinik) bosqichda aniqlash aniqligini 15–20 % ga oshirgan.

ERTA TASHXISLASHDAGI LABORATOR TESTLAR TAVSIFI

Autoimmun gepatit (AIG)ni erta bosqichda aniqlash klinik amaliyotda alohida ahamiyat kasb etadi. Chunki kasallikning dastlabki bosqichlarida klinik belgilar sust yoki nonspecifik bo‘lib, bemorlar ko‘pincha kech murojaat qiladi. Shu sababli, laborator tekshiruvlar erta diagnostika jarayonida “ko‘zgu” vazifasini bajaradi — ular immun tizimda sodir bo‘layotgan patologik jarayonlarni klinik simptomlar paydo bo‘lishidan ancha oldin aniqlash imkonini beradi.

Aminotransferazalar (ALT va AST)

Erta tashxislashda birinchi baholanadigan laborator ko‘rsatkichlardan biri — bu jigar fermentlari faolligi, xususan, alanin (ALT) va aspartat (AST) aminotransferazalardir. AIGda bu fermentlar jigar hujayralarining nekroz va yallig‘lanish natijasida plazmaga chiqishi tufayli oshadi. Ko‘plab tadqiqotlarda (PMC, 2023) erta bosqichdagi AIG bilan kasallangan bemorlarning 80 % da ALT va AST me’yordan 1,5–3 marta yuqori aniqlangan. Biroq virusli yoki toksik gepatitlardan farqli ravishda, AIGda aminotransferaza ko‘rsatkichlari ko‘pincha keskin emas, balki mo‘tadil darajada oshadi. Shu sababli, bu parametrlarning nisbatan past, ammo barqaror oshishi — erta autoimmun jarayonning muhim laborator signali hisoblanadi.

AST/ALT nisbatining tahlili ham tashxisda ahamiyatli: AIGda u odatda 1 ga yaqin yoki biroz past bo‘ladi, bu esa alkogolli gepatitdagi kabi AST/ALT > 2 nisbatidan farqli. Shunday qilib, aminotransferazalar erta laborator skrining uchun yuqori sezuvchan, ammo past spesifik marker sifatida baholanadi.

Immunoglobulin G (IgG) darajasi

Autoimmun gepatitning immunopatogenezida B-limfotsitlar va plazmatik hujayralarning giperfaolligi natijasida IgG darajasi ortadi. IgG — bu AIG uchun eng muhim erta laborator markerlardan biridir. EASL (2022) qo‘llanmasida ta’kidlanishicha, AIGda IgG darajasining me’yordan 1,1–1,5 marta oshishi kasallik faolligini bildiradi, garchi klinik belgilar hali namoyon bo‘lmagan bo‘lsa ham.

IgG oshishi AIGning immun mexanizmini ko‘rsatadi va u bilan birga boshqa sinfdagi immunoglobulinlar (IgM, IgA) ko‘tarilmasligi kasallikni PBC (birlamchi biliar sirroz) yoki alkogolli gepatitdan farqlashga yordam beradi. Bundan tashqari, IgG monitoringi davolanish jarayonida ham muhim: kortikosteroidlar fonida IgG normallashuvi immun javobning susayishini va bemorda klinik remissiyaning boshlanishini ko‘rsatadi.

Autoantikorlarga serologik tekshiruvlar

Autoantikorlarga tekshiruv AIGning eng asosiy immunodiagnostik bosqichi hisoblanadi. Bu testlar immun tizimning jigar to‘qimasiga qarshi ishlab chiqayotgan maxsus antitelalarini aniqlashga imkon beradi.

• **ANA (Antinuklear antitelalar)**: AIG tip 1 uchun eng sezgir marker bo‘lib, bemorlarning 80 % ida aniqlanadi. ANA ko‘pincha “speckled” yoki “homogeneous” nuklear bo‘yoqlanish patterni bilan ifodalanadi.

• **ASMA (Anti-smooth muscle antitelalar)**: taxminan 60–70 % bemorlarda musbat bo‘lib, ular aktin filamentlariga qarshi yo‘naltirilgan. ASMA va ANA birgalikda aniqlansa, tashxis ehtimoli sezilarli darajada ortadi.

• **Anti-LKM1 (Liver-kidney microsomal antibody)**: bu marker AIG 2 tipiga xos bo‘lib, ayniqsa bolalarda va o‘smir yoshdagi bemorlarda uchraydi.

• **Anti-SLA/LP (Soluble liver antigen/liver pancreas antibody)**: eng yuqori spetsifiklikka ega (95–100 %) laborator marker bo‘lib, boshqa testlar manfiy chiqqan hollarda ham tashxisni tasdiqlashi mumkin.

Bu autoantikorlardan birortasining mavjudligi erta bosqichda tashxis qo‘yish uchun kuchli asos bo‘lib xizmat qiladi. Shu bilan birga, seronegativ AIG holatlari ham mavjud bo‘lib (10–15 %), bunday vaziyatlarda IgG darajasi va jigar biopsiyasi yordamchi diagnostik mezon sifatida qaraladi.

Jigar funktsional ko‘rsatkichlari

AIGning erta bosqichida umumiy bilirubin, ALP (alkali fosfataza) va GGT (gamma-glutamiltransferaza) ko‘rsatkichlari odatda me’yor chegarasida yoki biroz oshgan bo‘ladi. Bu holat xolestatik gepatitlardan farqli belgidir. Albumin darajasi odatda erta bosqichda pasaymaydi, ammo kech bosqichda jigar sintez faoliyatining kamayishi bilan kamayishi mumkin.

Jigar funksional testlarining bunday nisbiy barqarorligi laborator tahlilchilarni xato xulosaga olib kelmasligi lozim — bu AIGning aynan erta, klinik jihatdan “sokin” fazasini aks ettiradi.

Histologik va molekulyar tekshiruvlar bilan uyg‘unlik

Laborator testlar natijasi ko‘p hollarda biopsiya bilan tasdiqlanadi. Agar ALT/AST va IgG oshgan bo‘lsa, autoantitel mavjud bo‘lsa, jigar biopsiyasi orqali portal zonalarda limfoplazmositar infiltratsiya va “interface hepatitis” belgilarining aniqlanishi tashxisni mustahkamlaydi. Biopsiya laborator topilmalarni morfologik dalil bilan birlashtiradi, bu esa tashxisning aniqligini oshiradi.

So‘nggi yillarda biotexnologik laboratoriyalar tomonidan ishlab chiqilgan **multiplex-ELISA** va **rekombinant antigen testlari** AIG diagnostikasini yanada erta bosqichda amalga oshirish imkonini berdi. Bu texnologiyalar bir vaqtning o‘zida bir necha autoantikorlarga (ANA, ASMA, SLA, LKM1) qarshi antitelalarni aniqlaydi, bu esa klassik serologik testlarga nisbatan aniqlikni 15–20 % ga oshiradi.

Laborator testlar kombinatsiyasi – diagnostik aniqlik mezoni

Yagona test bilan AIGni to‘liq aniqlash mumkin emas. Shuning uchun laborator markerlar kombinatsiyasi eng ishonchli usul hisoblanadi. Quyidagi triada erta tashxis uchun diagnostik qiymatga ega:

1. **ALT/AST darajasining me’yordan yuqoriligi (≥ 1,5 × ULN)**
2. **IgG darajasining oshishi (≥ 1,1 × ULN)**
3. **Hech bo‘lmaganda bitta autoantitel (ANA, ASMA, LKM1 yoki SLA) ijobiyligi**

Ushbu uchlik mavjud bo‘lsa, AIG ehtimoli 85–95 % atrofida baholanadi.

DIAGNOSTIKA STRATEGIYASI

Autoimmun gepatit (AIG) diagnostikasi bosqichma-bosqich, izchil yondashuvni talab etadi. Chunki bu kasallik klinik jihatdan o‘ziga xos bo‘lmagan belgilar bilan kechadi, laborator ko‘rsatkichlar esa boshqa gepatit turlarida ham o‘xshash tarzda o‘zgarishi mumkin. Shuning uchun tashxis qo‘yishda faqat bitta test natijasiga emas, balki kompleks diagnostika algoritmiga asoslanish zarur. Diagnostik strategiya uch asosiy yo‘nalishni o‘z ichiga oladi: klinik baholash, laborator-immunologik tahlil va histologik tasdiqlash.

Klinik bosqich – kasallikka shubha uyg‘otuvchi belgilar

AIG klinik jihatdan juda turlicha kechadi: ayrim bemorlarda toliqish, ishtahaning pasayishi, qorin sohasida og‘irlik, bo‘shashish, ba’zida terining sarg‘ayishi kabi yengil nonspecifik belgilar bo‘ladi. Ayrim hollarda esa bemorlar faqat qon biokimyoviy tahlilidagi transaminaza oshganini ko‘rib, shifokorga murojaat qiladi. Shu bois, diagnostikaning birinchi bosqichida shifokor virusli yoki toksik sabablar bo‘lmagan, lekin jigar fermentlari oshgan har bir holatda AIG ehtimolini ko‘rib chiqishi kerak.

AASLD (2023) tavsiyasiga ko‘ra, AIG ehtimoli quyidagi hollarda yuqori bo‘ladi:

- aminotransferazalar (ALT, AST) sababsiz oshganida;
- IgG yoki γ-globulinlar darajasi me’yordan yuqori bo‘lsa;
- autoimmun kasalliklarga (tiroidit, revmatoid artrit, 1-tip diabet) ega bemorlarda jigar fermentlari oshgan bo‘lsa;
- virusli gepatit markerlari (HBsAg, anti-HCV) manfiy chiqqan hollarda.

Shu bosqichda to‘plangan klinik ma’lumotlar laborator tekshiruvlarni tanlash va talqin etishda yo‘l-yo‘riq beradi.

Laborator-immunologik bosqich – asosiy tashxis vositasi

Laborator testlar AIG diagnostikasining markaziy halqasidir. Ular yordamida immun jarayonning mavjudligi, faolligi va yo‘nalishi aniqlanadi.

Jigar fermentlari ALT va AST faolligining oshishi deyarli har doim kuzatiladi. Ammo virusli gepatitlarda bu ko‘rsatkichlar odatda keskin oshsa (10–20 barobar), AIGda o‘rtacha (3–10 barobar) yoki hatto ozgina oshish kuzatiladi. Shu sababli, o‘rtacha ko‘tarilgan aminotransferazalar AIGni istisno qilmaydi, balki aksincha, erta bosqich belgisi bo‘lishi mumkin.

Immunoglobulinlar IgG darajasining oshishi — AIG uchun eng muhim immun-biokimyoviy ko‘rsatkichlardan biridir. AASLD va EASL ma’lumotlariga ko‘ra, IgG me’yordan 1,1–1,5 marta oshsa, bu kasallikning faol immun jarayon boshlanganini ko‘rsatadi. Boshqa sinflardagi immunoglobulinlar (IgM, IgA) ko‘tarilmagani bu belgining o‘ziga xosligini oshiradi.

Autoantitel aniqlash autoantikorlar AIG tashxisining immunologik “imzosi” hisoblanadi.

- ANA (antinuklear antitel) va ASMA (anti-silliq mushak antitel) AIG-1 tipini ko‘rsatadi.
- Anti-LKM-1 esa AIG-2 tipiga xos bo‘lib, bolalar va o‘smirlarda uchraydi.

• Anti-SLA/LP esa eng yuqori spesifik marker hisoblanadi (95–100 % aniqlik bilan).

Bu antikorlarning yo‘qligi kasallikni istisno qilmaydi: seronegativ AIG holatlari 10–15 % bemorlarda aniqlanadi. Bunday vaziyatda IgG va biopsiya natijalari diagnostik mezon sifatida ahamiyatli bo‘ladi.

Virusli gepatitlarni istisno qilish virusli gepatit B va C ko‘rsatkichlari (HBsAg, anti-HCV, HCV-RNA, HBV-DNA) majburiy tekshiriladi. Virus markerlari manfiy bo‘lsa, AIG ehtimoli sezilarli darajada ortadi. Shu sababli AIG diagnostikasi har doim virusli tahlillar bilan parallel olib boriladi.

Metabolik va dori sabablarini chiqarish Wilson kasalligi (seruloplazmin, 24 soatlik siydikdagi mis), gemoxromatoz (ferritin, transferrin saturatsiyasi), va dori-induktsiyalangan gepatit (anamnezda dori qabul tarixi) imkoniyatlari baholanadi. Agar bular aniqlanmasa, immun gepatit tashxisi kuchayadi.

Histologik bosqich – yakuniy tasdiqlovchi mezon

Laborator testlar kasallikni taxmin qiladi, biroq jigar biopsiyasi tashxisni tasdiqlaydi. Biopsiyada quyidagi o‘zgarishlar aniqlanadi:

• portal traktlarda limfoplazmositar infiltratsiya;

• “interface hepatitis” – yallig‘lanish jarayoni portal hududdan parenximaga o‘tgan;

• gepatotsitlarda rozetka hosilasi (rosette formation);

• fibroz yoki boshlang‘ich cirrotik o‘zgarishlar.

Biopsiya AIGni boshqa kasalliklardan farqlashda ham yordam beradi, masalan, PBC (birlamchi biliar sirroz) yoki steatohepatitda infiltrat tarkibi va lokalizatsiyasi farq qiladi. Ma’lumotlariga ko‘ra, laborator va histologik belgilarni birgalikda baholash tashxis aniqligini 92–95 % gacha oshiradi.[9]

Diagnostika algoritmi (bosqichma-bosqich yondashuv)

Zamonaviy AIG tashxis algoritmi quyidagi izchil bosqichlarni o‘z ichiga oladi:

1. **Boshlang‘ich baholash:** AST/ALT, bilirubin, ALP, GGT kabi jigar testlarini o‘tkazish.
2. **Immunologik skrining:** IgG darajasi va γ-globulinlarni baholash.
3. **Autoantikorlarni aniqlash:** ANA, ASMA, anti-LKM1, anti-SLA.
4. **Virusli markerlarni tekshirish:** HBV, HCV, HAV, HEV testlari.
5. **Metabolik sabablardan istisno:** seruloplazmin, ferritin, transferrin saturatsiyasi, dori tarixi.
6. **Biopsiya:** histologik tasdiq va faollik darajasini baholash.
7. **Tashxis balli tizimi (IAIHG)** orqali umumiy baho: AIG uchun 6 balldan ortiq bo‘lsa, tashxis “aniq” deb hisoblanadi.

Integratsiyalashgan yondashuvning ahamiyati

Zamonaviy diagnostika strategiyasi bir nechta laborator natijalarni o‘zaro taqqoslashga asoslanadi. Masalan:

• IgG oshgan, ANA/ASMA ijobiy, ammo virus markerlari manfiy — AIG ehtimoli yuqori.

• ALT/AST oshgan, IgG normal, ANA manfiy — dori yoki steatohepatit ehtimoli.

• ALT/AST o‘rta darajada oshgan, IgG biroz oshgan, autoantitel manfiy — seronegativ AIG ehtimoli.

Shunday qilib, AIG tashxisi uchun yagona “oltin standart” test yo‘q, balki klinik-laborator kompleks baho zarur. Biotexnologiya markazi (2024) ma’lumotlariga ko‘ra, bu yondashuv bilan erta tashxis qo‘yilgan bemorlarning 85 % ida 6 oy ichida klinik remissiyaga erishilgan.

Diagnostik strategiyaning maqsadi va natijasi

AIGni erta tashxislash strategiyasi faqat kasallikni aniqlash uchun emas, balki uning prognozini yaxshilash uchun ham muhimdir. Chunki erta aniqlangan AIG bemorlarda immunosupressiv terapiya (prednizolon, azatioprin) yordamida to‘liq remissiyaga erishish ehtimoli 80 % dan ortiq. Kech aniqlangan, fibroz rivojlangan holatlarda esa bu ko‘rsatkich 40–50 % gacha tushadi.

Shu sababli, AIG diagnostikasining strategik maqsadi — **aminotransferazalar oshgan har bir bemorda autoimmun etiologiyani istisno qilmaslik**, ya’ni oddiy laborator skriningda ham immunologik komponentni baholashni yo‘lga qo‘yishdan iboratdir.

O‘zbekiston sog‘liqni saqlash tizimida ham bunday integratsiyalashgan yondashuv — jigar kasalliklari bo‘yicha laborator skrining algoritmiga autoimmun markerlarni kiritish — AIGni erta aniqlash samaradorligini oshiradi va jigar sirrozi holatlarini kamaytirishga xizmat qiladi.

Amaliy tavsiyalar

Autoimmun gepatit (AIG)ni erta bosqichda aniqlash klinik amaliyotda muhim ahamiyat kasb etadi. Zamonaviy laborator diagnostika yondashuvlari orqali kasallikning immun patogenezini erta bosqichda aniqlash mumkin, bu esa davolash natijasini yaxshilaydi, jigar sirrozi va yetishmovchiligi rivojlanish xavfini kamaytiradi. Quyida klinik amaliyotda foydali bo‘ladigan asosiy tavsiyalar keltiriladi.[12]

Shubhali holatlarda laborator skriningni kechiktirmaslik

Jigar fermentlari (ALT, AST) oshgan har bir bemorda, hatto simptomlar bo‘lmasa ham, AIG ehtimoli ko‘rib chiqilishi kerak. Virusli va toksik sabablar chiqarib tashlanganidan so‘ng, bemorga **IgG darajasi** va **autoantikorlarga (ANA, ASMA, anti-LKM1, anti-SLA)** tahlil o‘tkazish tavsiya etiladi. AASLD (2023) ma’lumotlariga ko‘ra, bunday yondashuv erta tashxis qo‘yish ehtimolini 35–40 % ga oshiradi.

Laborator tahlil natijalarida:

• ALT yoki AST me’yoridan ≥1,5 marta yuqori;

• IgG me’yoridan ≥1,1 marta yuqori;

• kamida bitta autoantitel ijobiy bo‘lsa — AIG tashxisi taxmin qilinishi kerak.

Laborator testlarni kompleks talqin qilish

Birorta test natijasi yakka o‘zi tashxis qo‘yish uchun yetarli emas. Shuning uchun shifokor laborator natijalarni kompleks tarzda baholashi kerak. Masalan, faqat aminotransferazalar oshgan, ammo IgG normada bo‘lgan bemorlarda dori-

induktsiyalangan gepatit, yog‘li jigar yoki metabolik kasalliklar ehtimoli ko‘proq bo‘ladi. Aksincha, IgG va autoantikorlari ijobiy, lekin virus markerlari manfiy bo‘lgan bemorlarda AIG ehtimoli yuqori hisoblanadi.

Bunday kombinatsion baholash differensial diagnostikaning aniqligini oshiradi va keraksiz invaziv tekshiruvlardan (masalan, biopsiya) saqlanishga yordam beradi.

IgG monitoringi va autoantitel dinamikasini baholash

AIG tashxisi tasdiqlangan bemorlarda laborator monitoring muntazam olib borilishi lozim. Har 3–6 oyda quyidagilar nazorat qilinadi:

- AST, ALT va bilirubin darajalari;
- IgG konsentratsiyasi;
- autoantitel titrining dinamikasi (ANA, ASMA, SLA).

IgG pasayishi va transaminazalarning normallashuvi davo samaradorligini bildiradi. Aksincha, ularning qayta oshishi relaps xavfini ko‘rsatadi. Shuning uchun laborator monitoring — nafaqat tashxis, balki bemor holatini kuzatishning eng muhim vositasidir.

Virusli va metabolik gepatitlardan ajratish algoritmini joriy etish

Amaliyotda AIG ko‘p hollarda virusli B yoki C gepatiti bilan aralash tashxis qilinadi. Shu sababli har bir bemorda quyidagi ketma-ket algoritm tavsiya etiladi:

1. Virusli markerlarni (HBsAg, anti-HCV) tekshirish.
2. Agar manfiy bo‘lsa — IgG, ANA, ASMA, anti-LKM1 testlarini o‘tkazish.
3. Natijalar shubhali bo‘lsa — jigar biopsiyasi orqali tasdiqlash.
4. Wilson kasalligi, gemoxromatoz yoki dori ta’sirini chiqarib tashlash.

Bu algoritm differensial tashxisda xatoliklarni kamaytiradi va laborator resurslardan oqilona foydalanishga yordam beradi.[11]

AIGga shubha qilingan bemorlarni hepatolog yoki immunologga yo‘naltirish

Birlamchi bo‘g‘indagi (oilaviy shifokor, terapevt) mutaxassislar jigar fermentlari barqaror oshgan, ammo virus markerlari manfiy bo‘lgan bemorlarni hepatolog yoki immunologga yo‘naltirishi zarur. Bu bemorlarda autoimmun kasalliklar (tiroidit, 1-tip diabet, revmatoid artrit) bilan birgalikda AIG aniqlanishi ehtimoli yuqori. Bunday yo‘naltirish tizimi kasallikni kech bosqichda emas, balki immunologik faollik davrida aniqlashga imkon beradi.

AIG tashxisi qo‘yilgan bemorlarda davolash oldi baholashni o‘tkazish

Immunosupressiv terapiya boshlanishidan avval quyidagi laborator tahlillarni o‘tkazish tavsiya etiladi:

- to‘liq qon tahlili (eritrotsit, leykosit, trombotsitlar);
- buyrak va jigar funktsiyasi (kreatinin, ALT, AST, albumin, PT/INR);
- glyukoza va lipid profili;
- virus markerlari (HBV-DNA, HCV-RNA);
- homiladorlik testi (ayollar uchun).

Bu ko‘rsatkichlar asosida davo uchun xavfsiz va individual yondashuv tanlanadi.

Laborator markazlarda AIG uchun standart skrining panelini joriy etish

Biotexnologiya markazining 2024-yilgi tavsiyalariga ko‘ra, tibbiyot laboratoriyalarida “Autoimmun gepatit skrining paneli” ni yo‘lga qo‘yish samarali natija beradi. Ushbu panel quyidagilarni o‘z ichiga oladi:

- ALT, AST, bilirubin;
- IgG, IgM, IgA;
- ANA, ASMA, anti-LKM1, anti-SLA.

Bu yondashuv AIGni erta bosqichda aniqlashni 20–25 % ga yaxshilaydi va bemorlarni o‘z vaqtida mutaxassisga yo‘naltirishga imkon yaratadi.

Biopsiyadan oldin laborator “uchlik” bahosini o‘tkazish

Jigar biopsiyasi — invaziv usul bo‘lib, har doim ham zarur emas. Shu sababli biopsiyaga yo‘naltirishdan oldin quyidagi laborator “uchlik” baholanadi:

1. ALT/AST oshganmi?
2. IgG darajasi me’yordan yuqorimi?
3. Kamida bitta autoantitel aniqlanganmi?

Agar bu uch shartdan ikkitasi mavjud bo‘lsa, biopsiya o‘tkazish va AIGni tasdiqlash tavsiya etiladi. Bu metod klinik qarorlarni yanada asosli qiladi.

Immunosupressiv terapiya davrida laborator nazoratni yo‘lga qo‘yish

Prednizolon, metilprednizolon, azatioprin yoki mikofenolat mofetil kabi preparatlar bilan davolashda:

- har oyda AST, ALT, IgG, glyukoza, lipidlar, qon formulasi tekshiriladi;
- 6 oyda bir marta ANA/ASMA titrlari va ko‘rsatkichlar qayta baholanadi;
- agar laborator parametrlarda yomonlashuv kuzatilsa, doza qayta ko‘rib chiqiladi yoki dori almashtiriladi.

Bu yondashuv jigar faoliyatini himoya qiladi va terapiya xavfsizligini ta’minlaydi.

Mahalliy sog‘liqni saqlash tizimida erta laborator diagnostika dasturlarini kengaytirish

O‘zbekiston sharoitida jigar kasalliklari orasida AIG nisbatan kam tashxislanadi, bu esa laborator skrining cheklanganligi bilan bog‘liq. Shu sababli, oilaviy poliklinikalarda “autoimmun gepatitni erta aniqlash” dasturini joriy etish zarur. Bu dastur doirasida:

- dispanser hisobidagi bemorlarda har yili ALT/AST, IgG va autoantikor testlari o‘tkazilishi;
- shubhali natijalarda hepatologga yo‘naltirish;
- laborator mutaxassislar uchun AIG diagnostikasi bo‘yicha qisqa o‘quv kurslarini tashkil etish tavsiya etiladi.

Bu chora-tadbirlar erta tashxis qo‘yish, davolashni soddalashtirish va jigar sirrozi bilan yakunlanadigan holatlar sonini kamaytirishga xizmat qiladi.

Xulosa

Autoimmun gepatitni erta bosqichda aniqlash laborator testlarning to‘liq va maqsadli ishlatilishini talab etadi. Jigar aminotransferazalarining oshishi, IgG darajasining ko‘tarilishi va autoantikorlarga ijobiy natija — bularning har biri

AIGni taxmin qilishda muhim ko‘rsatkichdir. Ammo hech bir test alohida pathognomonik bo‘lmagani bois, differensial diagnostika va klinik holatni birgalikda baholash zarur. Erta tashxis va muddatli monitoring kasallik natijasini yaxshilashga xizmat qiladi. O‘zbek tibbiyot muhitida ham laborator-skrining strategiyasini taklif qilish va AIGni inkor etilgan holatlardan biri sifatida ko‘rib chiqish tavsiya etiladi.

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THE ROLE OF LABORATORY INVESTIGATIONS IN THE EARLY DIAGNOSIS OF AUTOIMMUNE HEPATITIS

Abstract: *Autoimmune hepatitis (AIH) is a chronic inflammatory liver disease caused by an immune-mediated attack on hepatocytes, which, if diagnosed late, can progress to cirrhosis and liver failure. Because the clinical manifestations of AIH are often nonspecific, early diagnosis relies primarily on laboratory investigations. This article comprehensively analyzes the diagnostic value of biochemical (aminotransferases, bilirubin, liver enzymes), immunological (immunoglobulin G, autoantibodies – ANA, ASMA, LKM1, SLA), and morphological (liver biopsy) markers in the early detection of AIH.*

The analysis shows that a combined evaluation of aminotransferase levels, elevated IgG concentration, and positive autoantibody profiles increases the likelihood of early diagnosis up to 90%. In addition, the paper discusses differential diagnosis from viral and toxic hepatitis, the logical sequence of laboratory testing, and the importance of dynamic monitoring. Based on contemporary diagnostic algorithms and international clinical recommendations, a strategy for early detection of AIH adapted to the healthcare context of Uzbekistan is proposed.

Keywords: *autoimmune hepatitis; laboratory diagnosis; early detection; aminotransferases; immunoglobulin G (IgG); autoantibodies (ANA, ASMA, LKM-1, SLA); liver biopsy; liver enzymes; immunological markers; clinical diagnostic strategy.*

Introduction

Autoimmune hepatitis (AIH) is a chronic inflammatory liver disease characterized by an immune-mediated attack on hepatocytes; its etiology has not been fully elucidated. AIH occurs more frequently in women and exhibits heterogeneous clinical presentations—ranging from asymptomatic forms to severe manifestations resembling acute hepatitis.

According to the American Association for the Study of Liver Diseases (AASLD) [8], AIH accounts for 5–10% of chronic liver diseases. If not recognized in a timely manner, it can lead to early fibrosis, subsequent cirrhosis, and liver failure. Recent reports from the Biotechnology Center emphasize the combined roles of genetic susceptibility (HLA-DR3, DR4), viral infections, hormones, environmental factors, and disturbed immune regulation in AIH pathogenesis.

At early stages, symptoms are usually nonspecific—fatigue, loss of appetite, dyspeptic complaints, and occasionally mild jaundice of the skin and sclerae.

Consequently, AIH is frequently misdiagnosed as viral, alcoholic, or drug-induced hepatitis. Analyses summarized in PMC [5] indicate that in 40% of patients with a delayed diagnosis, fibrosis–cirrhosis has already begun in liver tissue.

The cornerstone of early diagnosis is laboratory testing, which helps characterize the immune mechanism, activity of inflammation, and response to therapy. Laboratory studies are crucial not only for identifying AIH but also for differential diagnosis with other etiologies of liver disease.

Role of Laboratory Testing and Diagnostic Stages

Laboratory studies are central to AIH diagnosis. They determine the immunologic nature of disease, grade its activity, support differential diagnosis, and monitor treatment effectiveness. According to AASLD (2023), 60–70% of AIH cases are first detected through laboratory testing, with clinical symptoms recognized later. Thus, laboratory evaluation is the foundation for early detection and ongoing monitoring.

Biochemical Liver Tests

The first step is to assess hepatic enzyme activity. Aspartate aminotransferase (AST) and alanine aminotransferase (ALT) are the most sensitive—but relatively nonspecific—markers of AIH. Their levels typically rise to 5–15 times the upper limit of normal, though at an early stage increases may be only 1.5–2 times. The Biotechnology Center's 2024 observations report elevated AST/ALT in 92% of AIH patients, while 8% remain within normal limits.

Elevated aminotransferases reflect hepatocellular necrosis but are not sufficient alone for diagnosis; therefore, additional tests are performed: total and direct bilirubin, alkaline phosphatase (ALP), gamma-glutamyltransferase (GGT), prothrombin time, and albumin. In AIH, ALP is often normal or only mildly elevated, which helps distinguish AIH from cholestatic disorders.

Immunoglobulins and Hypergammaglobulinemia

An increased level of immunoglobulin G (IgG) is characteristic of AIH. AASLD and EASL (2022) guidelines consider IgG > 1.1 × the upper limit of normal a diagnostic criterion. IgG elevation occurs in 90–95% of type 1 AIH and about 80% of type 2 AIH. Elevations in IgM or IgA typically suggest other liver diseases (e.g., primary biliary cholangitis or alcoholic hepatitis).

Measuring IgG is also useful for activity assessment and treatment monitoring: a decline in IgG during therapy with prednisolone or azathioprine can be an early sign of clinical improvement.

Serologic Testing for Autoantibodies

Serologic assays form the core immunologic component of AIH diagnosis and confirm an immune-mediated process:

- **ANA (antinuclear antibodies):** positive in ~80% of type 1 AIH.
- **ASMA (anti–smooth muscle antibodies):** positive in ~63%.
- **Anti-LKM-1 (liver–kidney microsomal antibodies):** typical of type 2 AIH, seen more often in children.
- **Anti-SLA/LP (soluble liver antigen/liver–pancreas antibodies):** the most specific markers (≈95–100% specificity).

However, the absence of these antibodies does not exclude AIH. Seronegative AIH (ANA-, ASMA-, LKM-) is seen in 10–15% of patients [9]; in such cases, the diagnosis is supported by elevated IgG and characteristic histology.

Histologic Examination and the Laboratory's Role

Definitive confirmation of AIH requires liver biopsy. Laboratory findings guide the decision to biopsy. Histology typically demonstrates lymphoplasmacytic infiltration, portal tract injury, and features of "interface hepatitis." Biopsy also helps assess disease severity and differentiate AIH from other etiologies (e.g., hepatitis B or C, steatohepatitis).

Differential-Diagnostic Laboratory Indicators

Laboratory work-ups help distinguish AIH from:

- **Viral hepatitides (HBV, HCV, HEV):** excluded by viral markers (e.g., HBsAg, anti-HCV).
- **Drug-induced liver injury:** supported by medication history and eosinophilia.
- **Metabolic diseases** (Wilson's disease, hemochromatosis): evaluated by ceruloplasmin, copper, ferritin, and transferrin saturation.
- **Alcoholic hepatitis:** suggested by elevated GGT and MCV with absence of autoantibodies.

Laboratory panels must always be interpreted alongside the clinical picture and history.

Steps of the Diagnostic Algorithm

Stage I — Identify patients with elevated liver enzymes (AST, ALT, bilirubin).
Stage II — Measure IgG and γ-globulins; if elevated, AIH becomes more likely.
Stage III — Test autoantibodies (ANA, ASMA, anti-LKM-1, anti-SLA).
Stage IV — Exclude viral, metabolic, and drug-related causes.
Stage V — Confirm by biopsy and histology.

When performed sequentially, diagnostic accuracy may reach up to 95% [3].

Importance of Laboratory Monitoring

Once AIH is diagnosed, laboratory tests are essential for follow-up. On therapy (prednisolone ± azathioprine), normalization of AST/ALT, decline in IgG, and decreasing autoantibody titers indicate remission; renewed elevations suggest relapse.

In addition, complete blood count, glucose, electrolytes, creatinine, leukocytes, and platelets should be monitored during treatment, as immunosuppressants—particularly azathioprine—can cause hematologic adverse effects.

Modern Laboratory Technologies

In recent years, molecular-biotechnology approaches have been adopted for AIH diagnostics:

- **Multiplex ELISA** platforms enable simultaneous detection of several autoantibodies.

- **Recombinant antigen systems** facilitate detection of anti-SLA, anti-LC1, and other markers.
- **Proteomics-based assays** are being explored for novel immune markers (e.g., CYP2D6, FTCD antigens).

According to the Biotechnology Center (2024), these technologies increase the sensitivity of early (subclinical) AIH detection by 15–20%.

Description of Early-Detection Laboratory Tests

Early recognition of AIH is clinically important because initial manifestations are often subtle or nonspecific. Laboratory testing functions as a "mirror" of the ongoing immune pathology, revealing abnormalities well before overt symptoms.

Aminotransferases (ALT and AST). Multiple studies (PMC, 2023) show that 80% of patients with early AIH have ALT/AST levels 1.5–3 × the upper limit of normal. Unlike viral or toxic hepatitis, AIH tends to produce moderate rather than abrupt spikes. A relatively mild yet persistent elevation can therefore be an early laboratory signal of autoimmunity. The **AST/ALT ratio** in AIH is generally near 1 or slightly below, contrasting with alcoholic hepatitis, where AST/ALT > 2 is common.

Immunoglobulin G (IgG). Driven by B-cell and plasma-cell hyperactivity, IgG rises early in AIH. The EASL (2022) guideline notes that an IgG increase of 1.1–1.5 × the upper limit of normal reflects disease activity—even when clinical signs are minimal. A selective rise in IgG (without concurrent increases in IgM/IgA) supports differentiation from PBC or alcoholic hepatitis. IgG monitoring also helps track response: normalization on corticosteroids signals early remission.

Autoantibody testing.

- **ANA:** the most sensitive marker for type 1 AIH; fluorescence patterns are often "speckled" or "homogeneous."
- **ASMA:** positive in ~60–70%; directed against actin filaments. Co-positivity with ANA increases diagnostic likelihood.
- **Anti-LKM-1:** typical for type 2 AIH, more frequent in children/adolescents.
- **Anti-SLA/LP:** highest specificity (95–100%); can confirm diagnosis when other tests are negative.

Liver function indices. In early AIH, total bilirubin, ALP, and GGT are usually normal or only mildly elevated—unlike cholestatic hepatitides. Albumin is typically preserved early and may decrease only in advanced disease due to impaired hepatic synthesis. This relative stability should not mislead clinicians: it often reflects a "quiet" early phase of AIH.

Concordance with histology and molecular tests. When ALT/AST and IgG are elevated and autoantibodies are present, biopsy demonstrating portal-zone lymphoplasmacytic infiltrates and interface hepatitis solidifies the diagnosis. Emerging multiplex ELISA and recombinant-antigen assays can detect multiple antibodies at once (ANA, ASMA, SLA, LKM-1), improving accuracy by 15–20% compared with classic single assays.

Combined testing—benchmark for diagnostic accuracy. No single assay definitively diagnoses AIH. A combination is most reliable. The following **triad** carries strong early diagnostic value:

1. ALT/AST above normal (≥ 1.5 × ULN)
2. Elevated IgG (≥ 1.1 × ULN)
3. At least one positive autoantibody (ANA, ASMA, LKM-1, or SLA)

When present, the probability of AIH is estimated at ~85–95%.

Diagnostic Strategy

Because AIH shares overlapping laboratory and clinical features with other hepatitides, a stepwise, integrated approach is required—clinical assessment, laboratory-immunologic testing, and histologic confirmation.

Clinical stage — triggers for suspicion Consider AIH in patients with unexplained transaminase elevation, especially when:

- ALT/AST are elevated without a clear cause;
- IgG or γ-globulins are above normal;
- there is coexisting autoimmunity (thyroiditis, rheumatoid arthritis, type 1 diabetes) with elevated liver enzymes;
- viral hepatitis markers (HBsAg, anti-HCV) are negative.

Laboratory-immunologic stage — the main diagnostic engine

- **Transaminases:** in viral hepatitis, rises may be abrupt (10–20 × ULN), whereas in AIH they are often moderate (3–10 × ULN) or even mild.
- **Immunoglobulins:** IgG 1.1–1.5 × ULN is an important indicator of active immune inflammation; lack of IgM/IgA elevation increases specificity for AIH.
- **Autoantibodies:** ANA/ASMA suggest type 1 AIH; anti-LKM-1 suggests type 2; anti-SLA/LP has the highest specificity. Seronegativity (10–15%) does not exclude AIH—elevated IgG and biopsy remain decisive.
- **Exclude viral hepatitis:** HBsAg, anti-HCV, HCV-RNA, HBV-DNA are mandatory.
- **Exclude metabolic/drug causes:** ceruloplasmin and 24-h urinary copper (Wilson's), ferritin and transferrin saturation (hemochromatosis), and a careful drug history.

Histologic stage — final confirmation Typical features:

- lymphoplasmacytic infiltration in portal tracts;
- **interface hepatitis** (inflammation extending from portal areas into parenchyma);
- **rosette formation** of hepatocytes;
- fibrosis or early cirrhotic change.

Combined interpretation of laboratory and histologic data yields diagnostic accuracy of 92–95% [9].

Stepwise algorithm

1. Baseline labs: AST/ALT, bilirubin, ALP, GGT.
2. Immunologic screening: IgG and γ-globulins.
3. Autoantibodies: ANA, ASMA, anti-LKM-1, anti-SLA.

4. Viral markers: HBV, HCV, HAV, HEV.

5. Metabolic causes: ceruloplasmin, ferritin, transferrin saturation; drug history.

6. Biopsy for confirmation and grading of activity.

7. Scoring (IAIHG): scores > 6 strongly support AIH.

Integrated assessment

- Elevated IgG, ANA/ASMA positive, viral markers negative → high likelihood of AIH.
- Elevated ALT/AST with normal IgG and negative ANA → consider drug-induced injury or steatohepatitis.
- Mildly elevated ALT/AST, slightly elevated IgG, autoantibodies negative → consider seronegative AIH.

According to the Biotechnology Center (2024), applying this integrated approach led to clinical remission within 6 months in 85% of patients diagnosed early.

Goal and impact early diagnosis improves prognosis: with timely immunosuppression (prednisolone, azathioprine), complete remission is achieved in over 80% of patients, whereas late-diagnosed cases with established fibrosis achieve remission in only 40–50%. Therefore, primary care algorithms for elevated aminotransferases should routinely evaluate an autoimmune component.

Practical Recommendations early detection of AIH in clinical practice is vital. Modern laboratory approaches reveal immune-pathologic processes early, improving outcomes and reducing risks of cirrhosis and liver failure. Key recommendations [12]:

- **Do not delay screening** in suspicious cases. In any patient with elevated ALT/AST— even if asymptomatic—consider AIH. After excluding viral and toxic causes, measure IgG and test for autoantibodies (ANA, ASMA, anti-LKM-1, anti-SLA). AASLD (2023) notes this strategy increases early diagnosis by 35–40%.
- **Interpret tests in combination.** No single result suffices. For example, isolated transaminase elevations with normal IgG suggest drug-induced injury, fatty liver, or metabolic disease; positive IgG and autoantibodies with negative viral markers strongly suggest AIH.
- **Monitor IgG and autoantibody dynamics.** Every 3–6 months check AST, ALT, bilirubin, IgG, and antibody titers (ANA, ASMA, SLA). Declining IgG and normalized transaminases indicate effective therapy; renewed rises suggest relapse.
- **Implement a stepwise exclusion algorithm** for viral and metabolic hepatitides to reduce misclassification and optimize resource use [11].
- **Refer to hepatology/immunology** when transaminases remain elevated with negative viral markers, especially in patients with coexisting autoimmune diseases.
- **Pre-treatment work-up** before immunosuppression: CBC, renal and hepatic function (creatinine, ALT, AST, albumin, PT/INR), glucose and lipid profile, HBV-DNA/HCV-RNA, and pregnancy testing (for women).

- **Adopt a standard "AIH screening panel"** in laboratories (ALT, AST, bilirubin; IgG/IgM/IgA; ANA, ASMA, anti-LKM-1, anti-SLA) as recommended by the Biotechnology Center (2024).
- **Use a pre-biopsy laboratory "triad":** (1) elevated ALT/AST, (2) elevated IgG, (3) at least one positive autoantibody. If any two are present, proceed to biopsy.
- **Establish structured monitoring** during immunosuppression (prednisolone, methylprednisolone, azathioprine, mycophenolate mofetil): monthly AST/ALT, IgG, glucose, lipids, blood counts; reassess ANA/ASMA every 6 months; adjust therapy if laboratory parameters worsen.
- **Expand early-diagnosis programs** within primary care in Uzbekistan: annual ALT/AST, IgG, and autoantibody testing for at-risk patients; prompt referral to hepatology; targeted training for laboratory personnel.

Conclusion

Early identification of autoimmune hepatitis requires comprehensive and purposeful use of laboratory testing. Elevations in aminotransferases, increased IgG, and positive autoantibodies are key indicators, but none is pathognomonic alone; clinical context and differential diagnosis are essential. Early diagnosis and scheduled monitoring improve outcomes. Within Uzbekistan's healthcare setting, incorporating autoimmune markers into standard liver disease screening and considering AIH among under-recognized etiologies will enhance early detection and reduce progression to cirrhosis.

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1C:ПРЕДПРИЯТИЕ YORDAMIDA TA'LIM XIZMATLARINI HISOBGA OLISHNI AVTOMATLASHTIRISH: AKADEMIK VA AMALIY YONDASHUV

Anotatsiya: *Ushbu maqolada ta'lim xizmatlarini hisobga olish jarayonini* ***1C:Предприятие*** *dasturiy platformasi asosida avtomatlashtirishning akademik va amaliy jihatlari yoritilgan. Maqolada ta'lim muassasalarida buxgalteriya va moliyaviy jarayonlarni avtomatlashtirish zaruriyati asoslab berilgan hamda* ***1C tizimi****ning asosiy imkoniyatlari, modullari va konfiguratsiyalari (jumladan, 1C: Образование 5. Школа, 1C:Universitet, 1C: Davlat muassasasi buxgalteriyasi) tahlil qilingan. Akademik yondashuv doirasida axborot tizimlarini modellashtirishning nazariy asoslari, amaliy yondashuvda esa 1C dasturini ta'lim muassasalarida joriy etish bosqichlari, foydalanuvchi interfeysi va hisobot mexanizmlari ko'rib chiqilgan. Shuningdek, tizimning afzalliklari, cheklovlari hamda samaradorlikni oshirish bo'yicha tavsiyalar berilgan. Tadqiqot natijalari ta'lim muassasalarida xizmatlarni hisobga olishni avtomatlashtirish orqali shaffoflik, aniqlik va boshqaruv samaradorligini oshirish mumkinligini ko'rsatadi.*

Kalit so'zlar: *1C:Предприятие, avtomatlashtirish, ta'lim xizmatlari, axborot tizimi, buxgalteriya, hisobga olish, akademik yondashuv, amaliy yondashuv, ta'lim muassasasi, 1C:Obrazovanie, 1C:Universitet, 1C: Davlat muassasasi buxgalteriyasi, raqamli transformatsiya.*

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AUTOMATION OF EDUCATIONAL SERVICES ACCOUNTING USING "1C:ENTERPRISE" ACADEMIC AND PRACTICAL APPROACH

Abstract: *This article explores the academic and practical aspects of automating the accounting of educational services using the* ***1C:Enterprise*** *software platform. The study substantiates the need to automate accounting and financial processes in educational institutions and analyzes the main features, modules, and configurations of the 1C system (including 1C:Education 5. School, 1C:University, and 1C:Accounting for Government Institutions). Within the academic approach, the theoretical foundations of information system modeling are discussed, while the practical approach examines the stages of implementing 1C in educational institutions, the user interface, and reporting mechanisms.*

Additionally, the paper highlights the advantages and limitations of the system and provides recommendations for improving its efficiency. The results demonstrate that automating the accounting of educational services enhances transparency, accuracy, and management effectiveness in educational organizations.

Keywords: *1C:Enterprise, automation, educational services, information system, accounting, bookkeeping, academic approach, practical approach, educational institution, 1C:Education, 1C:University, 1C:Accounting for Government Institutions, digital transformation.*

Kirish. Zamonaviy ta’lim muassasalari raqamli iqtisodiyot sharoitida moliyaviy va ma’muriy jarayonlarni avtomatlashtirishga muhtoj. Amaliyotda o‘qish uchun to‘lovlar, oziq-ovqat va turar joy kabi ko‘plab xizmatlar hisobini qo‘l bilan yuritish xatoliklar va kechikishlarga olib keladi. Axborot tizimlari joriy etish orqali bu muammolarni hal etish mumkin. Masalan, O‘zbekistonda IT sohasining jadal rivojlanishi ta’lim muassasalarida raqamli tizimlarni joriy etishni biznes jarayonlarini samaraliroq tashkil etish vositasiga aylantirayotganini hammamiz bilamiz. Shu bilan birga, bolalar bog‘chalari, maktab va oliy ta’limda ota-onalarning to‘lovlari, qo‘shimcha pullik xizmatlar hamda talabalar turar joyi va ovqatlanish kabi ma’lumotlar yirik hajmlarda to‘planadi. “1C: Buxgalteriya” kabi tizimlarda bu tur jarayonlar uchun maxsus funksiyalar mavjudligi namoyon bo‘ladi: masalan, bolalar muassasasida parvarish va qo‘shimcha xizmatlar uchun to‘lovlarni hisoblash, ota-onalarga kvitansiyalar chiqarish; shuningdek, talabalardan olinadigan pulli ta’lim yoki turar joy bo‘yicha hisob-kitob varag‘i tuzish imkoniyati beriladi.

1С:Предприятие – bu biznes jarayonlarini avtomatlashtirish uchun yaratilgan dasturiy platforma. O‘zbekistonda unga moslashtirilgan konfiguratsiyalar mavjud: masalan, “1C: O‘zbekiston uchun Buxgalteriya 8” buxgalteriya va soliq hisobotlarini yuritish uchun tayyor yechim bo‘lib, har qanday korxona – chakana yoki ulgurji savdo, xizmat ko‘rsatish, ishlab chiqarish – uchun mos keladi. Ushbu konfiguratsiya o‘zbek qonunchiligiga muvofiq tahliliy, valyuta va miqdor hisobini tashkil etadi, shuningdek, kontragentlar bilan hisob-kitob va xo‘jalik operatsiyalarini avtomatlashtiradi. Davlat muassasalari uchun esa “1C:Davlat muassasasi buxgalteriyasi 8” maxsus yechimi mavjud: u byudjet muassasalarida xarajatlarni hisoblash, hisobotlarni shakllantirish va davlat sektoriga xos boshqa vazifalarni avtomatlashtiradi. Bunda u madaniyat, ta’lim, sog‘liqni saqlash kabi byudjet idoralarida keng qo‘llaniladi. Ta’lim sohasiga yo‘naltirilgan qo‘shimcha modullar ham ishlab chiqilgan. Masalan, “1C: Образование 5. Школа” tizimi maktabda o‘quv jarayonini tashkil etish va elektron ta’lim muhitini yaratish uchun mo‘ljallangan; u 273-FZ “Ta’lim to‘g‘risida”gi qonun talablarini va yangi federal ta’lim standartlarini inobatga olgan holda zamonaviy axborot-ta’lim muhiti yaratadi. Shuningdek, oliy ta’lim muassasalari uchun “1C:Universitet”, kasb-hunar oliy o‘quv yurtlari uchun “1C:Kollej” kabi kompleks boshqaruv tizimlari ham mavjud. Bu mahsulotlarning barchasi birgalikda ta’lim muassasalarida

buxgalteriya, moliyaviy, kadr va ma’lumot almashish jarayonlarini yagona tizimda avtomatlashtirish imkonini beradi.

1С:Образование 5. Школа – maktab uchun 1C platformasida yaratilgan dasturiy majmua, u o‘quv jarayonini tashkil etish va elektron darsliklarni boshqarishga mo‘ljallangan.

Ta’lim xizmatlari hisobini yuritishda akademik yondashuv haqida gapirganda, avvalo bu jarayonlarni tizimli tushunish va modellashtirish muhim hisoblanadi. Ma’lumki, ta’lim muassasalarida ta’lim-metodik hujjatlar, o‘quv rejalari, kontingent va xizmatlar bo‘yicha ko‘plab biznes-protsesslar mavjud. Akademik tadqiqotlarda ta’lim jarayonlarining axborot tizimini loyihalashda funksional modellashtirish usullari qo‘llaniladi. Masalan, bir akademik tadqiqotda universitetda o‘quv-metodik hujjatlarni shakllantirish jarayonlari uchun strukturaviy tahlil (SADT) va IDEF diagrammalari orqali funksional modellar ishlab chiqilgan; bu modellash natijasida jarayonlarni qayta tashkil etish va avtomatlashtirish yo‘llari aniqlangan. Shuningdek, ma’lumotlar bazalari va ta’lim xizmatlari xarid qilish/xizmat ko‘rsatish bo‘limlari uchun nazariy ma’lumotlarni baholovchi tahliliy modellar ham ishlab chiqiladi. Bu nazariy yondashuvlar ta’lim jarayonlarini samarali boshqarish uchun axborot tizimlari strukturasini aniqlashga yordam beradi, keyinchalik amaliy dasturiy yechimlar tayyorlashda asos bo‘ladi.

Amaliy yondashuv 1C tizimini joriy etish va undan foydalanish tajribasiga asoslanadi. **Joriy qilish bosqichlari** odatda quyidagicha: dastlab dastur o‘rnatilib, muassasaga mos hisobot va soliq parametrlari sozlanadi. So‘ngra respublika miqyosidagi me’yoriy ma’lumotnomalar (hisob hujjatlari, kadrlarga oid standartlar va boshqalar) yuklanadi. Keyingi bosqich — boshlang‘ich qoldiqlarni kiritish: mol-mulk va boshqa aktivlar bo‘yicha balans holatini dasturga yuklash zarur.

Foydalanuvchi interfeysi 1C tizimida modulli bo‘lib, hujjat kiritish, hisob-kitoblar va hisobotlar bo‘limlarini o‘z ichiga oladi. Ta’lim muassasasining har bir bo‘limi uchun maxsus hujjat turlari (masalan, ota-onadan to‘lov kelib tushishi, talabalar turar joy uchun badal kiritishi) o‘rnatiladi. Unda talabalar va o‘qituvchilar haqidagi ma’lumotlar, kurslar, kontingent bo‘yicha kataloglar yuritiladi.

Hisobotlar va integratsiya jihatdan 1C kuchli vositalarni taqdim etadi. Dastur balanslar, mablag‘lar harakati va soliqqa oid hisobotlar kabi moliyaviy hisob-kitoblarni avtomatik hosil qiladi. Xuddi shu tizimda ta’lim xizmatlari bo‘yicha maxsus hisobotlarni shakllantirish mumkin. Masalan, bolalar uchun o‘qish va xizmatlarga to‘lov, qo‘shimcha to‘lovlar, darslik yoki ovqatlanish uchun ketgan xarajatlar bo‘yicha yig‘ma varaqalarni tuzish amaliyotlari mavjud. Tayyorlangan barcha hisobotlarni elektron shaklda eksport qilish va mas’ul idoralarga yuborish oson amalga oshiriladi; tizimda hujjatlarni elektron almashish platformalari bilan integratsiya imkoniyati ham mavjud. Shuningdek, 1C tizimi kadrlar, buxgalteriya va boshqa bo‘limlar o‘rtasida ma’lumot almashish uchun ham mo‘ljallangan bo‘lib, masalan “1C: Davlat muassasasi buxgalteriyasi 8” –da avtomatik tizim orqali bir nechta bo‘limlar hisobidan hisobotlar tayyorlanadi.

Xulosa. Ta’lim muassasalarida xizmatlarni hisobga olishni 1C platformasi yordamida avtomatlashtirish samaradorlik va shaffoflikni oshirishga xizmat qiladi.

Avtomatlashtirilgan tizim moliyaviy natijalarni tezkor taqdim etadi, inson omilini kamaytiradi va qonuniy talablarni o‘z vaqtida bajarilishini ta’minlaydi. Mahalliy mutaxassislar fikricha, axborot tizimlarini joriy etish endi raqobat uchun ustunlikdan ham ortiq, ish jarayonlarini qurishning zaruriy vositasiga aylanmoqda.

Tizimni joriy etishda bosqichlarni puxta rejalashtirish muhim: avvalo joriy jarayonlarni tahlil qilish, mos modulni tanlash, so‘ngra jadval asosida sozlash va sinovdan o‘tkazish lozim. Amaliyotda “First Bit” kabi integratorlar biznesni avtomatlashtirish loyihalarini to‘liq aylana jarayon bilan — dastlabki audit, to‘liq o‘rnatish va so‘nggi texnik yordam — ta’minlashni tavsiya etadi. Xodimlarni 1C tizimidan samarali foydalanish borasida o‘qitish, hujjat almashinish va ma’lumotlar bazasini muntazam yangilab borish ham maslahatlardandir. Natijada, tavsiya etilgan tadbirlar kadrlar mehnatini kamaytirib, ta’lim muassasasining moliyaviy boshqaruvi sifatini oshirishga yordam beradi.

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LANGUAGE AND INNOVATION: THE FUTURE OF INTERNATIONAL COLLABORATION IN DIGITAL LINGUISTICS

Abstract. *This article explores the growing significance of international collaboration in the field of digital linguistics, highlighting the transformative role of technological innovation in linguistic research. The study identifies key areas where language and innovation intersect—such as machine translation, corpus linguistics, and AI-driven language processing. It further analyzes the emergence of global linguistic data-sharing platforms, interdisciplinary cooperation, and the challenges and opportunities that arise from multilingual digital environments. Ultimately, the paper argues that the future of digital linguistics depends on fostering inclusive and adaptive international collaboration supported by innovative technology.*

Keywords: *digital linguistics, international collaboration, language innovation, machine translation, corpus linguistics, artificial intelligence (ai) in linguistics, language processing, multilingual data.*

Introduction. The digital age has fundamentally reshaped the structure and function of linguistic research. As languages become increasingly embedded in digital systems—from online communication to artificial intelligence—linguists face new challenges in understanding and processing human language. Innovations in technology have not only changed how linguists conduct research but also expanded the scope of global collaboration.

International collaboration is essential in this context, as linguistic diversity and technological expertise are distributed across different regions and research communities. This article examines the role of innovative digital tools in enhancing such cooperation and predicts future trends for international collaboration in digital linguistics.

Literature Review. Recent scholarship shows a remarkable expansion of digital linguistics as a discipline formed at the intersection of linguistics, computer science, and artificial intelligence. Researchers such as Liu (2021) and Narayanan (2023) have highlighted how natural language processing (NLP) and machine learning technologies are revolutionizing language analysis.

Several studies also emphasize the importance of collaboration. For example, Dufresne et al. (2022) discuss global corpus projects like the Universal Dependencies and their role in standardizing linguistic data. Meanwhile, Li and

Kumar (2024) detail how collaborative digital platforms facilitate cross-linguistic studies, especially between less-resourced and widely used languages.

Many contemporary digital linguistic tools and platforms—such as ELAN, SketchEngine, and Glosbe—serve as critical infrastructures for facilitating collaboration among researchers from diverse linguistic and cultural backgrounds. These platforms provide robust mechanisms for the systematic collection, annotation, and analysis of linguistic data, enabling scholars to engage in joint research projects irrespective of geographic location. The advent of open-access repositories and cloud-based computational environments has further democratized access to linguistic resources, effectively reducing barriers that traditionally arose from limited institutional funding, regional disparities, or constrained physical infrastructure. Such platforms not only allow for centralized storage of data but also promote reproducibility, transparency, and methodological rigor in linguistic research.

The rapid advancement of artificial intelligence (AI) and machine learning technologies has significantly transformed the processing and analysis of linguistic data. Tasks that were once labor-intensive—such as morphological parsing, syntactic tagging, part-of-speech annotation, and semantic interpretation—are increasingly automated, facilitating large-scale data handling and supporting the simultaneous analysis of multiple languages. This technological progress enhances collaborative research by enabling the integration of vast multilingual corpora, allowing researchers from different regions to contribute and utilize data efficiently. Nevertheless, despite these advancements, the accuracy and reliability of AI-driven linguistic tools remain limited, particularly for underrepresented and low-resource languages. Such languages often lack sufficient digital corpora or annotated datasets, which hinders the performance of automated models and perpetuates disparities in linguistic research.

Moreover, variations in linguistic structures, technical infrastructures, and regional academic practices continue to present significant challenges to international collaboration. The absence of standardized protocols for data annotation, divergent theoretical frameworks, and differing expectations regarding research methodology can impede effective cooperation. Additionally, limited resources for minority and endangered languages, coupled with cultural and institutional differences in research paradigms, exacerbate the difficulty of equitable participation in global digital linguistic initiatives. Addressing these challenges requires concerted efforts to develop standardized annotation schemas, inclusive digital resources, and cross-cultural methodological frameworks, thereby ensuring that innovation in digital linguistics supports truly collaborative and globally representative research.

Discussion. The globalization of digital linguistics offers unprecedented opportunities for researchers worldwide. However, innovation alone is not enough; it must be coupled with intentional strategies to ensure balanced and inclusive participation in research. This includes investments in language technology for

underrepresented languages, creation of multilingual corpora, and establishment of international standards in digital linguistic research.

Conclusion. Language and innovation form a powerful synergy that is redefining the future of linguistic research. Digital tools and artificial intelligence are enabling deeper and more collaborative international partnerships. If challenges related to inclusivity, access, and standardization are addressed, digital linguistics has the potential to become one of the most vibrant fields of global scientific collaboration.

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THE ROLE OF TRANSLATION IN THE GLOBAL RECEPTION OF RUSSIAN LITERATURE

Abstract. *This article examines the pivotal role of translation in shaping the global reception and understanding of Russian literature. Russian literary works, from the classics of Tolstoy and Dostoevsky to contemporary authors, have achieved worldwide recognition largely due to translation. The study explores the historical development of Russian literary translation, analyzes key translation strategies, and investigates the challenges translators face in preserving cultural, linguistic, and stylistic nuances. The article also highlights the impact of translation on comparative literary studies and cross-cultural literary discourse, arguing that the translator serves not only as a linguistic intermediary but also as a cultural mediator.*

Keywords: *Literary Translation, Global Reception, Comparative Literature, Cross-Cultural Communication, Translator as Cultural Mediator.*

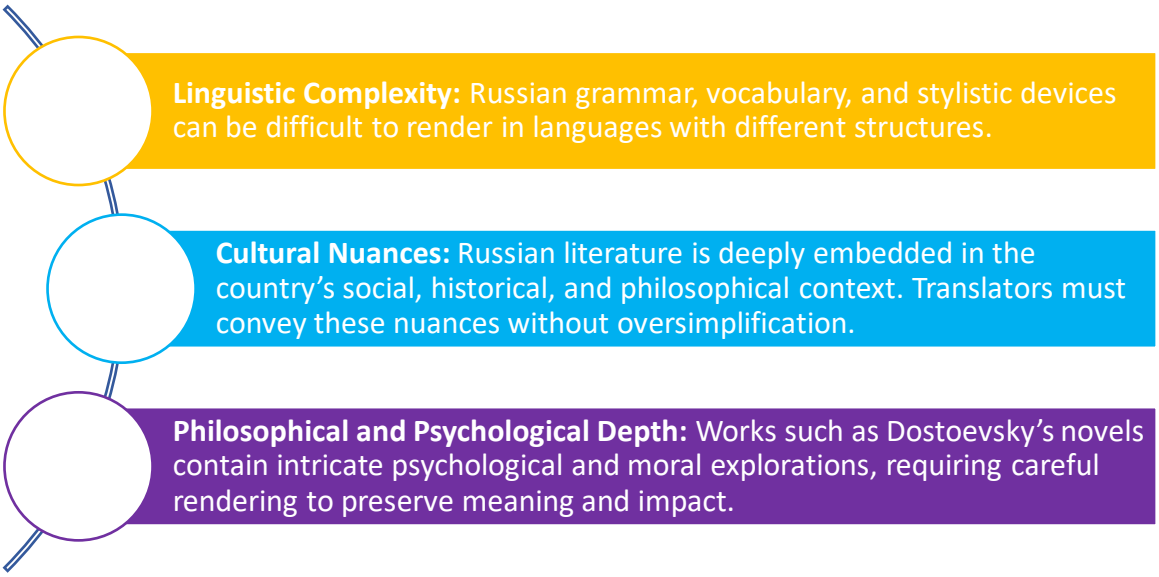
Introduction. Russian literature has long held a prominent place in the global literary canon. Authors such as Leo Tolstoy, Fyodor Dostoevsky, Anton Chekhov, and Alexander Pushkin have exerted profound influence on world literature. However, the international recognition of these works would have been impossible without translation. Translation facilitates the cross-cultural circulation of literary texts, enabling readers from different linguistic and cultural backgrounds to access and engage with Russian literature.

This article explores the role of translation in shaping the global reception of Russian literature, emphasizing the interplay between linguistic fidelity, cultural adaptation, and stylistic preservation. By examining historical and contemporary approaches to translation, this study highlights how translators contribute to the international visibility and interpretation of Russian literary works.

Historical Context of Russian Literary Translation. The translation of Russian literature into European and other world languages dates back to the 18th and 19th centuries, coinciding with the rise of Russian literary realism. Early translators, often scholars or expatriates, faced considerable challenges, including unfamiliar idiomatic expressions, complex syntactic structures, and culturally specific references. Notable translations, such as Constance Garnett's renderings of Dostoevsky and Tolstoy into English, were instrumental in introducing Russian classics to Western audiences.

Over time, translation practices evolved from literal word-for-word methods to more nuanced approaches that balance linguistic accuracy with cultural and aesthetic sensitivity. Contemporary translation theory emphasizes the role of the translator as an active participant in shaping meaning, rather than merely a conduit between languages.

Challenges in Translating Russian Literature. Translating Russian literature presents multiple challenges:



Linguistic Complexity. Russian literature is characterized by a highly intricate linguistic system, encompassing complex syntactic structures, rich morphological patterns, and a lexicon replete with nuanced semantic layers. The language employs flexible word order, extensive use of aspectual distinctions in verbs, and a variety of stylistic devices such as idiomatic expressions, archaisms, and culturally specific metaphors. These features pose significant challenges when translating into languages with fundamentally different grammatical, syntactic, and morphological frameworks. Translators must navigate these structural differences carefully to preserve not only the literal meaning of the text but also its stylistic elegance, rhetorical effects, and literary rhythm. Failure to account for these linguistic subtleties can result in loss of nuance, alteration of narrative voice, and diminished literary quality in the target language.

Cultural Nuances. Russian literature is deeply rooted in the nation's unique social, historical, and philosophical contexts. Works often reference culturally specific norms, historical events, literary traditions, folklore, and religious or philosophical ideas that are intimately familiar to Russian readers but may be obscure to international audiences. Translators face the challenge of conveying these cultural elements without resorting to oversimplification or distortion. Effective translation requires a combination of deep cultural literacy, contextual interpretation, and careful adaptation strategies that balance fidelity to the source text with accessibility for the target audience. This task often entails providing implicit or explicit cultural explanations, maintaining the text's cultural flavor, and

ensuring that the literary and aesthetic qualities remain intact across linguistic boundaries.

Philosophical and Psychological Depth. Russian literary works, particularly those by authors such as Dostoevsky, Tolstoy, and Gogol, are renowned for their profound philosophical inquiry and psychological complexity. Novels such as *Crime and Punishment* or *The Brothers Karamazov* explore intricate moral dilemmas, existential questions, and the inner workings of human consciousness. Translators must not only render the literal meaning of the text but also capture the subtleties of thought, emotion, and ethical reflection embedded in the narrative. This requires a highly nuanced understanding of both source and target languages, as well as sensitivity to the author's literary style, narrative tone, and thematic intentions. The challenge lies in preserving the depth of characterization, the intensity of psychological exploration, and the philosophical resonance that makes Russian literature universally compelling.

These challenges underscore the translator's role as both a linguistic and cultural mediator, whose interpretive decisions can shape global perceptions of Russian literature.

Conclusion. Translation plays a central role in the global reception of Russian literature. By bridging linguistic and cultural gaps, translators enable international audiences to access, interpret, and appreciate Russian literary works. The translator's dual function as a linguistic expert and cultural mediator highlights the complexity and importance of translation in cross-cultural literary discourse. As global literary exchanges continue to expand, the practice of translating Russian literature remains a vital conduit for fostering international understanding and enriching the global literary canon.

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FAVQULODDA VAZIYATLARDA PSIXOLOGIK YORDAMNI TASHKIL ETISH USULLARI

Annotatsiya*: Ushbu maqolada favqulodda vaziyatlarda insonlarga psixologik yordam ko‘rsatishning mazmuni va ahamiyati yoritilgan. Maqolada O‘zbekiston Respublikasi Favqulodda vaziyatlar vazirligi tizimida tashkil etilgan “Ruhiy ko‘mak berish bo‘limi” faoliyatining asosiy yo‘nalishlari, jabrlangan shaxslarga va qutqaruvchilarga ko‘rsatiladigan amaliy yordam shakllari, shuningdek, ekstremal sharoitlarda inson ruhiyatida kechadigan psixologik jarayonlar tahlil qilingan. Stress, qo‘rquv, tushkunlik, depressiya kabi holatlarning oldini olishda psixokorreksion, terapevtik va relaksatsion mashg‘ulotlarning o‘rni alohida ko‘rsatilgan. Muallif tomonidan Sardoba fojeasi misolida amaliy psixologik yordamning ijtimoiy ahamiyati yoritilib, favqulodda vaziyatlarda tezkor psixologik yordam ko‘rsatish bo‘yicha aniq tavsiyalar ishlab chiqilgan. Shuningdek, maqolada psixoprofilaktika va psixoterapiya jarayonlarining metodik asoslari, aholining sog‘lom qatlamida ruhiy zo‘riqishlarni oldini olishga qaratilgan chora-tadbirlar tahlil etilgan.*

Kalit so‘zlar: *favqulodda vaziyatlar, psixologik yordam, ruhiy zo‘riqish, stress, jabrlanuvchilar, qutqaruvchilar, psixoprofilaktika, relaksatsiya, psixokorreksiya, Sardoba fojeasi.*

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METHODS OF ORGANIZING PSYCHOLOGICAL ASSISTANCE IN EMERGENCY SITUATIONS

Abstract*: This article explores the essence and significance of providing psychological assistance to individuals in emergency situations. It highlights the main activities of the “Psychological Support Department” established under the Ministry of Emergency Situations of the Republic of Uzbekistan, focusing on practical support for victims and rescuers. The study analyzes psychological processes occurring in extreme conditions, such as stress, fear, depression, and*

emotional tension, and emphasizes the role of psychocorrectional, therapeutic, and relaxation practices in preventing such states. Using the example of the Sardoba disaster, the article demonstrates the social importance of timely psychological aid and presents specific recommendations for providing rapid psychological support during emergencies. Additionally, it discusses the methodological foundations of psychoprophylaxis and psychotherapy, as well as measures aimed at preventing psychological stress among the healthy population.

***Keywords**: emergency situations, psychological assistance, emotional stress, trauma, victims, rescuers, psychoprophylaxis, relaxation, psychocorrection, Sardoba disaster.*

Kirish.

Insonlar, favqulodda vaziyatga to‘g‘ridan-to‘g‘ri guvoh, sababchi yoki jabrlanuvchi sifatida bu kabi holatlarga uzviy bog‘liq bo‘ladi. Aynan shu sababli, odamlarning keskin xolatlarga tushishiga javoban, ularda psixologik kechinmalarni yuz berishini inobatga olish zurur. Respublikamizda favqulodda vaziyatlar vazirligi tizimida 2014 yilda “Ruhiy ko‘mak berish bo‘limi” tashkil qilingan va bu bo‘limda faoliyat ko‘rsatuvchi mutaxassislar jabrlangan insonlarga psixologik yordam ko‘rsatib kelmoqdalar . Mazkur bulimning birinchi galdagi vazifasi insonlarga ruhiy yordam ko‘rsatish hisoblanadi.Ushbu bo‘limda faoliyat yuritayotgan psixologlar, favqulodda vaziyatlarda ishtirok etib, ruhiy zo‘riqishga tushib qolgan jabrlanuvchilarga hamda qutqaruvchilarga yordam beradilar. Ekstremal vaziyatlarda ruhiy zo‘riqishga tushib qolgan insonlarga psixologik yordam ko‘rsatishda juda muhim bir xolatga e’tibor berish lozim: xaqiqiy ofat, favqulodda vaziyatning ta’siri tugagandan so‘ng, sodir etilgan voqealarni anglab olish jarayonida boshlanadi. Aynan shu kategoriyadagi jabrlanuvchilar ruhiy yordamga juda muhtoj bo‘ladilar. Ta’kidlash kerakki, jabrlanuvchi va ularning yaqinlariga ruhiy yordam ko‘rsatishda ekstremal yo‘nalishdagi psixolog-mutaxassislar ish olib boradilar. Tushkunlikka tushib qolgan insonlarga atrofida sodir bo‘layotgan voqea hodisalarini anglab yetishi qiyin kechadi, ushbu voqealarni anglab olmaganidan nima bo‘layotganini so‘zlab bera olmaydi.

Jumladan, qutqaruvchilar bilan individual suhbat va konsultatsiya o‘tkazilib boriladi. Qolaversa, qutqaruvchilar faoliyatida ruhiy emotsional zo‘riqishlarning oldini olish hamda ularni turli kutilmagan hodisalarga tayyor turishlari uchun ruhiy ko‘mak berish bo‘limi psixologlari tomonidan trening hamda relaksatsiya seans-mashg‘ulotlari o‘tkazilib boriladi. Ish jarayonida turli psixokorreksion va terapevtik metodlardan foydalaniladi. Ushbu faoliyatning negizida asosan stress holatlarning oldini olish birinchi o‘rinda turadi. Bo‘lim mutaxassislari qutqaruvchilarning murakkab sharoitli faoliyatida nostandart xolatlarga ruhiy jixatdan tayyor turishlarini ta’minlashga xarakat qildilar.

Ayniqsa pandemiya davrida o‘z yaqinlaridan ayrilgan yurtdoshlarimizga o‘z vaqtida ko‘rsatilgan amaliy psixologik yordam odamlar hayotini imkon qadar yengillashtiradi.Dunyo kutilmagan tasodiflarga boy. Ko‘pincha, bunday holatlar keskin tus olib, yaqinlarimiz yoki o‘zgalarning yordamisiz ruhiyatimizda

kechayotgan xissiyotlarni yenga olmaymiz. Ayniqsa, qadrli insonlarimizning vafoti, yaqinlar bilan munosabatlarning buzilishi, ajrashish xolatlari bunga misol bo‘la oladi. Bunday vaziyatlarda, tushkunlikka tushgan insonlar turli dori vositalarni yoki spirtli ichimliklarini ist’emol qilishni afzal ko‘rishadi. Uzoq vaqt davom etadigan kuchli emotsional bosim va mudhish kechinmalar turli hil psixosomatik buzilishlarga olib keladi. Ko‘pincha favqulodda xolat oqibatida uzoq davom etadigan – atrof muxitga nisbatan nafrat, qayg‘u, qo‘rquv, jahl, ranj-alam, depressiya kabi holatlar kuzatiladi. Bunday stress holatlarini boshidan kechirgan insonlar ko‘pincha shifokorning doimiy mijoziga aylanib qoladilar (1). Odatda, kuchli ruhiy silkinishni boshidan o‘tkazgan kishilarda qo‘rquv ,umidsizlik holatlari yuzaga keladi, bunday tazyiqlarga dosh berish uchun kuchli iroda ,chidam zarur bo‘ladi.Bu o‘rinda ruhiy bosimlarni yengib o‘tish uchun zarur amaliy yordam olish imkoniyatini yaratish muhim ahamiyat kasb etadi.

“Psixologik yordam ko‘rsatishning asosiy vazifasi favqulodda vaziyatlar oqibatida paydo bo‘lgan holatlarning oldini olish, yangi sharoitga moslashuv jarayonini anglash, shaxsning adaptiv va kompensator resurslarini aktivlashtirish kabi ishlarni amalga oshiradi” (2) Jabrlanuvchilarga samarali psixologik yordam ko‘rsatish natijasi bu – ekstremal, noodatiy vaziyatlarda insonning ruhiy holatini yengillashtirish hisoblanadi. Xalqimiz boshiga tushgan mudhish hodisalardan biri, 2020 yil 1 may kuni yuz bergan Sardoba fojeasidir. Barchaga ma’lumki, qurbon bo‘lganlar mavjud, falokat natijasida ko‘plab xonadonlar o‘z boshpanasidan ayrildi. Fojea yuz bergan zonadan ko‘chirilgan yetmish mingdan ortiq aholiga yordam ko‘rsatildi. Hukumatimiz tomonidan zudlik bilan aholining xavfsizligini ta’minlash yuzasidan chora tadbirlar ko‘rildi, xususan, tez psixologik yordam ko‘rsatish ishlari tashkil etildi. Mutaxassislarimiz jabr ko‘rgan aholi orasida amaliy psixologik yordam berishni boshlab yubordilar.

“Dunyo tajribasidan ma’lumki, har qanday favqulodda hodisalarda ko‘p sonli odamlarning bir joyda to‘planib qolishi katta xavf tug‘diradi. Bu hodisa ommaviy favqulodda xulq atvor shakllari paydo bo‘lishi bilan xarakterlanadi. Olib borilgan ilmiy tadqiqotlarning ko‘rsatishicha, favqulodda hodisalarda inson o‘z xatti harakatlarini nazorat qila olmaydi” (3). Turli toifadagi odamlarning bir joyda to‘planib qolishi reallikni to‘liq anglab yetmaslik, ruhiy zo‘riqish holati turli nizoli, ziddiyatli holatlarni yuzaga keltiradi, turli mish mishlar, asossiz ma’lumotlarning odamlar ongiga salbiy ta’siri ortadi. Ziddiyatli holatlarda amaliy psixologik yordam ko‘rsatish mutaxassisdan nihoyatda ehtiyotkorlik bilan harakat qilishni talab qiladi. Favqulodda vaziyatlar yuzaga kelganda birinchi yordam berishni ham o‘ziga xos qoidalari mavjud.

1. Favqulodda vaziyatlar yuzaga kelganda odam shok holatga tushib qoladi, bu normal xolatdir. Bunday vaziyatlarda yordamga muhtoj odamga muolajadan maqsad va uning natijasi haqida tushuntirish ishlari olib borilishi kerak. Insonda yaxshi natijaga bo‘lgan ishonchni uyg‘otish muolaja samaradorligini yanada oshiradi, natijada ruhiy holat nisbatan mutadillashadi.

2. Avvalo favqulodda vaziyatlarda voqea yuz bergan joydagi umumiy holatni nazoratga olish kerak. Odamlarga psixologik yordamdan oldin qanday ko‘mak

zarurligini aniqlash zarur. Kim tezroq birinchi yordam ko‘rsatishga muhtoj bo‘lsa, o‘sha shaxs bilan muloqotga kirishiladi. Jabr ko‘rganlar juda ko‘p bo‘lganda har bir odamga 30 sekund, agar jabrlanganlar soni nisbatan kam bo‘lganda esa 5 minut vaqt ajratiladi.

3. Jabr ko‘rgan shaxsni yoniga borib o‘zingizni tanishtirishingiz hamda yordam ko‘rsatishga tayyor ekanligingizni bildirishingiz lozim. Yo‘naltiruvchi savollar yordamida uning kimligi,qaerda yashashi haqida ko‘proq malumot olishga harakat qiling, yordamga muhtoj odam sizning g‘amxo‘rligingizni his etsin.

4. Ehtiyotkorlik bilan muloqotga kirishish zarur:sekin qo‘lidan ushlang yoki yelkasiga qo‘lingizni qo‘shingiz mumkin,hech qachon jabrlanuvchini boshiga qo‘l tekkizmang. Agar jabr ko‘rgan odam yerda yotgan bo‘lsa, siz ham yoniga cho‘kkalab o‘tirib olsangiz sizga bo‘lgan ishonch yanada ortadi. Hech qachon jabrlanuvchiga orqa o‘girmang.

5. Yuzaga kelgan vaziyatda hech qachon jabrlangan odamni aybdor qilmang.Bu vaziyatni yanada keskinlashuviga olib keladi, imkon qadar o‘z hamdardligingizni anglatishga harakat qiling. O‘z kasbiy tajribangiz haqida gapirib berishingiz, jabrlanuvchida ertangi kunga bo‘lgan ishonchni oshirishga harakat qilishingiz zarur.

6. Agar jabrlanuvchining holati imkon bersa,uning qo‘lidan kelishi mumkin bo‘lgan biror vazifa berishingiz mumkin. Bunday vazifa jabrlanuvchida o‘z imkoniyatlariga nisbatan munosabatni o‘zgarishiga sabab bo‘ladi. Mutaxassis psixolog shuni esdan chiqarmasligi kerakki, har bir masalaning ikki tarafi bo‘lganidek, favqulodda vaziyatlarda faoliyat olib borish bevosita mutaxassis uchun ham ayrim yoqimsiz holatlarni yuzaga keltirishi mumkin. Asabiy zo‘riqish paydo bo‘lganda maxsus relaksatsiya mashqlarini bajarish tavsiya etiladi.

Psixoprofilaktika ishlarini olib borish jarayonida mutaxassis psixolog ikki yo‘nalishda ish olib boradi. 1. Profilaktika maqsadida aholining sog‘lom qismi bilan ish olib borish. Favqulodda vaziyatlarda vahimaga tushmaslik, o‘zini to‘g‘ri tuta bilish, ruhiy zo‘riqishni oldini olish usullari bilan tanishtirib boriladi. Psixoterapiya va psixoprofilaktik maqsadlarda amalga oshiriladi. Favqulodda vaziyatlarda uzoq vaqt davomida qolib ketgan odamlarda nerv psixologik asoratlar saqlanib qoladi. Og‘ir zo‘riqish holatlarida, qutqaruv ishlarining murakkab sharoitlarda olib borilishi bilan bog‘liq vaziyatlarda psixologik tez yordam berish zarur. Odamlar hayotiga xavf soluvchi vaziyatlarda zilzila, avariya natijasida uylarning buzilishi, turli portlashlar natijasida tashki dunyodan ajralib qolish holatlarida psixologlarning vazifalari yanada murakkablashadi.

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INNOVATIVE DEVELOPMENT OF AGRICULTURAL PRODUCTION: PROBLEMS AND SOLUTIONS OF THE AGRARIAN ECONOMY

Abstract. *This article discusses not only the problems that need to be solved in the economy today in each direction of research work, but also issues related to the innovative development of agricultural production in the future. The purpose of the work. Innovative development of agricultural production in the Republic of Uzbekistan and scientific and methodological substantiation of economic problems and solutions. Method of work. A method for determining the effectiveness of financial resources of agrarian science in the Republic of Uzbekistan was proposed, and a comparative study of scientific knowledge was conducted on the most favorable direction for the innovative development of agricultural production. Results. Improving the mechanism of financing the system of scientific supply of agriculture, scientific support for the effective development of the network, specific content as a strategic goal of agricultural activities, the variety of climatic and soil conditions of the regions, as well as the development of the sphere are associated with biological processes. The scale of the results. The results of the study are the use of a mechanism for the implementation of a large-scale introduction of scientific developments into practice and the transfer of production to the path of scientific innovation development. Conclusion. Agriculture is mainly associated with the development of scientific products intended for the development of production, as well as the organization of fundamental and priority applied research carried out by agrarian science, including the scientific support of a competitive product that meets modern requirements in order to create promising scientific developments.*

Key words: *Agrarian science, agricultural sector, scientific research, scientific developments, scientific product, scientific-production, scientific development, scientific potential, mechanism, improvement.*

Introduction. Agriculture–is one of the leading spheres of the economy of the Republic of Uzbekistan. The main priority of the agricultural sector is to provide the population of the country with food products and industries with hom oshyo. The agricultural sector has long provided the population with food and clothing, which is its most important function in the social sphere. Adequate provision of the population with food products and a high level of purchasing power of the population prevent the emergence of social tension in each country. Also, rural areas are considered the habitat of the population and determine its lifestyle.

In the field of Agriculture, favorable conditions for research work should be created in order to apply new technological achievements, to determine its effect. The introduction of scientific developments in agriculture and the development of scientific institutions according to the results of the study, it is important to improve the mechanism of practical implementation of scientific developments, as well as direct part of the profits received to science. Such a mechanism should include: Organization of direct participation of authors and scientific institutions in the introduction of scientific developments in agriculture; increasing the author's interest in working on the introduction of scientific developments; creation of financial resources for conducting research on new topics in scientific institutions; continuous improvement of the mechanism for stimulating agriculture.

Therefore, it will be necessary to invest in the agricultural economy and finance the introduction of scientific developments, as well as improve the mechanism of direct participation of subjects using scientific developments in this process. Investments and innovations aimed at developing intellectual potential in our country are one of the main factors in the development of the agricultural economy in the future.

In the regions, the further development of agricultural production, creation of a scientifically sound system of regional agriculture taking into account the current state of each region, first, shall make up one of the important features in addressing the issues, listed in the agrarian sector [1].

The research carried out today is mainly linked to the production process of agricultural products. Little attention is paid to the financing of research on the issues of improving techniques and technologies in the latest processes from the production of products.

Materials and methods. Theoretical and methodological foundations of the issues of the scientific foundations of innovative development of production in the agricultural sphere were studied by scientists from foreign countries and the Republic of Uzbekistan on the basis of economic reforms in their research on the strategy of innovative development of Agriculture in the economy.

According to Professor Slepneva, the complexity of agricultural production and its peculiarities determine the need to improve the approaches and methods of innovative management used today, to strengthen the role of the state in stimulating innovation [2].

V.F. In Fedorenko research provides a detailed description of the priorities of innovative development in the sphere: crop production related to the improvement of methods of selection of crops with high productive potential, the development of scientifically sound systems of agriculture and seed production, ensuring the ecological purity of agricultural products [3].

G. Mintzberg defined innovation as a means to overcome established and established patterns of behavior. In this interpretation, the simple development of the production of new products does not become an innovation if it does not lead to changes in the behavior of economic entities [4].

Denying such an interpretation of the concept of "innovation", M. Porter believed that "most innovations are incremental and routine in nature", they are more the result of accumulating a large amount of small new knowledge than one grandiose scientific and technical breakthrough [5].

The comparative characteristic of interpretations of "innovation" and "innovation" in order to understand their nature and the definition of scientific approaches to the control, as a separate step of the innovation process, as well as a set of elements to obtain economic benefits [6].

The main problems of manufacturers of agricultural products: due to the rapid increase in prices for the necessary technical means, the possibility of their purchase decreases, which leads to a weakening of the material technical base of farms and the depreciation of existing equipment [7].

As a result of the influence of the main problems of producers of agricultural products, at the expense of the unit of resources spent, agricultural products have a negative impact on the growth of production efficiency.

In the sustainable development of the country's national economy is associated with the improvement of Agrarian science and agricultural production.

It is known that the main goal of the economic reforms being implemented in the sectors of the economy of the Republic of Uzbekistan is to improve the economic and social conditions of the country's population.

The scientific development of the country's agricultural sphere is important, including: improving the scientific supply system; development of unconventional methods of financing research work; increasing the effectiveness of funds directed to research work; development of a mechanism for stimulating the introduction of scientific results into practice.

At the new stage of economic reforms carried out in our country, an important basis was the scientific development of agricultural production and ensuring their effective implementation.

The share of Agriculture in the formation of the country's gross domestic product should be assessed. This can be seen through the following indicators (figure 2).

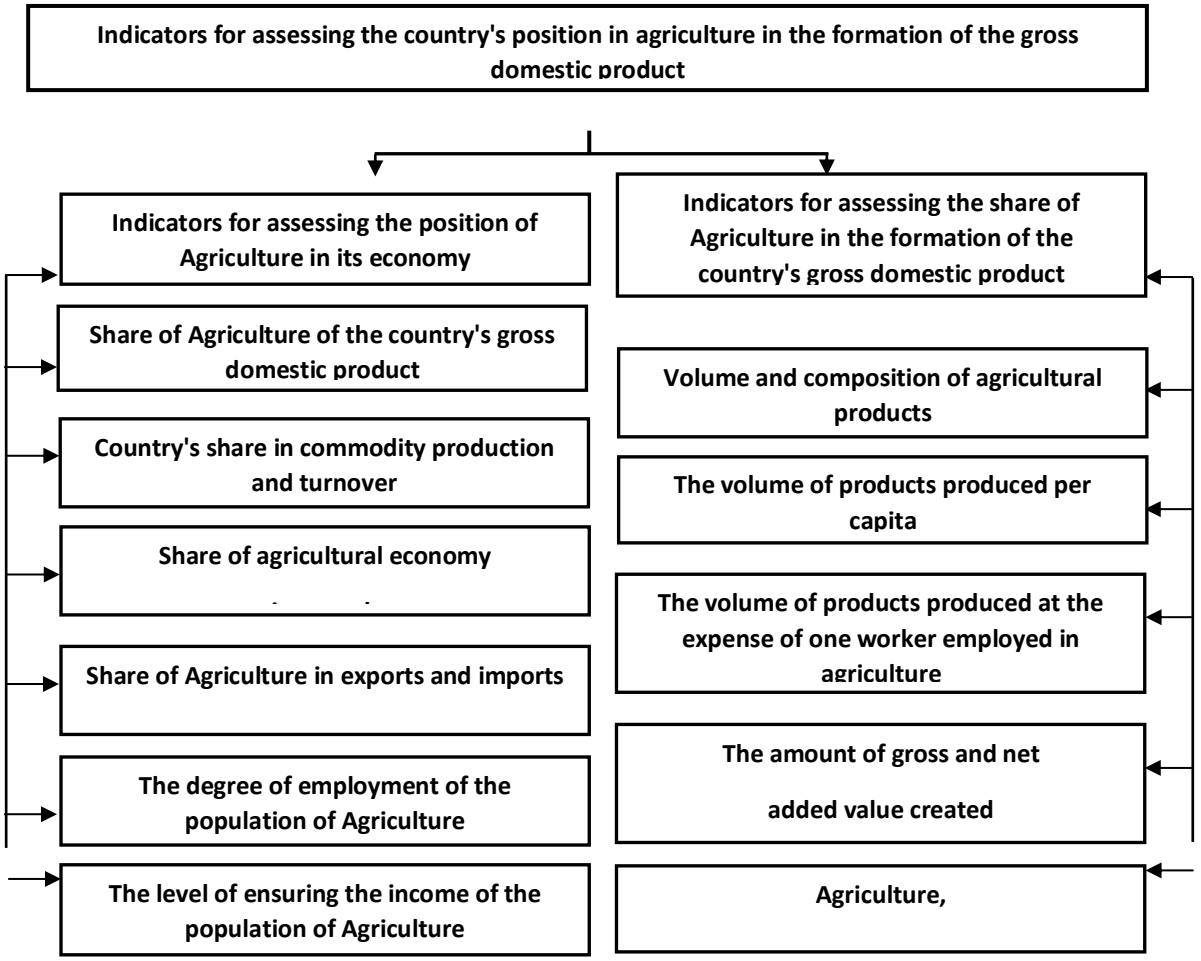


Figure 2. Indicators for assessing the country's position in agriculture in the formation of the gross domestic product[1].

The role of Agriculture in ensuring the economic growth of the country is as follows: supplies food to the population; provides industrial enterprises with raw materials; acting as a market to other sectors of the economy, it serves as a consumer of the resources developed in them.

The process of production of products in agriculture, combining social and biological processes, allows the population to maintain an ecological balance providing the population with food products, along with the supply of raw materials to sphere enterprises, as well as ensuring the socio-demographic development of those working in the industry. That is, agriculture solves extremely important problems at the same time, such as maintaining both production and social, environmental and demographic balance.

Therefore, the assessment of the share of Agriculture in the country's gross domestic product consists of three components related to its activities: production of agricultural products; material and Technical Supply and service system; it is

[1]Source: Compiled on the basis of the author's research.

necessary to approach the systems of processing and selling finished products taking into account the final results.

Agricultural issues. The main attention to agrarian Science in the country is paid to the issues of the priority direction of the scientific development of agricultural production. Despite the measures taken in agriculture, there are still a number of unresolved issues in agriculture and research institutes.

In the conditions of the country's economic reforms in the field of agriculture, it also requires an increase in the price and quality of the products of farms and peasant farms.

The country should study the problems that related ministries, departments, farms, organizations, farms and peasant farms should be solved by investors, evaluate their relevance, summarize and select [8].

The implementation of a scientific project provides an opportunity to raise the scientific supply of the country's agriculture to a new level. The problems that the country faces in agrarian science can be attributed to a system such as (figure 3).

Problems that hinder the increase in the efficiency of agricultural research work, the reasons for their origin		
№	**Problems**	**Causes of origin**
1	Low coefficient of introduction of completed scientific work lack of balance between supply and demand for scientific and technical achievements.	The lack of balance between supply and demand for scientific developments, achievements of Science and technology leads to a lower coeficient of implementation. Most of the current scientific developments are aimed at increasing the production of products. The main emphasis is on production technology. 90 percent of research work is carried out on this, including 60 percent in the field of crop production. Not enough attention is paid to the technologies of that time before and after the production of products.
2	The need to improve the system of Agrarian science and the method of conducting research.	The regions in the country are more based on quantitative indicators than on quality indicators. In the process of choosing a topic, approving it and conducting research, superficial approaches continue. The priority of quantitative indicators leads to an increase in the incomes of farmers and peasants, the preservation of technologies aimed at preserving the environment, a decrease in the competitiveness of agricultural products in the international market and a decrease in the level of development.
3	The need to improve the management system of Agrarian science.	There is no connection between research institutes, higher education institutions and relations of production, administrative and economic relations. The duplication of each other in research work, the sending of funds on small topics, the lack of coordination between networks, ministries and departments, the human factor and the low efficiency of other resources hinder innovative development.
4	Shortage of scientific personnel in the scientific-research system of the	Studies show that for every 10 thousand inhabitants living in the village there are 34 agricultural scientific workers. This pointer is very low. The shift of agricultural scientific technical staff to other fields, where young people prefer to be expert for more Computer Engineering, Biotechnology and economic management systems, can

	agricultural sector.	lead to disruption between older and younger scientists. With this condition, agrarian science can collide over the next few decades.
5	The lack of improvement of the state program for the development of Science and technology in the agrarian sphere.	It is this factor that causes a decrease in the scale of research in the agrarian sphere and a decrease in the level of introduction of technological achievements in science. Currently, research work in agriculture is being funded in the amount of 0.1-0.3% of the gross agricultural product, which in some years is even lower. Laboratory equipment for conducting research in the agricultural sector is outdated, the work of scientific workers is at a low level. These are obstacles to the development of Agrarian science and the introduction of completed scientific developments.
6	Lack of knowledge of farmers and peasants about the organization of production.	Of farms and peasant farms cultural and knowledge level low, it prevents the formation of an effective demand for the product of science and technology and its introduction. This situation not only reduces the level of implementation of technical achievements in practice, but also reduces the effectiveness of the use of new technologies, and also leads to a higher risk of using new technology.

Figure 3. Classification of problems that hinder the increase in the effectiveness of agricultural research work in the context of economic reforms[2].

Currently, the development of Agrarian science consists in an in-depth analysis of the listed problems facing science.

Research institutions in each direction of agricultural scientific supply today will need to conduct a large-scale scientific research not only on the problems for which a scientific solution should be found, but also on the problems associated with the development of Agriculture in the future. Based on this, it will be necessary to radically revise and improve the mechanism of selection and financing of research topics of scientific institutions and scientists.

The result of the study of a number of important problems is that the untimely introduction of ready-made scientific developments into production or its late introduction has a certain negative impact on the country's economy. Also: first of all, failure to solve problems in time leads scientists to waste their time, and the late presentation of scientific solutions that need to be introduced into life, as well as the negative effects on their investment, leads to a low level of research; secondly, the delay in solving important problems, the solution of which is considered relevant, leads to a low level of quantity, quality, competitiveness of products and an increase in costs.

The second important issue, further development is advanced techniques and technologies, high-yielding varieties and related to the creation of breeds of productive livestock and the large-scale establishment of their introduction into practice. It should be noted that since the past stages of economic reform are associated with institutional, organizational and legal issues, the processes of

[2]Source: Developed on the basis of the author's research.

introducing these scientific developments into practice are associated with significant expenditure of funds. The measures to be introduced will certainly be related to investment and innovation processes.

On the example of the use of Information Technology in the scientific work Zhukovskaya, attributive models of innovative solutions were identified [9].

It is also noticeable that the introduction of completed work on practical scientific research in proportion to the above situation has also slowed down, and the current mechanism in this regard is not working enough.

The method of solving tasks in the field of Agriculture, problems and issues solutions.

Solving the problems facing agrarian science and agricultural production today (figure 4).

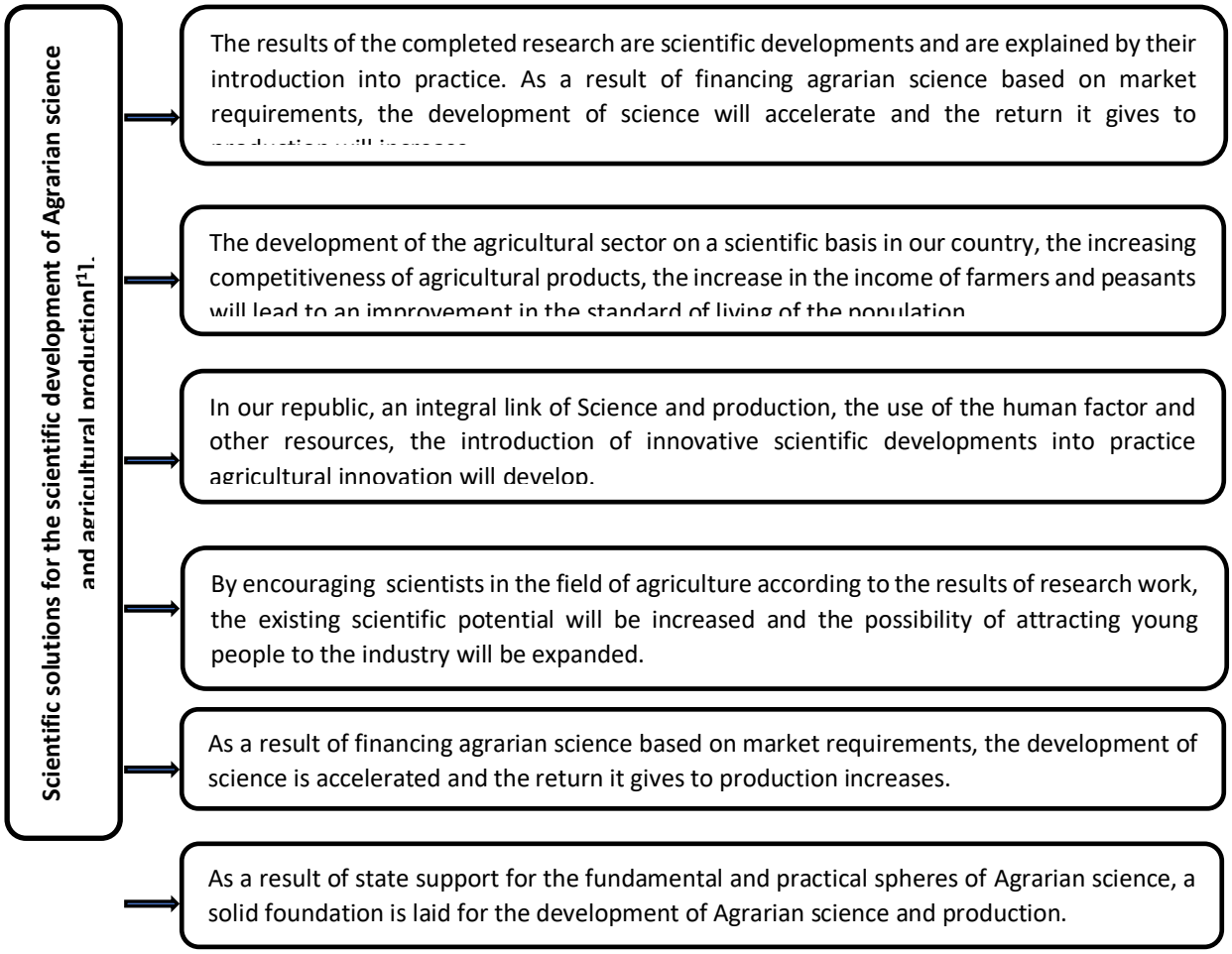


Figure 4. Scientific solutions for the scientific development of Agrarian science and agricultural production[[3]].

In the process of research carried out in finding these solutions, it is necessary that not only scientific research institutions and higher education institutions

[3]Source: developed by the author.

engaged in science participate, but also the ministries, departments and, of course, the private sector in which the government is required.

The solution of agricultural problems, in turn, is associated with the creation of additional value by diversifying the composition of crops, increasing productivity and livestock productivity, increasing the product quality indicator, reducing losses in the cultivation, collection, transportation and storage of products, developing product processing and marketing issues.

The need to improve the system of scientific provision of Agriculture: determined by the role of the industry in the country's economy, which, in turn, determines the directions for the development of this agricultural sector; ways to develop the field on a scientific basis; determining the priorities of research work; the need to finance research work and increase the efficiency of.

There are various methods of innovative development of agricultural production, the active use of which increases the production efficiency of the agricultural sector.

Agricultural activities should be adapted to the method of solving tasks in two areas. Methods of solving tasks in the agricultural direction:

- First direction; management of the activities of higher educational institutions and research institutes in the structure of agriculture, the selection of Personnel, their placement, management of postgraduate and doctoral activities, financing, strengthening the material and technical base of scientific institutions, coordination of construction, repair work and other economic activities in agriculture. This direction should include such tasks as managing economic and financial affairs of scientific institutions. This direction should be headed by the scientific center in agriculture.

- Second direction; it is advisable to organize a system that comprehensively summarizes agricultural work, contributes to the integration of Science and production with each other, contributes to the implementation of research results, provides agricultural arable land with guaranteed water, provides rational and targeted use of water, supports the introduction of water-saving technologies in agriculture. As well as involvement of advanced experience of developed countries in agricultural production.

These methods are considered scientific solutions to the problem of solving agricultural tasks.

Such a change in the current structural structure of the country's agricultural system looks like this: increasing the responsibility of researchers, to increase the efficiency of funds aimed at agricultural research. Makes it possible to comprehensively objectively evaluate completed scientific work, including evaluating its effectiveness.

The most optimal direction for the scientific development of the country's agriculture is the implementation of projects, and it is envisaged to solve two issues at once. Implementation of agricultural projects and issues solutions:

- First issue; The fact that one scientific innovation introduced in agriculture is not associated with other scientific innovations in this direction, is not bound by

the organizational and economic side, does not provide an opportunity to effectively use from scientific news. In addition, the system of creating projects in agriculture is also not sufficiently established, more precisely, it is necessary to develop specialized enterprises producing projects. It must be said that the customers for the project are also not clear.

- Second issue; We believe that by concentrating financial resources and the mechanism of its use, it will be appropriate to approach the solution of problems as follows. To develop the economy of the country's agrarian sector, it is advisable to introduce a scientific project, to establish special cooperatives that introduce projects, taking into account the difficulty of implementation by farms and peasant farms. Such cooperatives are engaged in the design, creation and implementation of innovative projects. These cooperatives, called “cooperative for the creation and implementation of innovative projects in agriculture”, are in a non-governmental form and work on a commercial basis. In this regard, the issue of the scale of the introduction of innovative projects should also be considered. Agricultural enterprises limit the possibility of implementing an innovation project due to the small size of the land area and production costs, lack of financial resources and, in most cases, the cost of introducing innovations does not justify itself.

The first is to find sources of funding for the structure and mechanism for introducing scientific innovations.

The second is that these resources are concentrated financial resources, and it is also necessary to develop a mechanism for its use.

It provides an opportunity to dwell on these two directions separately, to study the problems in them in more detail, to improve their effective mechanism.

It is obvious that with the introduction of digital technologies and modern agro biotechnologies, automation and robotization of agricultural sector, the list of specialties and competencies of agricultural workers will expand [10].

In our opinion, the researcher and the consumerist of the research results are also obliged to be attached to one system, to create a mechanism of economic relations between them, based on mutual equality, independence.

Such a system can be implemented on the basis of a scientific project. It combines all the factors listed above and ends with the sale of its final product. Thus, as an important link in the introduction of scientific developments, it is necessary to transfer agriculture to the path of scientific innovation development. At the same time, the volume of incomprehensible research for the current consumer is decreasing. The study will be aimed at achieving the set goal and result.

Results

From the introduction of scientific developments in agricultural sectors, it is advisable to take as a basis the economic efficiency that can be obtained at the expense of one hectare. In this case, it is recommended to take the following indicators:

The implementation of these functions is mainly carried out through investments using internal and external sources of financing [11].

- the rate of increase in the yield of agricultural crops due to the introduction of scientific developments (Yi);

- increased level of quality of agricultural products grown due to the introduction of scientific developments (Qi);

- the degree of reduction of Labor consumption on one hectare of arable land, due to the introduction of scientific developments (Lcr);

- the rate of decline in the cost of material and technical resources within one hectare of arable land, due to the introduction of scientific developments (MTcd);

Based on these indicators, it is proposed to calculate the economic efficiency of scientific developments in the following formula (IS):

$$IS = \frac{Yi_n}{Yi_o} + \frac{Qi_n}{Qi_o} + \frac{Lcr_o}{Lcr_n} + \frac{MTcd_o}{MTcd_n} \geq 1, [4].$$

Here: Yi_n, Yi_o - to increase the yield of new crops obtained due to the introduction of scientific developments (Yi_n) and the level of old productivity up to the introduction (Yi_o), (c/ga);

Qi_n, Qi_o - an increase in the quality of new products obtained due to the introduction of scientific developments (Qi_n) and an increase in the quality of their old products before the introduction (Qio), (dollar/ga);

Lcr_n, Lcr_o - a reduction in the consumption of new Labor obtained as a result of the introduction of scientific developments (Lcr_n)-and the degree of reduction of old Labor consumption up to the introduction (Lcr_o), (man-hour/ga);

$MTcd_n$, $MTcd_o$ - a decrease in the cost of new material and technical resources obtained due to the introduction of scientific developments ($MTcd_n$) and a decrease in the cost of old material and technical resources up to the introduction ($MTcd_o$) (expense-dollar/ga);

Here, the final result obtained must have a coefficient greater than "1" or equal to 1", otherwise, if the final result obtained is less than "1", the economic effect of the introduction of scientific developments is considered unattainable, and the scientific result is denied.

In our opinion, the research associated with the introduction of scientific developments is the result of scientific activity in practice in order to increase the efficiency and competitiveness of production in agriculture, provide scientific products, improve the quality indicators of goods.

Prices based on the effect obtained as a result of the introduction of scientific developments in agricultural sectors prevent price differences between researchers and consumers. Because in this case it is determined by the real impact that can be obtained as a result of the implementation of innovations to farmer farms and peasant farms.

The transition of producers of agricultural products to the path of innovation creates the basis for an increase in the efficiency of production of this product.

[4]Source: This formula was developed on the basis of research.

Discussion of finding solutions based on our research on the factors identified in the gricultural sector and its aspects in eliminating the problems associated with them.

Factors of innovation activity of subjects of the agricultural sector: scientific support of the scientific development of the sphere, selection of priorities in mastering scientific achievements in agricultural production; accelerate the development of innovations that meet the requirements of agricultural production; economic incentives for the results of scientific activities of employees of the sphere; the interest of agricultural commodity producers in additional incentives from the introduction of scientific developments; the concept of scientific developments recommended in agricultural networks in order to master the production of commodity producers; scientific and organizational training of personnel at all levels of the research process.

Problems in agrarian science that are extremely relevant today: improving the regulatory framework of land relations; improving the financial condition of the country's agricultural sectors; it is necessary to work on improving the relations of economic entities and the interrelationships of the directions of the state agrarian policy.

The tasks set to accelerate the introduction of scientific and technical achievements in the field should be prepared for the training of scientific personnel and their research in market conditions.

It is known that today in the rapidly developing world market, the volume of food products of genetic modification is increasing. In developed countries for the cultivation of food products based on gene engineering, great research is being carried out, and for us, to know the pros or cons of this process, we must also have the appropriate knowledge and a scientific base.

Problems of the agricultural sector which affect the improvement and development of the technological process were identified. It was emphasized that new technologies can reconstruct the structure of the agricultural industry and provide the population with agricultural products [12].

Determination of the entities from the scientific product user today, then that's, choosing a research topic of the entities, order give, financing and its role in the implementation of the completed research work and participation will have to be clarified. It is difficult to find the right solution to the problems listed above without clarifying these issues.

Conclusion and Recommendations

As a result of the research carried out, the following basic scientific conclusions were developed.

The following problems may arise with expanding the scope of research work in the agricultural sector and improving the financing system, the reason for which is as follows: no mechanism has been created for a new approach to research work; a new system of financing research work has not been introduced; scientific product users are currently using this product for free; insufficient knowledge and lack of information about the use of scientific developments in agriculture and the benefits

of new technologies; there are not enough concepts of farmers and peasant farms in production, in terms of improving their finances and the benefits they receive; there is not enough environment in agricultural production to introduce innovations in science and technology and technology.

One of the important aspects is the further development of agricultural production in the regions, the creation of a scientifically based system of regional agriculture, based primarily on the current state of each region, in solving the problems listed in the agricultural sectors.

Recommendations for use as a new solution to agricultural problems: introduction of advanced technical-technological, organizational and economic solutions in agricultural activities; high-yielding varieties, livestock, elite seeds, which are characterized as a complex process, are the creation of highly effective agricultural techniques and aggregates. The orientation of agricultural enterprises on the path of scientific development can be determined by analyzing the ability, capabilities and readiness of farms and peasant farms for innovation.

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TURK BALETI TARIXIDAN HOZIRGI DAVRGACHA: BALETMEYSTER MEHMET BALKANNING IJODIY FAOLIYATI

Annotatsiya: *Mazkur maqolada Turkiya Respublikasida balet san’atining shakllanishi va rivojlanish bosqichlari tahlil qilinadi. Ayniqsa, turk baletining zamonaviy bosqichida yirik baletmeyster va xoreograf Mehmet Balkanning ijodiy faoliyati o‘rganiladi. Uning milliy va jahon balet san’ati rivojiga qo‘shgan hissasi, sahnalashtirgan asarlari, uslubiy izlanishlari hamda yosh avlodni tarbiyalashdagi roli yoritilgan. Maqolada tarixiy manbalar, san’atshunoslik tahlillari va tanqidiy fikrlar asosida turk baletining kechmishi hamda hozirgi davri o‘rtasidagi uzviylik ilmiy asosda ko‘rsatib beriladi.*

Kalit so‘zlar:*Turk baleti, Mehmet Balkan, baletmeyster, xoreografiya, milliy raqs, sahnalashtirish, madaniyat, san’at, zamonaviy balet, Turkiya Davlat Operasi va Baleti.*

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FROM THE HISTORY OF TURKISH BALLET TO THE PRESENT DAY: THE CREATIVE ACTIVITY OF BALLET MASTER MEHMET BALKAN

Abstract: *This article explores the development of Turkish ballet on the world stage through the creative activity of choreographer Mehmet Balkan. It examines his distinctive artistic features, such as the combination of national and modern elements, choreographic plasticity, and expressive movement. The research concludes that Balkan’s works represent a synthesis of Eastern spirituality and Western ballet aesthetics, contributing significantly to the global recognition of Turkish ballet.*

Keywords: *Turkish ballet, Mehmet Balkan, choreography, stage direction, cultural integration, modernity.*

In the mid-twentieth century, ballet art as one of the most important branches of Western culture began to take shape in Turkey. The entry of ballet into Turkey and its enrichment with national features became one of the important stages in the

process of modernization of Turkish culture. This process is associated with the invitation to Turkey in 1947 of one of the leaders of the British Royal Ballet, the famous choreographer Dame Ninette de Valois, who founded the Yeşilköy Ballet School in Turkey, laying the foundation for the first professional ballet education. Thus, Turkish ballet was formed, and in the 1950s and 1960s it was recognized as a new form of performing arts, integrating its traditions with Western schools. One of the artists who grew up during this historical process is Mehmet Balkan, who is internationally recognized as a leading ballet artist, stage director and teacher of modern Turkish ballet.

formative period of Turkish ballet (1940–1970s). Foreign teachers - Joy Newton, Audrey Knight, Dame Ninette de Valois - played an important role in the development of ballet art in Turkey at the initial stage. They founded professional ballet schools in Istanbul and Ankara and trained the first cadres of the Turkish National Ballet. In the 1950s and 1960s, the first Turkish ballets were staged at the State Opera and Ballet in Ankara. Early national ballet works include "Çeşmebaşı" (composer Ferit Tüzün), "Keloğlan", "Hürrem Sultan" and "Judith". During this period, Turkish ballet absorbed the forms and techniques of classical European ballet and tried to add elements of national dance.

National motives in Turkish ballet

Turkish ballet developed in the middle of the twentieth century and allowed to bring on the stage the culture, traditions and musical heritage of our people. National motifs are important in the art of ballet, not only enriching the appearance of the stage, but also conveying to the viewer a kind of national spirit. In this article we will dwell in detail on the formation of national motives in Turkish ballet, their characteristics and their application to the stage.

The emergence of national motifs Although the art of ballet in Turkey has adopted the stylistic foundations of European classical ballet, it has always included elements of national tradition and folklore. In 1947, ballet schools established in Yeşilköy, as well as with the help of Dame Ninette de Valois, began the development of Turkish ballet. During this period, ballet directors and choreographers sought to bring national music, dance, and costumes to the stage. National motifs are manifested in Turkish ballet in several forms: 1. Through music – national instruments and folk music motifs are integrated into ballet music.2. Through dance style – folk dances and ethnic movements are adapted to ballet choreography.3. Through costume and stage design – national costumes, ornaments and décor elements increase the originality of the stage. Examples of national motives in Turkish ballet The most vivid examples of national motives in Turkish ballet are the following: 1. Ballet "Çeşmebaşı" – in this ballet, folk dances and national musical rhythms play a central role. The stage costumes and character movements were inspired by Turkish folklore. 2. Ballet "Jalal ad-Din Manguberdi" – a historical theme in which national spirit and costumes of the period were brought to the stage. 3. "Keloğlan" and children's ballets – promotes national motives by bringing national fairy tales and folk heroes to the stage. National motifs not only decorate the stage, but also enhance the dramatic and emotional composition of the

ballet. For example, movements in folk dances help to determine the character of the characters on stage.

Distinctive features of national motives

National motives in Turkish ballet are distinguished by the following features:

Dynamic and rhythmic harmony – folk dances are in harmony with the rhythmic structure of Turkish ballet.

Local Clothing and Accessories – On stage, historical and regional clothing conveys a national spirit.

Integration of music and dance – a scenic movement performed by folk instruments brings national culture to the audience.

The combination of story and theme – national motifs are adapted to the ballet script in order to make the story on stage more lively.

The Role of National Motives in Modern Ballet

Today, Turkish ballet combines elements of modern choreography and folk, creating a distinctive style. National motives give ballet the following benefits:

preservation and promotion of cultural heritage - bringing folk music and dancing to young audiences.

Creating an identity for foreign audiences – thanks to national elements, Turkish ballet stands out in the world.

Creative expansion – national motives inspire the creation of new movement and musical elements in new ballet performances.

Conclusion

In Turkish ballet, national motifs are an integral part of the art, giving to each element on the stage a uniqueness, historical and cultural content. National motifs serve not only as an aesthetic asset, but also as a means of cultural identity. Therefore, Turkish ballet is creating its own distinctive and modern path by combining the national spirit with the classical style. Through national motifs, the ballet stage provides not only a visual but also an emotional experience for the viewer.

The stage of development of modern Turkish ballet (1980–2000) By the 1980s, the art of ballet in Turkey had reached a new level. State attention to culture grew, new theaters, opera and ballet troupes were created. During these years young choreographers appeared on the stage, among them Mehmet Balkan. Mehmet Balkan was born in the 1950s and graduated from the Ankara Conservatory. She started working as a dancer in the troupe of the Ankara State Ballet, later she has performed in foreign theaters, especially in Germany, Austria, He honed his skills in the England scenes. Since the 1980s, he has continued his ballet career and in a short time became one of the most active choreographers in the art of Turkish ballet. His works, based on the style of "modern ballet", embody dramatic content, psychological state and contemporary stage expressions in contrast to classical forms. The so-called "Mehmet Balkan style" is based on the expressive power of the movement, the harmony of modernity and nationalism in dramaturgy.

Mehmet Balkan sheds light on Turkish historical heroes, national legends, modern human mentality and social themes in his work. The famous ballet works Jaloliddin Manguberdi illuminates the historical theme of the Uzbek and Turkic peoples with a unique combination of drama and movement. In this ballet, she brought a fresh look at the historical epic genre in the art of ballet, expressing the image of a national hero in modern choreographic language. The ideas of patriotism, freedom and courage are conveyed in the work through the medium of ballet art.

Emerald (Samarin Bird) is a philosophical ballet staged as a symbol of rebirth, spiritual renewal and hope. There are many scenic compositions, contemporary ballet numbers based on folk dances, created for the Bodrum Ballet Festival. He has reinterpreted such world classics as "The King and Ben", "Notre Dame de Paris", "Don Quixote" on the Turkish stage. He has also worked as Artistic Director and Artistic Director of the Antalya, Izmir, Mersin and Istanbul State Ballet Theatres. Under his leadership, dozens of young choreographers and dancers have matured.

Stylistic features of the Balkans In his staged works, the following features can be distinguished: The combination of national motifs and contemporary forms. He combines the plasticity of folk dances with classical ballet techniques. Movement dramatism Each scene expresses emotions through action. In his synthesis of music and dance, he often uses the works of Turkish composers, thereby harmonizing the tones of national music into the rhythms of ballets. In stage design, Balkan's work is visually modern, symbolic and aesthetically perfect. Her work was positively assessed by international critics and became a symbol of the new stage of the so-called "modern era" of Turkish ballet.

Today Mehmet Balkan works as an experienced ballet dancer, stage director and teacher in the Turkish State Ballet system. Not only does she stage performing performing works, but she also directs tutoring classes, workshops and international festival projects for young dancers. In 2018, the ballet "The Lady of the Camellias" by Mehmet Balkan became one of the milestones in the history of Uzbek ballet art on the stage of the State Academic Bolshoi Theater named after Alisher Navoi in Tashkent. This two-act performance is based on the famous novel by Alexandre Dumas, the works of Giuseppe Verdi and Pietro Mascani were chosen as the musical solution. Through this work, Balletiste showed his delicate aesthetic taste, his skill in expressing dramatic situations through movement. On stage, she creates a new artistic expression by combining classical dance techniques with elements of Turkish plasticity. The ballet's stage solution, acting dramatism and decorative decorations are highly appreciated by viewers and critics. The ballet "Our Lady of the Camellias" not only enriched the theater's repertoire, but also became a major artistic event in the cultural life of Tashkent. In 2023, the creative cooperation between the State Academic Bolshoi Theater named after Alisher Navoi in Tashkent and Mehmet Balkan reached a new level. The national ballet "Jaloliddin Manguberdi" was dedicated to the historical character of the Uzbek folk hero. This work became a vivid example of the harmony of friendship between the two peoples, historical values and national spirit. The work was composed by the artist Rustan Abdullayev, who served in Uzbekistan, and the Turkish artist Tayfun Chebi

worked on the stage decoration. In the ballet, Jalal ad-Din's courage, selflessness, personal suffering and dreams are expressed. In this work, Mehmet Balkan combines the Uzbek historical theme with the aesthetics of Turkish ballet, creating a work that has a strong dramatic effect on the audience. The performance was recognized as the supreme artistic expression of the ideas of national spirit, historical pride and patriotism. In February 2025, Balkan will present another major project on the stage of Tashkent. He has published works such as "Bolero" by Maurice Ravel and "Holy Spring" by Igor Stravinsky staged. These performances became a unique event in the cultural life of Uzbekistan.

The ballet Bolero combines the rhythmic dynamics of Ravel's music with Uzbek national melodies and creates a new aesthetic atmosphere. The ideological interpretation of the work was skillfully expressed on the stage by Abdullo Alimov. The Sacred Spring Ballet, on the other hand, is characterized by its intense dramatism and philosophical content. The spiritual power of Stravinsky's music was combined with the Uzbek national movements and left a deep emotional impression on the audience. Through these works Balkan presented vivid examples of the national spirit of enrichment of the international musical heritage and through his creativity brought to the Uzbek stage the advanced experience of the Turkish ballet school. The art of the Balkans strengthened the cultural closeness of the two peoples, the Uzbek and Turkic peoples, and took their place in the history as the vivid example of international artistic dialogue through art. Despite its short history, Turkish ballet today occupies a special place among the ballet schools of the world, and the contribution of such dedicated artists as Mehmet Balkan to these achievements is invaluable. He set the modern direction of Turkish ballet not only through his stage works, but also through his teaching activities. Through his work, Turkish ballet was shaped as an art that achieved a harmonious blend of nationalism, modernity and universality.

Ballet in Turkey today is developing and performing extensively on stage. The State Opera and Ballet Theaters of Istanbul and Ankara stage classical works such as Gizele, Don Quixote, and modern ballets. Ballets based on national themes are also popular: ballets by Mehmet Balkan and Jaloliddin Manguberdi reflect elements of Turkish history and folklore. Professional ballet dancers are trained in the ballet departments of Hacettepe Conservatory and Istanbul Conservatories. The younger generation of ballet dancers will learn not only classical techniques, but also modern dance and choreography. International cooperation is widespread: master classes and stage exchanges take place with schools in Russia, France, the UK. In modern trends, experimental stage movements, multimedia elements and interactive performances are popular. Although financial resources are limited, with the help of private theaters and international grants, ballet continues to thrive. The main task today is to express the national identity through ballet and train a new generation.

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YER OSTI KON ISHLARIDA SHAMOLLATISH ISHLARINI OPTIMALLASHTIRISH

Annotatsiya: *Hozirgi davrda konchilik sanoati mamlakat iqtisodiyotining asosiy o'rinlaridan biridir. Yer osti koni ochiq konlarga qaraganda tuzilish va shamollatish jihatdan murakkabroq va xavfli kon hisoblanadi. Shunday ekan shamollatish ishlarini optimallashtirish ishchilar sog'ligiga ta'sir etuvchi zararli va zaharli omillarni hamda shamollatish davrini tezlashtirish orqali qazib olish samaradorligini oshirishga imkon beradi. Ushbu maqolada shammolatish quvurlariga o'zgartirish kiritish hamda qo'shimcha shamollatish ventilyatorini ma'lum vaqtga qo'yish haqida so'z boradi.*

Kalit so'zlar: *shamollatish usullari, shamollatish quvuri, shamollatish ventilyatori, zaharli va zararli gazlar.*

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OPTIMIZATION OF VENTILATION IN UNDERGROUND MINING OPERATIONS

Annotation: *currently, the mining industry is one of the main places in the country's economy. An underground mine is a structurally and aerationally more complex and hazardous mine than open pit mines. Therefore, the optimization of ventilation work makes it possible to increase the efficiency of mining by accelerating the harmful and toxic factors affecting the health of workers and the ventilation cycle. This article will talk about making changes to the ventilation pipes as well as placing an additional ventilation fan for a certain period of time.*

Keywords: *ventilation methods, ventilation duct, ventilation fan, toxic and harmful gases.*

Konchilik ishlari mamlakat iqtisodiyotining eng muhim va ajralmas bo'lagi bo'lishi bilan birga eng xavfli ishlab chiqarish turidir. Asosan yer osti konchilik

ishlarida zaharli va zararli omillar kon ishchisi salomatligiga jiddiy ta'sir ko'rsatadi. Asosiy omillarga gaz, chang, havo haroratining yuqoriligi, havodagi kislorod miqdorining tushib ketishini misol qilib olish mumkin. Bu xavfli omillarni kamaytirish uchun shamollatish va qazib olish tizimini to'g'ri tashkil etish eng muhim vazifadir.

Shaxtaga toza havo yuboruvchi va ishlatilgan havoni chiqarib yuboruvchi stvollar o‘rtasidagi o‘zaro bog‘liqlik bo‘yicha shaxatani shamollatish yagona va seksiyali bo‘lishi mumkin. Shaxatani yagona shamollatish sxemasida havo yuboruvchi stvol barcha shamollatish stvollari bilan bog‘langan bo‘ladi. Shaxta maydonini (seksiyasini) shamollatish sxemasi havo harakatlanishining yo‘nalishlari bo‘yicha markaziy, flangli va aralash bo‘lishi mumkin [1. 74-bet]

Yer osti konchilik ishlarida shamollatishni 3 xil usulda amalga oshirish mumkin. Bular: Quvurlar orqali havo yuborish, so'rib olish va kombinatsiyalashgan. Har bir usul o'ziga xos avzalliklarga va kamchiliklarga ega. Masalan havo yuborish orqali shamollatilganda ish olib boriladigan joy muntazam toza havo bilan ta'minlanib turadi ammo zararli gazlar kon maydoni bo'ylab tarqalib ketadi. Havoni so'rib olish usulida ish joyini toza havo bilan ta'minlash murakkablashadi, sababi toza havo ochuvchi kon lahimi orqali kirib kon lahimlari orqali keladi va lahimlarda harakatlanuvchi transportlar, chang, kon lahim devorlaridan sizib chiqayotgan gazlar havo tarkibini sifatsizlantiradi. Kombinatsiyalashgan usul bilan shamollatish ishlarini jadallashtirish mumkin bo'ladi.Ushbu maqolada biz ko'rib chiqadigan usul shamollatish quvuriga qo'shimcha havoni so'rib olish uchun teshiklar ochish va portlatish ishlari amalga oshirilgandan so'ng shamollatish ishlarini qo'shimcha ventilyator qo'shish orqali jadallashtirish. Demak bu jarayon qanday kechadi? Ruda konlarida lahimlarni qazib olish portlatish ishlari orqali amalga oshiriladi va portlatish ishlaridan so'ng katta miqdorda chang va gaz hosil bo'ladi. Portlatish ishlaridan ajralib chiqgan mayda zarrachalar havoda ko'p muddat muallaq holda turadi. Portlash ishlaridan so'ng havoni so'rib olish orqali shamollatish eng muqobil yechim ammo quvurning faqat bir tomonidan havo so'rib olish shamollatish davrini uzaytirishga sabab bolishi yoki yetarlicha toza havo bilan ta'minlab bera olmasligi mumkin. Bu holatda shamollatish quvurining 3-7 metr qismiga teshiklar ochish orqali hosil bo'lgan chang, zaharli va zararli gazlarni tezroq tortib chiqarish imkoni mavjud bo'ladi. Shamollatish ishlarini faqat shamollatish davrida tezlashtirish mumkin chunki ish paytida tezlashtirish ishchilar sog'ligiga zarar yetkazadi. Har bir konda asosiy shamollatish ventilyator kamida 2 ta bo'ladi, ya'ni ishchi va zahira ventilyatori. Shamollatish davrida shamollatish ishlarini tezlashtirish uchun qo'shimcha ventilyator qo'shib kovjoydagi havoni so'rib olish orqali bu davrni tezroq tugallash mumkin. Bunda qo'shimcha ventilyator asosiy ventilyatorga qo'shilib havoni tezroq so'rib olish imkoniyatini yoki kon lahimiga havo yuborish orqali bu jarayonni tezlashtirish mumkin bo'ladi.

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HISTORY OF THE STUDY OF OIKONYMYS IN SOUTHERN UZBEKISTAN

Annotation. *This article highlights the history of toponymic study of the toponyms of Kashkadarya and Surkhandarya regions, which are part of Southern Uzbekistan. The research work of many toponymists who studied the toponyms of this region was thoroughly analyzed, and toponymic research that needs to be carried out in the future was determined.*

Key words*: toponym, oikonym, oronym, toponymic system, oikonymic system, geographical name.*

Like any modern science, geography is characterized by the rapid development of its branches adjacent to related scientific disciplines. Such research directions include toponymy (from the Greek topos - place and onomo, onima - name), which is usually defined as a science (scientific direction) developed at the intersection of geography, history, and linguistics. Scientific research of toponyms is of great interest. The toponyms of our country have gone through a complex path of development and formation. Their toponymic system was in constant dynamic motion and felt the influence of many peoples, therefore today it reflects the geography of the past. Therefore, the study of geographical names is of paramount importance.

Toponyms express social knowledge of the environment and arise during the development of objective phenomena. At the present stage of human development, none of the sciences can exist in isolation from each other. Mutual development and interpenetration for sciences is a natural phenomenon. On this basis, interdisciplinary sciences arise. Thus, toponymy functioned and was formed on the border of geography, history and linguistics.

In our country, many toponymic studies by toponymist scholars began in the 1950s. In this regard, research work was carried out by H.Hasanov, S.Koraev, T.Nafasov, Z.Dusimov, N.Okhunov, T.Enazarov, N.Ulukov, M.Mirakmalov and other toponymist scientists. It is on the toponyms of Southern Uzbekistan (Kashkadarya and Surkhandarya regions of the Republic of Uzbekistan), which we are studying, that such scientists as T.Nafasov, E.Khuzhamberdiev, Kh.Khuzhamuminov, T.Enazarov, O.Begimov, S.Tursunov, B.Eshboev conducted their research work. The purpose of our research today is to deeply analyze these

research works and determine the work that needs to be done in future toponymic research.

Toponymy is of interest to many scientists due to its versatility. Toponyms, which are an integral part of the environment, imperceptibly enter the subconscious and the life of society. It is natural that there is a desire to understand and reveal the genesis and evolution of geographical names. Among the regions of Uzbekistan, the Kashkadarya and Surkhandarya regions stand out for their significant toponymic uniqueness.

The role and contribution of T.Nafasov to the scientific research of toponyms of Southern Uzbekistan is invaluable. Many of his scientific works are devoted to the toponyms of Southern Uzbekistan, especially the toponyms of the Kashkadarya region. In the research works of T.Nafasov, the toponyms of Kashkadarya are given as consisting of the following toponymic layers according to their origin: toponyms related to Turkic words; toponyms with a Mongolian element; toponyms of Sogdian origin; toponyms with an Arabic element; toponyms of Persian-Tajik origin; toponyms of Soviet-international origin.

It has also been established that the toponyms of Kashkadarya originated mainly on the basis of the following 10 types of lexico-semantic principles, and some examples of them are given: 1. Toponyms based on ethnic characteristics; 2. Toponyms derived from names and nicknames; 3. Toponyms derived from the names of people's professions or occupations; 4. Toponyms formed from the characteristic natural features of the object; 5. Toponyms created on the basis of beliefs, religious traditions, or the names and pseudonyms of priests; 6. Toponyms denoting any event; 7. Toponyms based on the quantitative characteristics of the object; 8. Toponyms reflecting some features of the old social system; 9. Toponyms derived from the names of other objects; 10. Toponyms created during the years of Soviet power.

The scholar has published major works such as: “Ўзбекистон топонимларининг изоҳли луғати (Ўзбекистоннинг жанубий районлари)” (1988), “Қишлоғингиз нега нега шундай аталган?” (1989), “Ўзбек номномаси” (1993), “Қашқадарё қишлоқномаси” (2009), “Қашқадарё ўзбек халқ сўзлари луғати” (2011).

E.Khojamberdiyev's research work is directly devoted to the study of Surkhandarya toponyms. In his research, he divided the toponyms of the Surkhandarya region into 4 groups, such as toponyms related to the Persian-Tajik language, common Turkic language, Arabic language, and Mongolian language lexicon, according to the lexicon of which people they belong to in terms of their appearance and formation, and determined their role in phyoz, and developed a map of their territorial distribution. Also, in this scientific work, a list of villages named after ethnonyms and a map of the territorial distribution of ethnotoponyms of the region were developed.

Kh.Kholmuminov's research work is devoted to the toponyms of the Baysun district, mainly microtoponyms. In his research work, villages, auls, and towns were studied separately into a separate group, in which he divided the oikonyms of the

region into 6 classifications and gave examples of them: 1. Indicating the features of the location of settlements; 2. Describing fauna or other natural conditions; 3. Indicating the natural conditions of the relief where the objects are located; 4. Names derived from hydronyms; 5. Oikonyms, the origin of which is connected with historical events, have been largely forgotten to this day; 6. Neotoponyms, that is, names of a new era.

T.Enazarov is a prominent philologist who studied the toponymy of Uzbekistan. His dissertation is devoted to the study of the toponyms of the Shakhrisabz region of Southern Uzbekistan. Taking into account the historical belonging of the place names of the Shahrisabz region to the lexicon of which language, he distinguished 6 layers, such as place names related to the common Turkic lexicon, place names specific to the lexicon of the Sogdian language, place names related to the lexicon of the Persian-Tajik language, place names specific to the lexicon of the Arabic language, place names related to the lexicon of the Mongolian language, and place names that appeared with a lexical layer borrowed from the Russian language and through it from other languages. Also, in the research work, it is written that toponymic definitions are words denoting the type of objects, and they are divided into groups, one of which is called toponymic definitions of an oikonymic nature, which are given as examples of sitting, guzar, village, mahalla, etc. At the same time, in the lexico-semantic classification of place names of the Shahrisabz region, oikonyms are presented as a separate group, divided into astionyms and comonyms, and information about some oikonyms of this region is provided.

O.Begimov is currently considered a leading toponymist in the study of toponyms, especially oronyms, of Southern Uzbekistan. In his research, toponyms belonging to ancient Iranian languages (Sogdian, Khorezmian) and modern Iranian languages (Persian, Tajik) in the territory of Southern Uzbekistan were studied, and some oikonyms were given as examples. Also, some examples of oikonyms based on such components of Iranian languages as kat, diz// diza, man// mon, metan// maton, var// vor, wag'n//fag'n, deh (di//dey//dev) and others, which actively participated in the formation of oikonyms, are given. He also deeply studied the oronyms of this region.

A prominent historian, S.Tursunov, in many of his works, provides information on the toponyms of the Surkhandarya region, their meaning, and the reasons for their naming. In the scholar's book “Сурхондарё вилояти топонимлари” (2008), we see that he deeply studied the toponyms of the region. The scientist also co-authored major toponymic works such as “Ўзбекистонда топонимик номлар ва уларнинг тарихи” (2017) and “Сурхондарё вилояти жой номлари изоҳли луғати” (2025).

Also, M.Umarova studied the toponyms of the Surkhandarya region from a physico-geographical point of view, and in her works, we see that the issues of physico-geographical classification of toponyms of the region, types according to the nature of their origin, and the features of the formation of toponyms based on topoformants are highlighted.

B.Eshboev studied the toponyms of the Kashkadarya region from a physico-geographical point of view, and in his research work it was found that the physico-geographical terms that are part of the toponyms of the Kashkadarya region are most often actively used in oronyms and oikonyms. In particular, the term "tepa" participated in the oikonym 75 times, 83% of toponyms with the term "tosh" and 94% of toponyms with the term "dara" consist of oronyms and oikonyms. “Map of oikonyms of the Kashkadarya region" was created.

Another researcher who studied the toponyms of the Kashkadarya region is A. Berdiyev. He especially studied many secrets of the toponyms of the Kitab district. His works mainly contain the names of pilgrimage sites and their names, notable places and settlements in the Kitab district.

In general, from the data of the above analysis, it can be seen that, despite the publication of many scientific research works and books on the toponyms of Southern Uzbekistan from linguistic and physical-geographical points of view, to date, scientific research has not been carried out on oikonymic systems, from the point of view of topoterminology, content, historical and natural-economic aspects of oikonyms. This requires a deeper study of the oikonyms of this region.

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THE SOCIAL ECONOMY OF THE MODERN ERA AS A RESULT OF GLOBALIZATION

Annotation: *Globalization has profoundly reshaped the contemporary social economy by integrating national markets, accelerating capital flows, and fostering technological and cultural exchange. This study examines its dual impact: while driving unprecedented economic growth and the emergence of a global middle class, it has simultaneously intensified income inequality, disrupted labor markets, and exacerbated environmental degradation. Drawing on data from the WTO, UN, Oxfam, and Brookings Institution, the analysis highlights divergent outcomes across developed and emerging economies, with case studies from the United States, China, and Uzbekistan. The paper argues that sustainable progress requires a shift toward fair globalization, where states harmonize national strategies with international cooperation and transnational corporations uphold stronger social and ecological accountability. The findings underscore globalization not merely as an economic phenomenon but as a pivotal force redefining social structures in the 21st century.*

Key words: *globalization, social economy, inequality, labor migration, sustainable development, transnational corporations, national policy.*

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GLOBALIZATSIYA NATIJASIDA HOZIRGI ZAMON IJTIMOIY IQTISODIYOTI

Annotatsiya: *Globalizatsiya milliy bozorlarni integratsiya qilish, kapital oqimlarini tezlashtirish hamda texnologik va madaniy almashinuvni rag‘batlantirish orqali zamonaviy ijtimoiy iqtisodiyotni tubdan o‘zgartirdi. Ushbu tadqiqot uning ikki tomonlama ta’sirini o‘rganadi: bir tomondan, misli ko‘rilmagan iqtisodiy o‘sish va global o‘rta sinfning paydo bo‘lishini ta’minlasa, boshqa tomondan, daromad tengsizligini kuchaytirdi, mehnat bozorlarini buzdi va ekologik degradatsiyani yanada og‘irlashtirdi. JST, BMT, Oxfam va Brookings Institution ma’lumotlariga asoslanib, tahlil rivojlangan va rivojlanayotgan iqtisodiyotlardagi farqli natijalarni ta’kidlaydi; AQSh, Xitoy va O‘zbekiston misollarida. Maqola barqaror taraqqiyot uchun adolatli globalizatsiyaga o‘tish zarurligini ta’kidlaydi, bunda davlatlar milliy strategiyalarni xalqaro hamkorlik bilan*

muvozanatlashtiradi, transmilliy korporatsiyalar esa kuchliroq ijtimoiy va ekologik mas'uliyatni o'z zimmasiga oladi. Natijalar globalizatsiyani faqat iqtisodiy hodisa emas, balki XXI asr ijtimoiy tuzilmalarini qayta shakllantiruvchi muhim kuch sifatida ko'rsatadi.

Kalit so'zlar: *globalizatsiya, ijtimoiy iqtisodiyot, tengsizlik, mehnat migratsiyasi, barqaror rivojlanish, transmilliy korporatsiyalar, milliy siyosat.*

Globalization, often described as the defining phenomenon of the late 20th and early 21st centuries, represents an unprecedented convergence of economies, societies, and cultures across borders. Fueled by advancements in transportation, telecommunications, and digital technology, it has dismantled traditional barriers to trade, investment, and information flow, creating a deeply interconnected global system. This process has not only accelerated the movement of goods, services, and capital but has also facilitated the rapid dissemination of ideas, innovations, and cultural practices—reshaping the very fabric of modern social and economic life.

At its core, globalization has transformed national economies into components of a single, dynamic world market. The rise of transnational corporations (TNCs), the liberalization of trade under frameworks like the World Trade Organization (WTO), and the proliferation of global supply chains have enabled countries to specialize, compete, and collaborate on a scale previously unimaginable. Emerging economies such as China and India have leveraged export-led growth to lift hundreds of millions out of poverty, while digital platforms have empowered individuals—from freelance coders in Tashkent to entrepreneurs in Silicon Valley—to participate in a borderless economy.

Yet, this integration has come at a cost. The benefits of globalization have not been evenly distributed. While a new global middle class has emerged—estimated by the Brookings Institution to encompass nearly 3.8 billion people by 2023—the gap between the wealthiest and the rest has widened dramatically. Oxfam reports that since 2010, the richest 1% have captured 82% of all wealth created globally. Labor markets have been disrupted as manufacturing shifts to low-wage regions, leaving behind deindustrialized communities in developed nations and exploitative working conditions in others. Environmental degradation has intensified, with carbon-intensive production outsourced to countries with weaker regulations, undermining global sustainability efforts.

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Moreover, globalization challenges the traditional role of the nation-state. As capital and corporations operate beyond borders, governments struggle to regulate economic activity, protect workers, or preserve cultural identity. Migration—both voluntary and forced—has surged, with the United Nations recording 304 million international migrants in 2024, nearly double the 1990 figure. This influx contributes economically—adding trillions to host economies like the U.S.—but also sparks social tensions and populist backlash in Europe and beyond.

This article explores the social economy of the modern era through the lens of globalization’s dual legacy. It examines how global integration has driven prosperity and innovation while simultaneously generating inequality, ecological strain, and governance dilemmas. Using empirical evidence from the WTO, UN, Oxfam, and Brookings Institution, and drawing on case studies from the United States, China, and Uzbekistan, the analysis reveals divergent national experiences within a shared global trajectory. Ultimately, it argues that the future of the social economy depends on transitioning toward fair globalization—a model in which inclusive growth, environmental stewardship, and equitable governance replace unchecked market forces. In doing so, globalization can evolve from a source of division into a foundation for shared human progress in the 21st century.

1. Globalization and Economic Growth

Globalization's hallmark is the explosive expansion of international trade and investment, which has propelled global GDP growth to new heights. According to the WTO, world trade volume has grown over 43 times since 1950, with merchandise trade alone expanding by more than 80 times since the early 1900s. From 1990 to 2024, this surge averaged 4-5% annual growth, far outpacing population increases and fueling a "great convergence" where emerging markets

like China (GDP growth averaging 6-7% annually) and India (5-6%) have narrowed the gap with developed economies.

Key drivers include trade liberalization—WTO membership has reduced average tariffs from 10% in 1990 to under 3% today—and the digital revolution, which has boosted services trade (e.g., software exports) by 10% annually. Foreign direct investment (FDI) flows reached $1.5 trillion in 2023, with TNCs like Apple and Samsung integrating supply chains across Asia, Africa, and Latin America. This has created jobs and technology spillovers: In Vietnam, FDI in electronics has generated 1.5 million jobs since 2010.

However, growth's unevenness is stark. While Asia captured 60% of trade gains from 2000-2024, Sub-Saharan Africa saw only 3%, exacerbating regional divides. Within countries, benefits skew toward urban elites. Oxfam's 2024 report highlights that billionaire wealth surged by $2 trillion in 2023 alone, triple the 2022 rate, while wage growth for the bottom 50% stagnated at 1-2% globally. This "K-shaped" recovery—rich getting richer, poor falling behind—stems from TNCs prioritizing shareholder value over broad-based development.

To visualize this disparity, consider the following table of global wealth distribution trends (based on Oxfam and Credit Suisse data):

Year Range	Wealth to Top 1% (%)	Wealth to Bottom 50% (%)	Global GDP Growth (Annual Avg.)
1990-2000	45	2	3.2%
2000-2010	50	1.5	4.1%
2010-2020	55	1	3.5%
2020-2024	62	0.5	3.0%

This table illustrates how globalization amplified inequality even as it boosted aggregate output. A simple line graph (conceptualized here; in a full report, use tools like Matplotlib) would plot rising GDP against stagnant bottom-half shares, underscoring the need for redistributive policies.

2. Labor Markets and Migration

Globalization has revolutionized labor dynamics, creating a hyper-competitive, flexible workforce while displacing millions. High-skilled sectors like IT and finance thrive on global talent pools: Platforms like Upwork facilitated $4 billion in freelance work in 2023, with remote jobs enabling a "digital nomad" economy that grew 20% post-pandemic. In India, the IT sector employs 5 million and exports $200 billion annually.

Conversely, low-skilled manufacturing has offshored en masse. The U.S. lost 5 million factory jobs from 2000-2020 to China and Mexico, per the Economic Policy Institute, fueling Rust Belt decline and opioid crises. In response, automation and AI exacerbate this: McKinsey estimates 45 million U.S. jobs at risk by 2030.

Migration fills gaps but amplifies tensions. UN data shows 304 million migrants in 2024, up from 153 million in 1990, contributing $700 billion in remittances—more than foreign aid. In the Gulf states, migrants comprise 80% of the workforce; in the EU, they add 1-2% to GDP. Yet, backlash is evident: Europe's 2024 elections saw anti-migrant parties gain 20% of seats.

For Uzbekistan, migration is a lifeline: 2.5 million labor migrants (mostly to Russia) sent $8 billion in remittances in 2023, 12% of GDP. However, the 2022 Ukraine war disrupted flows, spiking unemployment to 9% among youth.

A bar chart of migration impacts (hypothetical visualization):

- Positive: Remittances to low-income countries: $700B (2024)
- Negative: Job displacement in host countries: 2-3M annually
- Uzbekistan-specific: Youth migration rate: 15% of 18-25 age group

This highlights migration's dual role as economic stabilizer and social disruptor.

3. Social Inequality and the "Global Middle Class"

The "global middle class"—defined by Brookings as those earning $11-110 daily—ballooned from 1.2 billion in 2000 to over 4 billion by 2024, driven by Asia's rise (China alone added 800 million). This cohort demands consumer goods, boosting global demand by 50% since 2000.

Yet, national inequalities persist. The U.S. Gini coefficient hit 0.42 in 2024 (World Bank), up from 0.41 in 1980, with the top 1% holding 32% of wealth. In Uzbekistan, Gini fell to 0.33 by 2022 (latest data), aided by reforms and remittances, but urban-rural gaps remain (0.35 rural vs. 0.28 urban).

Oxfam notes gender disparities: Men hold $105 trillion more wealth globally, with women overrepresented in informal jobs (70% in developing nations).

Table: Gini Trends (Selected Countries, 2024 Estimates)

Country	Gini (2024)	Change from 2010	Key Factor
USA	0.42	+0.03	Tech wealth concentration
China	0.38	-0.02	Poverty alleviation
India	0.36	+0.01	Urban migration
Uzbekistan	0.33	-0.03	Remittances & reforms

A pie chart would show the global middle class's 55% share of consumption, contrasting with the top 1%'s 22% of income.

4. Environmental and Social Risks

Globalization's environmental toll is severe: Total CO2 emissions reached 36.3 Gt in 2024, up 0.9%. China (12.6 Gt, 35% global) and India (3 Gt, 8%) lead due to outsourced manufacturing; together, they emit over 40%. The "polluter pays" principle falters as TNCs evade costs—e.g., fast fashion's $500 billion industry dumps 92 million tons of waste yearly.

Socially, cultural homogenization erodes diversity: UNESCO warns 40% of languages face extinction by 2100. In Uzbekistan, traditional crafts decline amid cheap imports.

Line graph: CO2 Emissions Growth (China/India vs. Global Avg., 2010-2024) – Steep rise in emerging markets.

5. State Policy Responses

States counter with varied strategies:

Country	Policy Example	Key Outcomes (2020-2024)
USA	CHIPS Act ($52B subsidies)	50K high-tech jobs; reduced China reliance
China	Belt and Road ($1T invested)	150 countries linked; exports +15%
Uzbekistan	Youth Employment Program	377K jobs created; exports to $26.9B (+8.4%)

Uzbekistan's success: Since 2017, SEZs and IT-Park attracted $10B FDI, boosting youth employment to 85% (from 70% in 2020).

Bar chart: Policy Impacts – Uzbekistan exports doubled vs. USA's flat manufacturing.

Conclusion

Globalization has transformed the modern social economy, driving **unprecedented growth** while creating deep **inequalities**. It lifted over **1.2 billion people** into the global middle class, expanded trade to **$33 trillion**, and connected nations like never before. Yet, the **richest 1% now hold 48% of global wealth**, millions of jobs have been lost to offshoring, and **CO_2 emissions hit 36.3 Gt in 2024**—mostly from global supply chains.

The U.S., China, and Uzbekistan show different paths:

- **USA**: High tech gains, but rising inequality and job loss.
- **China**: Global power through trade, but environmental and social costs.
- **Uzbekistan**: Smart reforms doubled exports and cut inequality.

The future needs **fair globalization**:

1. Tax the rich and corporations fairly.
2. Make polluters pay and go green.
3. Protect workers and culture with strong national policies.

Only then can globalization bring **shared progress**, not just profit for a few.

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EPIDEMIOLOGY OF BRUCELLOSIS IN UZBEKISTAN AND PREVENTIVE MEASURES

Abstract: *This study focuses on the epidemiology of brucellosis in Bukhara region, Uzbekistan, during 2015–2025, and the development of preventive measures. Epidemiological, serological, and laboratory data were analyzed. The results show a significant decline in brucellosis incidence over the past decade, attributed to vaccination campaigns, public hygiene education, and veterinary preventive measures. The study highlights the importance of integrated veterinary and public health interventions to control brucellosis.*

Keywords: *brucellosis, epidemiology,*

Introduction

Brucellosis is a zoonotic infection affecting both humans and animals. It is caused by bacteria of the genus Brucella, with primary reservoirs in cattle, sheep, goats, and camels. Human infection typically occurs through direct contact with infected animals, consumption of contaminated animal products, or inhalation of infectious aerosols.

In Uzbekistan, particularly in Bukhara region, brucellosis cases have been consistently reported from 2015 to 2025. This disease has not only health implications but also significant economic and social impacts, affecting livestock productivity and labor efficiency. Preventive interventions, including vaccination and public education, are critical to reduce transmission.

OBJECTIVES

Main Objective:

To analyze the epidemiology of brucellosis in Bukhara region (2015–2025) and develop effective preventive strategies.

Specific Objectives:

1. Analyze the incidence and distribution of brucellosis cases.
2. Identify the primary sources and transmission routes of infection.
3. Evaluate the effectiveness of veterinary and public health preventive measures.
4. Develop recommendations for enhanced epidemiological control and public awareness.

MATERIALS AND METHODS

The study was conducted in Bukhara region, Uzbekistan, between 2015 and 2025.

Methods Used:

1. Epidemiological Analysis: Annual case reports and regional surveillance data.

2. Serological and Microbiological Diagnostics: Blood and animal product testing for Brucella species.

3. Preventive Measures Evaluation: Assessment of vaccination campaigns, hygiene awareness programs, and veterinary interventions.

4. Comparative Analysis: Comparison with national and international brucellosis trends.

5. Data were statistically analyzed to identify trends, high-risk areas, and the impact of preventive strategies.

RESULTS

The incidence of brucellosis decreased from 15.2 cases per 100,000 population in 2015 to 7.4 in 2025.

High-incidence districts included Qorakul, Jondor, and Vobkent, while Bukhara city and Olot showed lower incidence.

Preventive measures, including vaccination campaigns and public hygiene education, contributed to the reduction in cases.

DISCUSSION

Veterinary services and preventive measures significantly reduced incidence.

Laboratory diagnostics, including serological and PCR-based methods, improved case detection.

Some districts maintain higher incidence due to lower vaccination coverage and insufficient public awareness.

Comparative analysis with international data shows that integrated veterinary and public health interventions are the most effective approach.

CONCLUSION AND RECOMMENDATIONS

1. Brucellosis incidence in Bukhara region decreased significantly between 2015 and 2025.

2. Preventive measures, including vaccination, hygiene education, and veterinary surveillance, were effective.

3. Strengthening veterinary and public health coordination is recommended.

4. Enhance public awareness and epidemiological reporting systems.

5. Develop an integrated regional brucellosis prevention plan.

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YANGI O‘ZBEKISTON KONSTITUTSIYASIDA SIYOSIY PARTIYALARNING HUQUQIY MAQOMI

Annotatsiya. *Maqolada Yangi O‘zbekiston Konstitutsiyasining qabul qilinishi natijasida mamlakatimizda faoliyat olib borayotgan siyosiy partiyalar faoliyati huquqiy jihatdan ta'minlanishi masalalari tahlil qilingan. Xalq hokimiyatchiligini shakllantirish jarayonida O‘zbekiston siyosiy partiyalarining ishtiroki kabi masalalar yoritilgan.*

Kalit so‘zlar: *siyosiy partiya, qonun, fuqarolik jamiyati, plyuralizm, huquqiy asos, siyosiy tizim, siyosiy faollik, parlament, ishonchsizlik votumi*

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THE LEGAL STATUS OF POLITICAL PARTIES IN THE NEW CONSTITUTION OF UZBEKISTAN

Annotation. *The article analyzes the issues of legal support for the activities of political parties operating in our country as a result of the adoption of the new Constitution of Uzbekistan. Issues the participation of political parties in Uzbekistan in the process of forming people's power are highlighted.*

Keywords: *political party, law, civil society, pluralism, legal framework, political system, political activism, parliament, vote of no confidence*

Yangi O‘zbekistonda huquqiy davlatni, kuchli fuqarolik jamiyatini rivojlantirish jarayonida ko‘ppartiyaviylik tizimi, mustaqil, barqaror, faol va keng aholi qatlamlari (elektorat) tomonidan qo‘llab-quvvatlanadigan siyosiy partiya hamda boshqa jamoat birlashmalarini shakllantirishga katta ahamiyat berildi.

Ko‘ppartiyaviy tizimga o‘tish, ushbu tizimni shakllantirish uchun zaruriy qonunchilik va siyosiy shart-sharoitlarni yaratish mamlakat taraqqiyotining birlamchi va dolzarb masalalardandir. Darhaqiqat, siyosiy partiyalarga keng huquqiy makon yaratib berish, ko‘ppartiyaviylik tizimi rivoji uchun huquqiy asoslarni ta'minlash ularni jamiyatdagi rolini kuchaytirishning eng muhim omili hisoblanadi.

Xorijiy mamalakatlar (Argentina, Janubiy Koreya, Fransiya, Albaniya, Finlyandiya, Irlandiya va Shveytsariya) konstitutsiyalari tahlil qilindi, V.Meytus, Vl.Meytuslarning siyosiy partiyalarning boshqaruvi, mafkurasi bilan bog‘liq fikrlari o‘rganildi.

O‘zbekiston Konstitutsiyasida mamlakatda ijtimoiy hayot siyosiy institutlar, mafkuralar va fikrlar xilma-xilligi asosida rivojlanishi e’tirof etildi. U fuqarolarning siyosiy partiyalar va ijtimoiy harakatlarga erkin birlashish huquqi asosida siyosiy partiyalarning faoliyat ko‘rsatishiga mustahkam huquqiy zamin yaratdi.

Jahondagi ko‘plab mamlakatlar asosiy qonunining siyosiy partiyalar bilan bog‘liq normalarida ularni ixtiyoriy tuzilishi va faoliyat yuritishi kafolatlangan. Chunonchi, Argentina Konstitutsiyasining 38-moddasida [1] siyosiy partiyalar demokratik tizimning asosiy instituti bo‘lib, ularning shakllanishi va faoliyati uchun Konstitutsiya erkin sharoit yaratib bergan. Janubiy Koreya Konstitutsiyasining 8-moddasida[2] davlat siyosiy partiyalarning ixtiyoriy tuzilishini kafolatlashi va ko‘ppartiyaviylik siyosiy tizimini himoya qilishi ko‘zda tutilgan. Fransiya Konstitutsiyasining 4-moddasi [3] ga muvofiq, siyosiy partiyalar fuqarolarning saylov huquqini ifodalashga imkon beradi. Ko‘pchilik mamlakatlar, masalan Albaniya, Finlyandiya, Irlandiya va Shveytsariya Konstitutsiyalarida siyosiy partiyalar haqida aniq bir mulohaza bildirilmagan [7].

O‘zbekiston Respublikasi Konstitutsiyasida siyosiy partiyalarga alohida e’tibor qaratilgan. Konstitutsiyaning 10, 39, 70, 71, 74, 118, 130, 136, 145-moddalarida bevosita siyosiy partiyalar bilan bog‘liq masala qayd etilgan. Jumladan, 39-moddada «O‘zbekiston Respublikasi fuqarolari kasaba uyushmalariga, siyosiy partiyalarga va boshqa jamoat birlashmalariga uyushish, ommaviy harakatlarda ishtirok etish huquqiga egadirlar. Siyosiy partiyalarda, jamoat birlashmalarida, ommaviy harakatlarda, shuningdek davlat hokimiyati vakillik organlarida ozchilikni tashkil etuvchi muxolifatchi shaxslarning huquqlari, erkinliklari va qadr-qimmatini hech kim kamsitishi mumkin emas» [9, 17], deyilgan. Mazkur norma orqali mamlakatdagi siyosiy partiyalar fuqarolarning siyosiy huquqlarini amalga oshirishda ishtirok etib kelmoqda.

70-moddada «O‘zbekiston Respublikasida kasaba uyushmalari, siyosiy partiyalar, olimlarning jamiyatlari, xotin-qizlar tashkilotlari, faxriylar, yoshlar va nogironligi bo‘lgan shaxslar tashkilotlari, ijodiy uyushmalar, ommaviy harakatlar hamda fuqarolarning boshqa birlashmalari jamoat birlashmalari sifatida e’tirof etiladi» [9, 26-27].

Siyosiy partiya *— davlat hokimiyati uchun kurash olib boruvchi, jamiyatni rivojlantirish mafkurasiga, boshqaruv tuzilmasi, elektorati va dasturiga ega bo‘lgan fuqarolarning ixtiyoriy-siyosiy uyushmasidir*.

O‘zbekiston Konstitutsiyasining 71-moddasi 1-qismida «Konstitutsiyaviy tuzumni zo‘rlik bilan o‘zgartirishni maqsad qilib qo‘yuvchi, O‘zbekistonning davlat suverenitetiga, hududiy yaxlitligiga va xavfsizligiga qarshi chiquvchi, urushni, ijtimoiy, milliy, irqiy hamda diniy adovatni targ‘ib qiluvchi, fuqarolarning konstitutsiyaviy huquqlari va erkinliklariga, aholining sog‘lig‘iga, ijtimoiy axloqqa tajovuz qiluvchi siyosiy partiyalarning, boshqa nodavlat notijorat tashkilotlarining,

shuningdek milliy va diniy belgilariga ko‘ra siyosiy partiyalarning, harbiylashtirilgan birlashmalarning tashkil etilishi va faoliyati taqiqlanadi» [9, 27].

Mazkur norma xalqaro huquq va standartlarga zid emas. Jumladan, Yevropa Kengashi Parlament Assambleyasining 1308(2002)-sonli «Yevropa Kengashiga a’zo davlatlarda siyosiy partiyalar faoliyatini cheklash to‘g‘risida»gi Rezolyutsiyasining 11-bandida qayd etilganidek, «*siyosiy partiya faoliyatini cheklash yoki uni tarqatish choralari faqat istisno tariqasida, ya’ni partiya zo‘ravonlikka murojaat qilgan yoxud jamiyat tinchligi va mamlakatning demokratik konstitutsion tuzumiga tahdid solgan hollardagina qo‘llanilishi lozim*» [8, 53]. Bu haqida davlatimiz rahbari Sh.Mirziyoyev ham o‘z fikrlarini quyidagicha bildirib o‘tgan: “... yangi Konstitutsiyamizda jamoat birlashmalarini tarqatib yuborish, ularning faoliyatini taqiqlash yoki cheklab qo‘yish faqatgina sud qarori asosida amalga oshirilishi qat’iy belgilab qo‘yildi” [6, 430].

Konstitutsiyaning 74-moddasida: «Siyosiy partiyalar turli ijtimoiy tabaqa va guruhlarning siyosiy irodasini ifodalaydilar va o‘zlarining demokratik yo‘l bilan saylab qo‘yilgan vakillari orqali davlat hokimiyatini tuzishda ishtirok etadilar. Siyosiy partiyalar o‘z faoliyatining moliyalashtirilishi manbalari haqida O‘zbekiston Respublikasi Oliy Majlisining Qonunchilik palatasiga yoki u vakolat bergan organga belgilangan tartibda oshkora hisobotlar taqdim etadilar» [9, 28], – deb qayd etilgan. Haqiqatan ham, Konstitutsiyaning ushbu moddasida ta’kidlanganidek, siyosiy partiyalar hokimiyatning yuzaga kelishida asosiy rolni bajaradi.

118-modda 1-qismida «O‘zbekiston Respublikasi Bosh vaziri nomzodi O‘zbekiston Respublikasi Oliy Majlisi palatalarining mansabdor shaxslari saylangandan va organlari shakllangandan so‘ng bir oy ichida yoki Bosh vazir lavozimidan ozod etilganidan keyin yoxud Bosh vazir, Vazirlar Mahkamasining amaldagi tarkibi iste’foga chiqqanidan keyin bir oy ichida Qonunchilik palatasi ko‘rib chiqishi va ma’qullashi uchun O‘zbekiston Respublikasi Prezidenti tomonidan barcha siyosiy partiyalar fraksiyalari bilan maslahatlashuvlar o‘tkazilganidan so‘ng taqdim etiladi» [9, 57-58] deyilgan. Buning natijasida *birinchidan*, siyosiy partiyalarning parlamentdagi tuzilmasiga katta mas’uliyatni yuklaydi. *Ikkinchidan,* nomzod yuzasidan har bir siyosiy partiya fraksiyasi orqali ularning elektorati manfaati nuqtai nazaridan fikri o‘rganiladi. *Uchinchidan,* siyosiy partiyalar o‘z dasturlarida elektorati manfaati ro‘yobga chiqaradigan takliflarini maslahatlashuv jarayonida o‘rtaga tashlash va muhokama qilish vakolati yuzaga kelishini ta’minlaydi.

Siyosiy partiyalar, elektorati manfaatidan kelib chiqqan holda muayyan mafkurani targ‘ib qiluvchi va unga tayanuvchi subyekt sifatida faoliyat yuritadi. «Siyosiy partiyalar, aynan, elektorati manfaatidan kelib chiqqan holda muayyan mafkurani targ‘ib qiluvchi va unga tayanuvchi subyekt sifatida faoliyat yuritadi» [4, 85]. Shu nuqtai nazardan, siyosiy partiyalarning parlamentdagi fraksiyasi, mahalliy kengashlardagi partiya guruhlari elektorati manfaatini ifoda etishi, uning uchun kurashishi kerak bo‘ladi.

Konstitutsiyada Bosh vazirga nisbatan «ishonchsizlik votumi»ni bildirish masalasi ham kiritilgan. “Ishonchsizlik votumi tartibini amalga oshirish natijasida hukumat iste’foga chiqarilishi mumkin” [10, 56]. Buning natijasida boshqaruv va ijro hokimiyati ustidan jamoatchilik nazoratining samarali tizimi yaratilishiga olib keladi. Siyosiy partiyalarning butun ijro tizimi ustidan jamoatchilik nazoratini o‘rnatilishi katta ahamiyat kasb etadi. Zero, siyosiy partiyalar demokratiya mexanizmining markaziy instituti hisoblanib, markaz va mintaqalarda xalq hokimiyati aynan, ular vositasida qaror topadi.

Xulosa qilib aytganda, respublikada huquqiy demokratik davlat va fuqarolik jamiyatini rivojlantirish jarayonida ko‘ppartiyaviylik tizimi muhim rol o‘ynaydi. Shu sababli ham, O‘zbekistonda ko‘ppartiyaviylik tizimi rivojini ta’minlaydigan huquqiy zamin yaratildi. Bu esa, hozirda respublikada jamiyatni demokratlashtirish va mordernizatsiyalashda, inson huquq va eriknliklarini to‘la ro‘yobga chiqarishda, fuqarolarning siyosiy ongi va siyosiy madaniyatini rivojlantirishda muhim ahamiyat kasb etmoqda.

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ANALYSIS OF THEATER TERMS IN ELECTRONIC DICTIONARIES

Abstract: *This study investigates how theater terminology is presented, defined, and categorized in modern electronic dictionaries. By examining a selection of authoritative digital lexicographic resources, the research evaluates the completeness, accuracy, contextual coverage, and user-friendliness of theater-related entries. The findings reveal that while electronic dictionaries provide broad access and convenient search functions, there exist inconsistencies in the depth of explanations, contextual examples, and semantic precision of theater terms. Recommendations for improved digital lexicography in the field of performing arts are offered.*

Keywords: *Theater terminology; electronic dictionaries; lexicography; definition accuracy; contextual usage; semantic clarity.*

Introduction. Theater, as one of the oldest forms of art, has developed a rich and specialized vocabulary. With the advent of digital technology, electronic dictionaries have become widespread tools for accessing linguistic information, including specialized terminology. However, the question remains whether these resources effectively represent the nuanced meanings and contextual usage of theater terms.

Traditional printed dictionaries often struggled to keep up with the rapid evolution of artistic vocabulary due to space and publication limitations. In contrast, electronic dictionaries offer dynamic and adaptable platforms that can theoretically house vast amounts of specialized information. The aim of this research is to analyze how well electronic dictionaries address theater-related terminology and whether they meet the demands of students, researchers, translators, and theater enthusiasts.

Methodology. This study employs a comparative content analysis of theater terminology featured in five widely used electronic dictionaries: Merriam-Webster Online, Oxford Learner's Dictionary, Cambridge Dictionary Online, Dictionary.com, Collins Dictionary

A corpus of 50 theater terms (e.g., “proscenium,” “cue,” “blocking,” “upstage,” “deus ex machina”) was selected. Each term was evaluated according to the following criteria:

1. **Definition accuracy** – precision and correctness of meaning
2. **Presence of contextual usage** – examples provided
3. **Etymological information** – origins and historical context
4. **Semantic clarity** – avoidance of ambiguity
5. **Cross-referencing** – links to related terms or concepts

Results and analysis. The analysis reveals notable variation among the dictionaries:

Definition Accuracy: Although the electronic dictionaries surveyed provide generally accurate definitions of foundational theater terms, there exists a noticeable discrepancy in the depth and comprehensiveness of explanations for specialized terminology. For instance, terms such as *"blocking"* and *"cyclorama"* are often defined in basic functional terms without elaborating on their broader artistic and technical implications within theater production. This lack of detailed semantic differentiation may limit users' understanding, especially in academically or professionally demanding contexts where precise terminology is essential.

Contextual usage: A critical component of effective lexicography, particularly for specialized vocabulary, is the inclusion of contextual usage examples. In this regard, the Oxford Learner's Dictionary and Cambridge Dictionary consistently provide exemplary sentences that illustrate the terms within authentic theatrical settings. Such examples are pedagogically valuable as they link linguistic meaning to practical application, aiding learners in internalizing terminology through real-world usage. Other dictionaries that neglect this feature risk presenting terms in isolation, which may hinder comprehension for non-expert users.

Etymology: Etymological information serves as a key linguistic and historical reference point, especially for terminology with classical or borrowed origins. Among the resources studied, Merriam-Webster stands out for regularly providing etymological notes that trace the origins and evolution of many theater terms. In contrast, platforms like Dictionary.com and Collins Dictionary either omit etymological details entirely or provide them inconsistently. For theater studies, where historical and cultural context is often deeply intertwined with language, such omissions limit the user's ability to fully grasp the layered meanings of certain terms.

Semantic clarity: The survey revealed several instances where semantic ambiguity is insufficiently addressed. Terms like *"cue"* and *"upstage"* exhibit polysemy, having different meanings within theatrical and broader social contexts [3,58]. However, not all dictionaries clearly distinguish these usages or provide sufficient markers to guide the reader toward the correct interpretative frame. This can lead to confusion, particularly for learners, translators, or non-native speakers who may struggle to discern context-specific meanings without clear lexicographic guidance.

Cross-referencing: Cross-referencing is an essential feature of digital lexicography that enhances user navigation and deepens understanding by linking related terms. Of the dictionaries examined, Collins Dictionary was the only one that consistently implemented this feature in relation to theater terminology. Relevant links (e.g., *"proscenium"* connected to *"stage"* and *"auditorium"*) were present, thereby enriching the semantic network available to users [1, 213]. The absence of such interconnectedness in other dictionaries limits comprehensive exploration and reduces the educational potential of the resource.

These findings indicate that while electronic dictionaries are evolving, there remains a need for more consistent inclusion of contextual and expert-informed content in special fields like theater.

Discussion. The digital transformation of lexicography promises accessibility and flexibility, yet the study's results suggest ongoing limitations in how theater terms are handled. A lack of comprehensive contextual explanations can hinder non-experts, particularly students or translators. Sources such as specialized theater glossaries and academic texts often provide more authoritative insight but are less accessible than online dictionaries.

Future lexicographic efforts should aim to integrate expert input, more dynamic multimedia features (such as audio pronunciation and visual examples), and user feedback mechanisms to improve the reliability and utility of theater-related entries.

Conclusion. Electronic dictionaries offer valuable and rapid access to theater terminology but vary in the depth and quality of their entries. Enhanced contextualization, cross-referencing, and semantic precision are necessary to meet the needs of users in the performing arts. Collaboration between lexicographers and theater practitioners could bridge these gaps, ensuring a more accurate representation of this culturally significant field.

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ASSESSMENT OF THE ROLE OF DROSPIRENONE-CONTAINING DRUGS IN ANTIANDROGEN THERAPY

Objective of the study. *To assess the effectiveness of drugs containing drospirenone in treating reproductive function disorders in hyperandrogenism.*

Materials and methods. *For the study, 126 women of reproductive age with hyperandrogenism syndrome and reproductive disorders were selected from those who sought treatment at the reproductive center department of the Bukhara regional branch of the Republican Specialized Scientific and Practical Center for Mother and Child. Additionally, 32 healthy women of the same age without reproductive diseases were chosen as a control group. The study employed anamnestic-clinical, laboratory, and statistical research methods.*

Results: *After the complex treatment phase, normalization of the menstrual cycle was observed in 29% to 81% of cases. Following treatment, clinical skin changes characteristic of hyperandrogenism were not detected in 90.6% of patients.*

Keywords: *Hyperandrogenism, drosperinone, infertility, menstrual cycle disorders.*

Relevance of the research. It is well-known that hyperandrogenism in women not only hinders the full realization of reproductive potential but also manifests in various forms of menstrual cycle disorders, diminishing women's quality of life indicators. In our experience, a decrease in work capacity in complicated cases is not uncommon. Furthermore, dermatological and cosmetological issues caused by hyperandrogenism evoke a sense of dissatisfaction with body and skin structure in women, leading to feelings of shame. Therefore, the treatment of this pathology is of paramount importance, stemming not only from medical necessities but also from social, cosmetological, and psychological needs [1,2].

Late complications of hyperandrogenism pose a high risk of developing endometrial cancer due to increased proliferative activity, and also create conditions for the development of type II diabetes mellitus and cardiovascular diseases [3,7].

One of the most frequent causes of hyperandrogenemia development in women of fertile age is polycystic ovary syndrome (PCOS) and a non-classical type of congenital adrenal hyperplasia. While the frequency of PCOS in women of this age is 10-15%, the development of adrenal hyperplasia occurs in 1:1000, 1:100 people, respectively, across different ethnic groups [4,6]. The identification of clinical signs in both cases creates a number of difficulties in differential diagnosis.

In the diagnosis of hyperandrogenism, the correct determination of the genesis of its development allows for justified pathogenetic therapy[1].

Objective of the study. To assess the effectiveness of drugs containing drospirenone in treating reproductive function disorders in hyperandrogenism.

Materials and methods. For the study, 126 women of reproductive age with hyperandrogenism syndrome and reproductive disorders were selected from those who sought treatment at the reproductive center department of the Bukhara regional branch of the Republican Specialized Scientific and Practical Center for Mother and Child. Additionally, 32 healthy women of the same age without reproductive diseases were chosen as a control group. In the study, from anamnestic-clinical examination, anthropometry, laboratory studies of follicle-stimulating hormone (FSH), luteinizing hormone (LH), prolactin, total testosterone, dehydroepiandrosterone sulfate (DGEA-S), 17-OH-progesterone, thyroid-stimulating hormone (TSH), free thyroxine, and the level of 25 (OH) D in the blood were studied using the IXLA method using an instrument manufactured by Shanghai International Holding of the Snibe Diagnostic firm "Maglumi 800." Hormones were detected on days 2-5 of menstruation. Laboratory analyses were conducted in the "Standard Diagnostics" laboratory. Reference indicators presented by the IXLA method were used to compare the obtained results.

Results and discussion: According to the anamnestic data, the number of patients under 20 years of age in the main group was 9 (7.1%), the number of patients aged 21-26 years was 52 (41.3%), the number of patients aged 27-34 years was 41 (32.5%), and the number of patients aged 35 years and older was 24 (19%). Also, according to the data obtained from the objective examination of the subjects of the main and control groups, women with abdominal obesity were identified using body mass index (BMI) using height and body weight, as well as waist circumference and hip circumference. In particular, during the study, in the main group of patients, patients with BMI up to 18.5 were 5.6%, patients with normal BMI were 27%, patients with excess weight were 38%, patients with obesity of the first degree were 25.4%, and patients with obesity of the second degree were 4%. (Table 1).

Table 1

Distribution of subjects of the main and control groups by BMI indicator

Parameters	<18,5		18,5-24,9		25-29,9		30-34,9		35-39,9	
	n	%	n	%	n	%	n	%	n	%
Main group	7	5,6	34	27	48	38	32	25,4	5	4
Control group	4	12,5	10	31,2	12	37,5	5	15,6	1	3

During the study, the lumbar/thigh index was calculated in all examined women, according to which abdominal obesity was noted in 58.5% of women in the main group, and the lumbar/thigh index was higher than 0.85.

Also, according to the collected anamnesis of reproductive potential in patients of the main group, primary infertility was detected in 25.4% (n=32) of patients, and secondary infertility in 37.3% (n=47) of patients (in the control group, these signs were not detected).

Among the clinical signs identified during the study, in particular, changes in the menstrual cycle, secondary amenorrhea was detected in 13% (n=16) of patients, opsomenorrhea in 28% (n=35), oligomenorrhea in 28% (n=35), polymenorrhea in 0.80% (n=1), hypermenorrhea in 1.6% (n=2), and algodysmenorrhea in 4% (n=5), while signs of primary amenorrhea and proomenorrhea were not found in patients of the main group. Also, menstrual cycle disorders were not detected in 29% (n=36) of patients (Fig. 1).

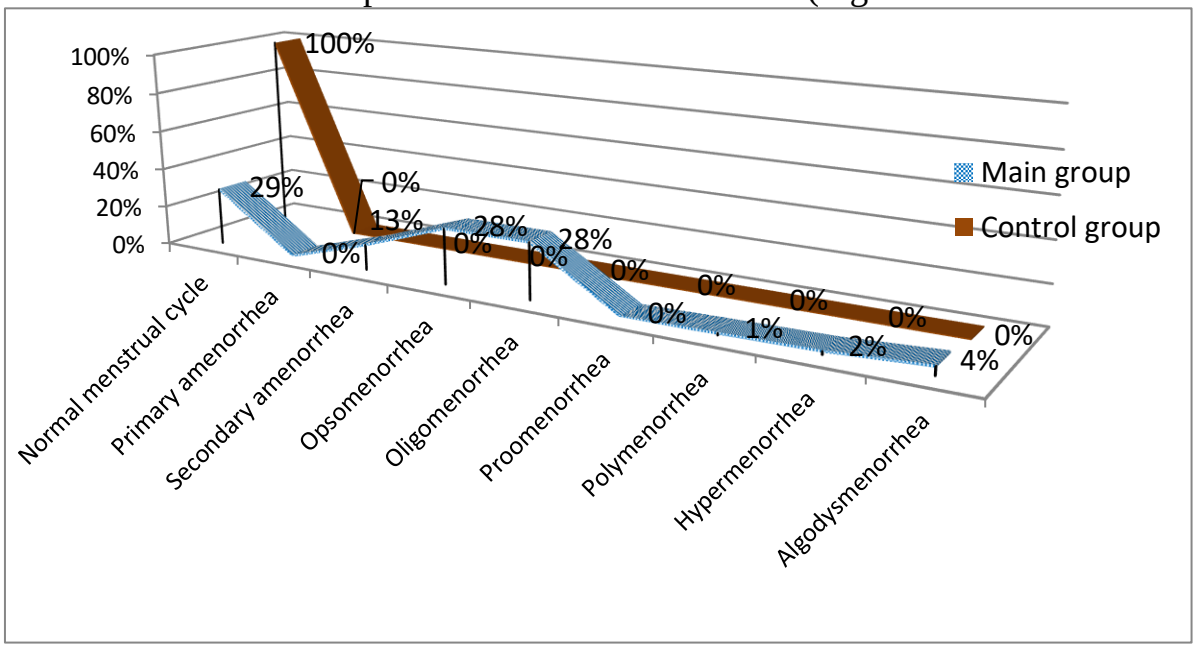


Figure 1. Manifestations of menstrual cycle disorders in patients of the main group.

Also, among skin changes in patients with hyperandrogenism (n=126), acne was detected in 17.5% (n=22), acanthosis nigra in 21.4% (n=27), seborrhea in 16.7% (n=21), alopecia in 1.6% (n=2), while in 42.8% (n=54) of the remaining patients, no such changes were found. Also, in the control group, acne was detected in 12.5% (n=3; $p<0.05$ (the significance of the distribution of symptoms in different groups was calculated according to the chi-square indicator)), sobereia - in 3.1% (n=1; $p<0.05$) of the examined, on the other hand, in 84.4% (n=28; $p<0.05$) of the examined, no skin changes were observed. Accordingly, among the skin changes in hyperandrogenism in women, acne and acanthosis nigra were the most common symptoms, while patients with alopecia were very rare.

In women with hyperandrogenism, methods for its correction have been developed depending on their complaints, i.e., what type of disorders they have. In this case, mixed oral contraceptives containing drospirenone were selected for antiandrogen therapy in women with menstrual cycle disorders and administered for a period of 3 to 6 months, depending on changes in clinical and laboratory signs. At

the same time, taking into account the fact that weight gain exacerbates the state of hyperandrogenism, women were recommended a modified lifestyle. It is known that mixed oral contraceptives, combining the properties of estrogen + progesterone, reduce the release of gonadotropins from the pituitary gland by having a progesterone-like effect; inhibit the process of steroidogenesis in both the ovaries and the adrenal glands, but do not affect the synthesis of glucocorticoids and mineralocorticoids. Also, their antiandrogenic effect not only reduces androgen synthesis but also inhibits the synthesis of dihydrotestosterone in the skin, which has a stronger androgenic effect than testosterone [8,9,10]. At the same time, it reduces the sensitivity of androgen receptors. In addition, ethinyl estradiol in mixed oral contraceptives also reduces the level of free testosterone, since it has a positive effect on the expression and production of sex hormone-binding globulin (SHBG) from the liver. In the treatment of infertility, which is one of the most common complications of hyperandrogenism, antiandrogen therapy was carried out in the first stage to normalize the level of hormones in the blood serum. In this case, tablets containing drospirenone, produced in a complex with a mixed oral contraceptive + metapholin, were selected. Metapholin prepares the body for pregnancy and reduces possible defects in the fetal nerve tube. It is biologically active against folic acid and is well absorbed by the body. After treatment, induction of ovulation was performed in patients with anovulation. Considering that 25- (OH) D deficiency is an important risk factor for the development of hyperandrogenism, patients with vitamin D deficiency were given vitamin D lamira at a dose of 5000 IU once a day for 2 months, and in case of insufficiency - at the same dose for one month. A prophylactic dose of Akvodetrim was recommended at 4 drops daily.

Analysis of the effectiveness of treatment practice depending on clinical indicators revealed a statistically significant decrease in the frequency of such clinical signs as secondary amenorrhea, opsomenorrhea, oligomenorrhea, in particular, according to menstrual cycle changes (from 13% to 0% ($p<0.05$); 28% to 3.2% ($p<0.05$); 28% to 11% ($p<0.05$)). Thus, after treatment of patients in the main group, the normal menstrual cycle was restored in 81% (before treatment, this

indicator was 29% (p<0.05)) (Fig. 2).

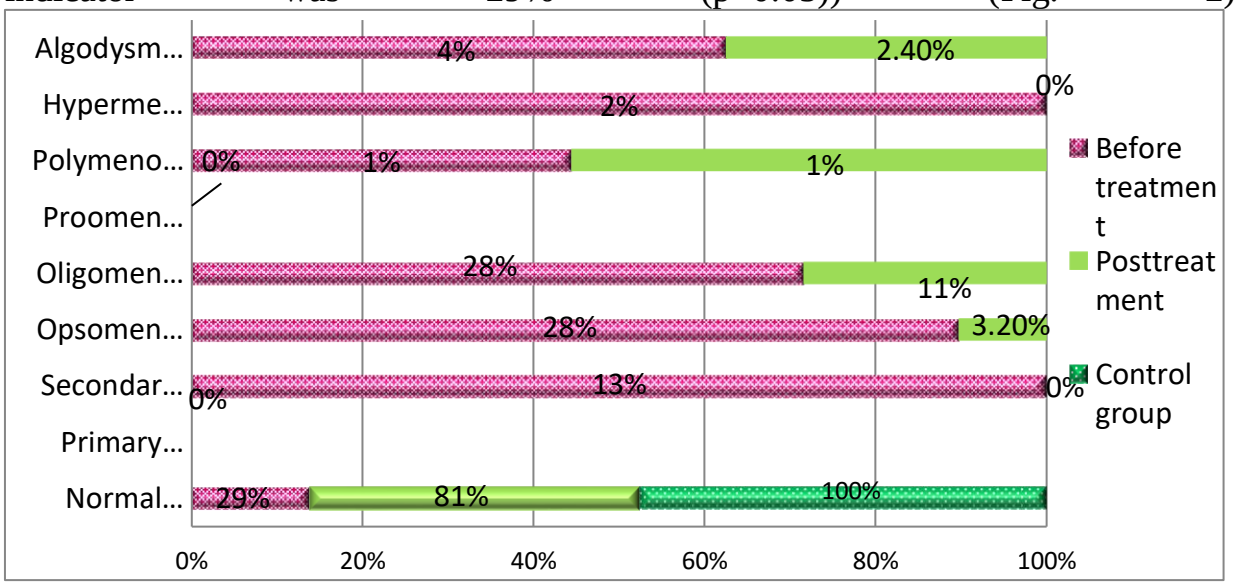


Figure 2. Frequency of detection of menstrual cycle disorders after treatment in patients of the main group.

When examining skin changes characteristic of hyperandrogenism after treatment, a significant change was observed in almost all clinical signs (acne symptom from 17.5% to 3.2% (p<0.05); acanthosis nigra symptom - from 21.4% to 4% (p<0.05); sobereia - from 17% to 2.2% (p<0.05)). As a result, clinical changes in the skin characteristic of hyperandrogenism were not detected in 90.6% of patients after treatment (this indicator was 42.8% before treatment (p<0.05)) (Fig. 3).

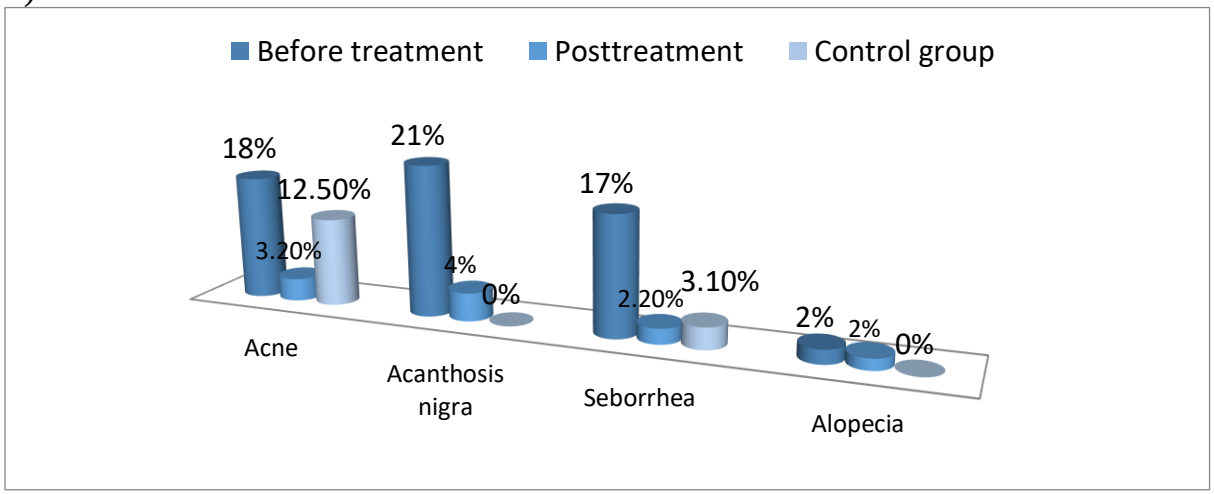


Figure 3. Frequency of detection of skin clinical signs characteristic of hyperandrogenism in patients of the main group after treatment.

Also, when analyzing the frequency of various degrees of hirsutism in patients of the main group, the initial degree of hirsutism was 11.9% (before treatment, this indicator was 35% (p<0.05)), and the frequency of mild and

pronounced hirsutism in patients was 99.2% ($p<0.05$) (Fig. 4).

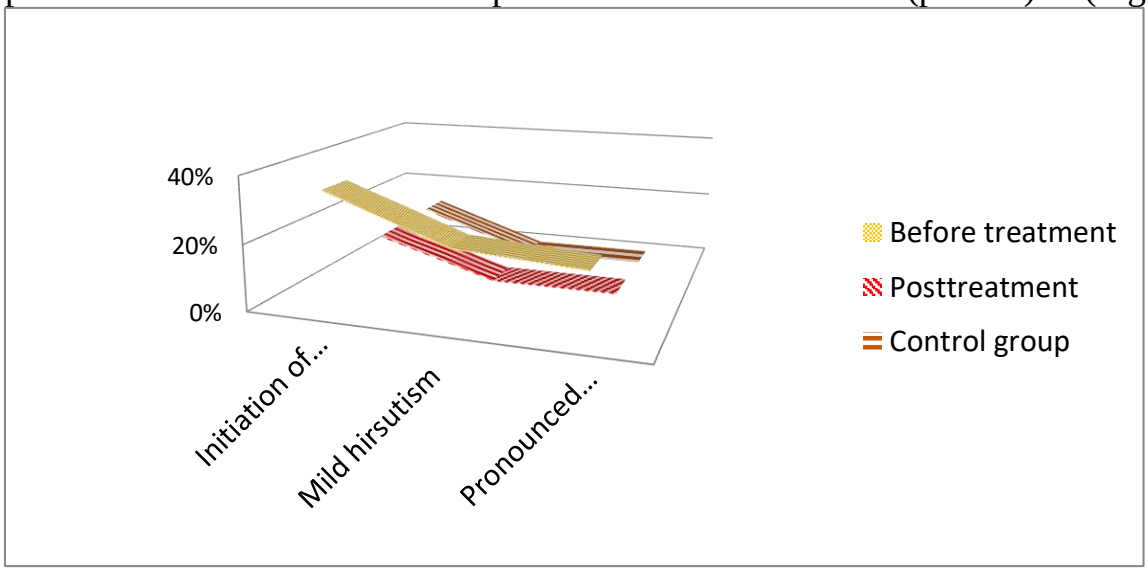


Figure 4. Frequency of detection of clinical signs and severity of hirsutism after treatment in patients of the main group.

Mutual analysis of the frequency of occurrence of clinical signs characteristic of hyperandrogenism before and after treatment showed that as a result of treatment practice, a reliable disappearance or reduction in the degree of these clinical signs was achieved in most patients.

Conclusion. The results of our study also confirmed the effectiveness of combined oral contraceptives containing drosperinone, selected in a complex, as antiandrogen therapy to eliminate dermatopathies and menstrual cycle disorders observed in hyperandrogenism syndrome. In particular, the inclusion of a modified lifestyle and vitamin D in the treatment complex increased the effectiveness of treatment. In particular, a statistically significant decrease in the frequency of such clinical signs as secondary amenorrhea, opsomenorrhea, oligomenorrhea in menstrual cycle disorders was revealed.

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TASVIRIY SAN'AT MASHG'ULOTLARI ORQALI TALABALARDA VIZUAL TAFAKKUR VA KREATIV KOMPETENSIYALARNI SHAKLLANTIRISHNING PEDAGOGIK ASOSLARI

Annotatsiya*: Maqolada tasviriy san'at mashg'ulotlari orqali talabalarda vizual tafakkur va kreativ kompetensiyalarni shakllantirishning pedagogik asoslari tahlil qilinadi. Ta'lim jarayonida tasviriy faoliyatning o'rni, uning talabalarning estetik idroki, ijodiy fikrlashi, tasavvur doirasini kengaytirishdagi ta'siri ilmiy asosda yoritiladi. Vizual tafakkurni rivojlantirishning psixologik va pedagogik mexanizmlari, kreativ kompetensiyalar tarkibi, ularni faollashtirishga xizmat qiluvchi integrativ metodlar, zamonaviy AKT vositalarining ahamiyati ko'rib chiqiladi. Tadqiqotda tasviriy san'at mashg'ulotlarining motivatsion, kognitiv, faol-amaliy va refleksiv komponentlari o'rtasidagi o'zaro bog'liqlik tahlil qilinib, o'quv jarayonini takomillashtirishga doir ilmiy asoslangan takliflar beriladi. Natijalar talabalarda mustaqillik, ijodiy tashabbus, o'zini ifoda etish madaniyati va san'atga nisbatan qadriyatli munosabatni shakllantirishda tasviriy san'atning o'rni muhimligini ko'rsatadi.*

Kalit so'zlar: *tasviriy san'at, vizual tafakkur, kreativ kompetensiyalar, tasviriy faoliyat, estetik idrok, pedagogik texnologiyalar, ijodkorlik, didaktik yondashuv, amaliy mashg'ulotlar, tasavvur rivoji, san'at ta'limi, refleksiya, innovatsion metodlar, motivatsiya, kreativ tafakkur.*

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PEDAGOGICAL BASIS OF FORMING VISUAL THINKING AND CREATIVE COMPETENCES IN STUDENTS THROUGH FINE ART CLASSES

Annotation*: The article analyzes the pedagogical foundations of forming visual thinking and creative competencies in students through fine art classes. The role of visual activity in the educational process, its impact on expanding the scope of students' aesthetic perception, creative thinking, and imagination are scientifically covered. The psychological and pedagogical mechanisms of developing visual thinking, the composition of creative competencies, integrative methods that serve to activate them, and the importance of modern ICT tools are*

considered. The study analyzes the relationship between the motivational, cognitive, active-practical and reflexive components of visual arts activities and provides scientifically based proposals for improving the educational process. The results show the importance of the role of visual arts in the formation of independence, creative initiative, culture of self-expression and a valuable attitude towards art in students.

***Keywords**: visual arts, visual thinking, creative competencies, visual activity, aesthetic perception, pedagogical technologies, creativity, didactic approach, practical activities, development of imagination, art education, reflection, innovative methods, motivation, creative thinking.*

Kirish

Tasviriy san’at ta’limi talabalarda nafaqat estetik idrok va badiiy ko‘nikmalarni shakllantiradi, balki ularning vizual tafakkuri, tasavvuri va ijodiy yondashuvini rivojlantiradi. Vizual tafakkur insonning atrof-muhitni tasvirlar, belgilar, ranglar, shakllar orqali idrok etishi va ularni qayta ishlay olishi bilan bog‘liq bo‘lgan murakkab kognitiv jarayondir. Zamonaviy ta’lim tizimi shaxsning ijodiy salohiyatini ochib berish, uning intellektual va estetik rivojlanishini ta’minlashga yo‘naltirilganligi sababli tasviriy san’at mashg‘ulotlarining ahamiyati yanada ortib bormoqda. Oliy ta’lim muassasalarida san’at fanlarining mazmuni talabalarda mustaqil fikrlash, badiiy tahlil qilish, ijodiy g‘oyalarni ishlab chiqish kabi kompetensiyalarni shakllantirishga qaratilgan bo‘lishi talab etilmoqda.

Kreativ kompetensiyalar tarkibida original fikr yaratish, muammolarga noodatiy yondashish, badiiy obrazlarni boyitish, san’at orqali shaxsiy qarashlarni ifodalash kabi ko‘nikmalar mavjud. Tasviriy san’at mashg‘ulotlari aynan shu sifatlarning shakllanishi uchun qulay muhit yaratadi. Talabalar ranglar uyg‘unligi, shakllar ritmi, kompozitsiya qonuniyatlari asosida o‘z fikrlarini san’at tilida ifoda etish jarayoniga kirishadilar. Bu jarayon tafakkurning moslashuvchanligini, original g‘oyalarni ishlab chiqish qobiliyatini, estetik didni va muhitni obrazli idrok etish ko‘nikmalarini rivojlantiradi.

Pedagogik jarayonda tasviriy faoliyatning o‘rni ko‘p qirrali bo‘lib, u talabalarning psixologik barqarorligi, emotsional muvozanati va shaxsiy rivojiga ham xizmat qiladi. Amaliy mashg‘ulotlar davomida talabalar rang va shakl bilan tajriba o‘tkazadi, materiallar xususiyatini sinab ko‘radi, tasviriy yechimlar qidiradi. Bu izlanish jarayoni ularning tadqiqot olib borish malakasini, ijodiy izlanish motivatsiyasini va o‘z ustida mustaqil ishlash ko‘nikmasini kuchaytiradi. Tasviriy san’atning integrativ tabiati uni boshqa fanlar bilan uyg‘unlashtirib o‘qitish imkonini beradi. Masalan, pedagogika, psixologiya, texnologiya, san’at tarixi kabi yo‘nalishlar bilan birgalikda olib boriladigan mashg‘ulotlar talabalarga chuqurroq tahlil qilish, ijodiy qarorlar qabul qilish va o‘z imkoniyatlarini ro‘yobga chiqarish imkonini yaratadi.

Zamonaviy ta’limda innovative metodlar, raqamli texnologiyalar va mobil ilovalardan foydalanish tasviriy san’atni o‘qitishning samaradorligini oshirmoqda. Raqamli grafikalar, vizual platformalar, 3D texnologiyalar, rang modellari va

dizayn dasturlaridan foydalanish talabalarning ijodkorlik salohiyatini kuchaytiradi. Shu bilan birga, an’anaviy san’at texnikalarini zamonaviy vositalar bilan uyg‘unlashtirish vizual tafakkurni yanada boyitadi. Bunday integratsiya talabalarda analitik va kreativ yondashuvni rivojlantirib, ularda keng qamrovli badiiy kompetensiyalarni shakllantiradi.

Natijada tasviriy san’at mashg‘ulotlari talabaning umumiy madaniy kompetensiyalarini rivojlantiradi, ularni kasbiy tayyorgarlik jarayoniga faol jalb qiladi hamda kelajakdagi pedagogik faoliyatida ijodiy yondashish uchun zarur bo‘lgan bilim, ko‘nikma va malakalarni shakllantiradi. Shu sababli tasviriy san’atni o‘qitishda pedagogik asoslar, ilmiy yondashuvlar va metodik tamoyillarni chuqur o‘rganish dolzarb masala hisoblanadi.

Metodlar

Tasviriy san’at mashg‘ulotlari orqali talabalarda vizual tafakkur va kreativ kompetensiyalarni shakllantirishga qaratilgan pedagogik metodlar kompleks va integrativ yondashuvga asoslanadi. Bunday metodlar talabalarning mustaqil fikrlashi, obrazli idrok etishi, rang va shakl bilan tajriba o‘tkazishi, ijodiy qarorlar qabul qilishi jarayonlarini faollashtiradi. Avvalo, amaliy mashg‘ulotlarda qo‘llaniladigan kuzatish metodi vizual tafakkurni rivojlantirishning asosiy pedagogik vositalaridan hisoblanadi. Talabalar real ob’ektlar, tabiat manzaralari, inson qiyofasi yoki buyumlarning shakli, tuzilishi va nisbati ustida kuzatuv olib boradi. Bu jarayon sezgi organlari faoliyatini kuchaytiradi, detallarni aniqlik bilan idrok etish, shakllar o‘rtasidagi bog‘lanishlarni aniqlash va kompozitsion fikrlashni shakllantiradi.

Badiiy tasavvurni rivojlantirishda ijodiy topshiriqlar metodi samarali hisoblanadi. Talabalarga abstrakt g‘oyalar asosida kompozitsiya yaratish, faqat rang orqali kayfiyat ifodalash, shaklni o‘zgartirish orqali mazmun yaratish kabi topshiriqlar berilishi ularning kreativ tafakkurini kuchaytiradi. Tasviriy faoliyatda improvizatsiya metodidan foydalanish ham talabalarda erkin ifoda, tezkor qaror qabul qilish va original yechim topish ko‘nikmalarini shakllantiradi. Bu metod talabaning badiiy jarayonda o‘z g‘oyasiga tayanib ish olib borishini, o‘ziga xos uslub topishini rag‘batlantiradi.

Zamonaviy pedagogik texnologiyalardan foydalanish, xususan raqamli grafik dasturlar, vizual dizayn platformalari, 3D modellashtirish vositalari talabalarda yangi turdagi badiiy kompetensiyalarni rivojlantirishga xizmat qiladi. Raqamli texnologiyalar yordamida talabalarning ranglarni uyg‘unlashtirish, formalarning ritmini his qilish, kompozitsiyani to‘g‘ri qurish, tasvirni qayta ishlash qobiliyatlari takomillashadi. Media-resurslar va interaktiv taqdimotlar yordamida mashg‘ulotlarni boyitish esa vizual idrokning faollashuviga olib keladi. Bu jarayon talabalarda ko‘pkanalli o‘qitish modelini shakllantirib, rang, tovush, tasvir orqali olingan ma’lumotlarni uyg‘un tahlil qilish ko‘nikmasini kuchaytiradi.

Tasviriy san’at mashg‘ulotlarida refleksiv yondashuv ham muhim metodik birlik hisoblanadi. Har bir ish yakunida talabaga o‘z ishlari bo‘yicha mulohaza yuritish, kuchli va zaif jihatlarini aniqlash, kelgusi bosqichda nimalarga e’tibor qaratish kerakligini tushunib olishga imkon beriladi. Refleksiya jarayoni talabaning

o‘z-o‘zini baholash kompetensiyasini shakllantirib, ijodiy rivojning ichki motivatsion mexanizmlarini kuchaytiradi.

Hamkorlikda o‘qitish metodlari, kichik guruhlarda ishlash, muammoli vaziyatlarni yaratish, badiiy tahlil va munozara tashkil qilish tasviriy san’at ta’limining muhim qismidir. Talabalar birgalikda g‘oya ishlab chiqadi, turli estetik pozitsiyalarni muhokama qiladi, bir-birining ishiga badiiy-texnik nuqtai nazardan fikr bildiradi. Bu jarayon ularda kommunikativ kompetensiyalarni, tanqidiy fikrlashni va ijodiy hamkorlik ko‘nikmalarini rivojlantiradi.

Shuningdek, integrativ metodlardan foydalanish — tasviriy san’atni pedagogika, psixologiya, texnologiya, san’at tarixi fanlari bilan uyg‘unlashtirish — talabalar dunyoqarashining kengayishiga, san’atni turli nuqtayi nazardan anglashiga yordam beradi. Bu yondashuv talabalarning kognitiv faoliyatini faollashtiradi, badiiy fikrlash jarayonini chuqurlashtiradi va ularning vizual tafakkurini kompleks tarzda shakllantiradi.

Natijalar

Tadqiqot natijalari tasviriy san’at mashg‘ulotlari talabalarda vizual tafakkur va kreativ kompetensiyalarni rivojlantirishda yuqori samaradorlikka ega ekanligini ko‘rsatdi. Mashg‘ulotlar davomida talabalar rang, shakl, kompozitsiya, faktura va yorug‘-soya munosabatlari kabi badiiy ifoda vositalarini ongli ravishda qo‘llay boshlagani kuzatildi. Bu jarayon ularning obrazli idrokini kengaytirib, vizual analiz qilish, detallarni taqqoslash, tasvirni konstruktiv fikrlash orqali yaratish qobiliyatlarini kuchaytirdi. O‘quv jarayonining uzluksizligini ta’minlovchi amaliy topshiriqlar talabalar ijodiy faolligini oshirdi, yangi g‘oyalarni ilgari surishga, mustaqil badiiy qaror qabul qilishga undadi. Mashg‘ulotlarda kuzatilgan o‘zgarishlar talabalarning tasviriy faoliyatga bo‘lgan qiziqishi, ichki motivatsiyasi va emotsional ishtirokini sezilarli darajada oshirganini ko‘rsatdi.

Vizual tafakkur rivojlanishida kuzatish metodi va badiiy tahlil muhim natijalar berdi. Talabalar real ob’ektni kuzatish orqali uning shakl tuzilishini chuqurroq anglay boshladi, tasviriy jarayonda nisbat, simmetriya, perspektiva kabi qonuniyatlardan ongli foydalanishni shakllantirdi. Bu esa ularning tasvirni geometrik va konstruktiv jihatdan to‘g‘ri qurish malakasini mustahkamlaganini ko‘rsatadi. Badiiy tahlil jarayonida talabalar asar mazmunini idrok etish, kompozitsion yechimlarni baholash, rang uyg‘unligi va emosional ifoda vositalarini tahlil qilish kabi ko‘nikmalarga ega bo‘la boshladi. Natijalarda ayniqsa tasviriy tafakkur va tanqidiy yondashuvning birgalikda rivojlanganligi qayd etildi.

Raqamli texnologiyalarni mashg‘ulotlarga integratsiya qilish talabalarning kreativ kompetensiyalariga kuchli ta’sir ko‘rsatdi. Grafik dasturlarda ishlash jarayoni ularda rang modellari, vizual kompozitsiya, raqamli formatlar va zamonaviy dizayn tamoyillari bo‘yicha yangi bilim va ko‘nikmalarni shakllantirdi. Talabalar an’anaviy san’at bilan bir qatorda raqamli ifoda vositalaridan foydalanishni o‘rgandilar, bu esa ularda multidisiplinar yondashuv va innovatsion fikrlashni kuchaytirdi. Raqamli va an’anaviy metodlarning uyg‘un holda qo‘llanishi talabalarning badiiy jarayonga moslashuvchan kirishishini, gibrid tasvirlar yaratish malakasini oshirdi.

Tadqiqot jarayonida talabalar ijodiy izlanish motivatsiyasining oshgani ham qayd etildi. Guruhiy ishlar va ijodiy loyiha topshiriqlari talabalarda hamkorlikka tayyorlikni, fikr almashish madaniyatini va bir-birining g‘oyalariga hurmat bilan yondashishni mustahkamladi. Ijodiy topshiriqlarni birgalikda bajarish ularning kommunikativ kompetensiyalarini, muammolarni birgalikda hal qilish va jamoaviy qaror qabul qilish ko‘nikmalarini rivojlantirdi. Natijalar shuni ko‘rsatdiki, tasviriy san’at mashg‘ulotlarida refleksiya jarayonining muntazam qo‘llanilishi talabalar o‘z ishlarini tanqidiy baholay olishni, badiiy yutuq va kamchiliklarni aniqlay olishni o‘rganganini ko‘rsatdi.

Umuman olganda, olingan natijalar tasviriy san’at mashg‘ulotlarining shaxsiy rivojlanishga, ijodiy qobiliyatlarni ro‘yobga chiqarishga, estetik didni shakllantirishga, vizual tafakkur jarayonlarini faollashtirishga samarali ta’sir ko‘rsatishini tasdiqladi. Bu natijalar pedagogik jarayonda tasviriy san’atning o‘rni va ahamiyati yuqori ekanini, uni rivojlantirish davlat ta’lim siyosatidagi dolzarb yo‘nalishlardan biri ekanini ko‘rsatadi.

Muhokama

Olingan natijalar tasviriy san’at mashg‘ulotlarining pedagogik jarayonda o‘ziga xos o‘rni borligini yana bir bor tasdiqlaydi. Muhokama jarayonida ushbu mashg‘ulotlarning talabalarning umumiy rivojlanishiga ta’siri bir nechta nuqtai nazardan ko‘rib chiqildi. Avvalo, vizual tafakkurning shakllanishi insonning idrok jarayonlari bilan uzviy bog‘liq bo‘lib, tasviriy faoliyat bu jarayonni kuchaytiruvchi asosiy amaliy mexanizmlardan biridir. Mashg‘ulotlar davomida talabalar rang, shakl, ritm, dinamikaga oid o‘z qarashlarini ifodalashga intiladi, bu esa ularning nafaqat badiiy, balki kognitiv rivojiga ham xizmat qiladi. Talabaning atrof-muhitni obrazlar orqali idrok etishi uning tafakkurida modellashtirish jarayonlarini faollashtirib, analitik va sintetik fikrlashni kuchaytiradi.

Kreativ kompetensiyalarning rivojlanishida pedagogning yondashuvi va metod tanlovi muhim omil bo‘lib xizmat qiladi. O‘qituvchi tomonidan topshiriqlarning izchillik bilan murakkablashib borishi, talabaning individual imkoniyatlarini hisobga olish, ijodiy izlanish uchun erkin muhit yaratish – bularning barchasi kreativlikni shakllantirishda hal qiluvchi ahamiyatga ega. Kreativ kompetensiyalarni rivojlantirish jarayoni ko‘proq ochiq vazifalar, noodatiy kompozitsion yechimlar, abstrakt shakllar bilan ishlash va talabaning erkin ifodasiga yo‘naltirilgan mashg‘ulotlar orqali amalga oshadi. Bunday mashg‘ulotlar talabalarda tashabbuskorlik, mustaqil qaror qabul qilish va o‘ziga xos badiiy uslubni yaratish ko‘nikmasini shakllantiradi.

Zamonaviy raqamli texnologiyalar tasviriy san’at ta’limiga yangi imkoniyatlar olib kirgani muhokama jarayonida alohida ta’kidlanadi. An’anaviy san’at materiallari bilan birga raqamli grafik dasturlardan foydalanish, 3D modellash, vizual interaktiv platformalarda ishlash talabalarning badiiy tafakkurini kengaytiradi, ularni global san’at jarayonlariga moslashtiradi. Bu esa talabaning kelajakdagi pedagogik faoliyatida ham zamonaviy ta’lim vositalaridan samarali foydalanishiga asos yaratadi. Raqamli texnologiyalar bilan boyitilgan mashg‘ulotlar ko‘pkanalli idrokni rivojlantiradi, vizual axborotni qayta ishlash tezligini oshiradi,

rang va shaklni raqamli muhitda qayta yaratish orqali ijodiy imkoniyatlarni kengaytiradi.

Hamkorlikda o‘qitish metodlari ham ijodiy jarayon uchun qulay muhit yaratadi. Talabalar guruhda ishlaganida o‘z g‘oyalarini himoya qilish, boshqalarning fikrini tahlil qilish, birgalikda ijodiy yechim topishga harakat qilishadi. Bu jarayon kommunikativ kompetensiyalarni, munozara madaniyatini, tanqidiy fikrlashni rivojlantiradi. Muhokama jarayonida aniqlanganidek, bunday interaktiv muloqot talabalarning o‘zaro o‘rganish jarayonini faollashtirib, ijodiy o‘sishga ijobiy ta’sir ko‘rsatadi.

Refleksiya muhim tarkibiy qism sifatida talabalarning o‘z faoliyatini baholash, o‘z kamchiliklarini ko‘rish va ularni bartaraf etish strategiyalarini ishlab chiqishiga yordam beradi. Refleksiyaning mavjudligi ularning badiiy ishlarida izchillik, sifat, mazmun va texnikani ongli ravishda boshqarish ko‘nikmalarini shakllantiradi. Bu jarayon psixologik barqarorlikni ta’minlaydi, talabaning o‘ziga bo‘lgan ishonchini mustahkamlaydi.

Umume’tirof etilgan xulosalardan biri shuki, tasviriy san’at mashg‘ulotlari o‘quv jarayonida ijodiylikni rivojlantirishning eng samarali pedagogik vositalaridan biridir. Bu mashg‘ulotlar talabalarning dunyoqarashi, madaniy saviyasi, estetika tushunchasi va kasbiy mahoratini takomillashtiradi. Muhokama jarayoni ko‘rsatdiki, tasviriy san’atni o‘qitishda metodik yondashuvlarning xilma-xilligi va ularni to‘g‘ri uyg‘unlashtirish talabalarning kreativ salohiyatini to‘liq ro‘yobga chiqarishga imkon yaratadi.

Xulosa

Tasviriy san’at mashg‘ulotlari talabalarning vizual tafakkuri va kreativ kompetensiyalarini shakllantirishda ta’lim jarayonining muhim tarkibiy qismi sifatida alohida o‘rin tutadi. Tadqiqot davomida aniqlanganki, tasviriy faoliyat nafaqat badiiy ko‘nikmalarni rivojlantiradi, balki talabalarning kognitiv jarayonlari, emotsional barqarorligi, estetik idroki va shaxsiy ijodiy salohiyatining ochilishiga keng imkoniyat yaratadi. Talabalar tasvir orqali fikrni ifodalash jarayonida mustaqil tahlil qilish, g‘oya yaratish, original yondashuv ishlab chiqish, muammolarni kreativ yechish kabi sifatlarni egallaydi. Bu esa ularning kelajakdagi pedagogik faoliyatida ijodiy yondashuvni shakllantirish, o‘quvchilarni san’atga jalb etish va ta’lim jarayonida estetik tarbiyani kuchaytirishga xizmat qiladi.

Xulosalardan biri shuki, tasviriy san’at mashg‘ulotlarini samarali tashkil etish uchun pedagogning metodik tayyorgarligi, ijodiy muhit yaratish qobiliyati, talabaning individual xususiyatlarini hisobga olish, rag‘batlantirish, erkin fikr almashish imkonini beruvchi sharoit yaratish katta ahamiyatga ega. Zamonaviy raqamli texnologiyalar, innovatsion metodlar, integrativ yondashuvlar tasviriy san’at ta’limini yanada boyitib, talabalarning zamonaviy kompetensiyalarini rivojlantirishga xizmat qilmoqda. Raqamli grafikalar, 3D modellashtirish, interaktiv vizual platformalarda ishlash, an’anaviy metodlar bilan birgalikda qo‘llanganda, talabalarda moslashuvchan, keng qamrovli va zamonga mos ijodiy tafakkur shakllanadi.

Guruhiy ishlar, hamkorlikda bajariladigan ijodiy mashg‘ulotlar, refleksiya jarayonlari talabalarning jamoaviy fikrlashi, kommunikativ ko‘nikmalari, tanqidiy tahlil qilish qobiliyatini kuchaytiradi. Bu jarayonlar ularning kasbiy faoliyatga tayyorgarligini oshiradi, ta’lim jarayonida samarali muloqot qurishga o‘rgatadi. Talabalarning o‘z ishlari ustida mulohaza yuritishi, xatolarni ko‘ra bilishi va ularni bartaraf etish yo‘llarini izlash esa ijodiy rivojlanishning ichki motivatsion mexanizmlarini kuchaytiradi.

Umuman olganda, tasviriy san’at mashg‘ulotlari talabaning kompleks rivojiga, kreativ tafakkurni shakllantirishga, estetik dunyoqarashni kengaytirishga va pedagog sifatida kasbiy tayyorgarligini mustahkamlashga xizmat qiluvchi kuchli pedagogik vositadir. Ushbu jarayonni ilmiy-metodik asosda tashkil etish ta’lim sifatini oshiradi, boshlang‘ich va maktabgacha ta’lim sohasida zamonaviy pedagoglarni tayyorlashda muhim ahamiyat kasb etadi.

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THE ARCHAEOLOGICAL SIGNIFICANCE OF COINS FROM THE MUGHAL ERA

Annotation. *This article highlights the archaeological and historical significance of coins from the Mughal era. It is noted that the coins minted during the reigns of rulers such as Humayun and Akbar played an important role not only in economic circulation but also in expressing political and religious symbolism. These coins possess great scholarly value as indicators of the economic stability of their time, their role in international trade, and their status as cultural heritage. Moreover, their preservation in museums and private collections serves as an essential numismatic source for modern research.*

Keywords: *Mughals, Humayunnama, museum, coin, numismatics, archaeology, trade, cultural heritage.*

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BOBURIYLAR DAVRI TANGALARINING ARXEOLOGIK AHAMIYATI

Annotatsiya. *Ushbu maqolada Boburiylar davri tangalarining arxeologik va tarixiy ahamiyati yoritiladi. Humoyun, Akbar kabi hukmdorlar davrida zarb etilgan tangalar nafaqat iqtisodiy muomalada, balki siyosiy va diniy ramziylikni ifodalashda ham muhim o‘rin tutgani qayd etiladi. Tangalar o‘z davrining iqtisodiy barqarorligi, xalqaro savdodagi o‘rni hamda madaniy meros sifatida alohida ilmiy qimmatga ega. Shuningdek, ularning muzey va shaxsiy kolleksiyalarda saqlanishi bugungi tadqiqotlar uchun muhim numizmatik manba vazifasini bajaradi.*

Kalit so‘zlar: *Boburiylar, „Humoyunnoma“, muzey, tanga, numizmatika, arxeologiya, savdo, madaniy meros.*

Kirish. Boburiylar sulolasi XVI–XVIII asrlarda nafaqat siyosiy va madaniy, balki iqtisodiy hayotda ham yirik iz qoldirgan. Ushbu davrda zarb etilgan tangalar davlatning moliyaviy barqarorligi, savdo aloqalari va diniy-siyosiy qarashlarini aks ettiruvchi muhim tarixiy manba hisoblanadi. Tangalar nafaqat kundalik muomalada, balki marosim va ramziy jarayonlarda ham faol qo‘llangan. Ularning yozuvlari, tasvirlari hamda metallarining sifati orqali o‘sha davr jamiyatining iqtisodiy qudrati, xalqaro savdodagi o‘rni va madaniy qadriyatlari haqida ilmiy xulosalar chiqarish mumkin. Shu bois, Boburiylar davri tangalari numizmatik va arxeologik nuqtayi nazaridan alohida ahamiyat kasb etadi.

Adabiyotlar tahlili. Ushbu maqolani tayyorlashda Boburiylar davri tangalarining arxeologik, numizmatik va madaniy ahamiyatini yorituvchi turli manbalardan foydalanildi. Ular orasida ilmiy qo‘llanmalar, adabiy asarlar, muzey kolleksiyalari va ommabop tarixiy portallar muhim o‘rin tutadi.

Tadqiqot metodologiyasi. Maqola yozishda ikki xildagi tadqiqot usuli qo‘llanildi. Birinchisi, numizmatik tahlil orqali Boburiylar davri tangalarining yozuvlari, tasviri va metall tarkibi o‘rganilib, ularning iqtisodiy va ramziy ahamiyati aniqlangan. Ikkinchisi, tarixiy-qiyosiy usul yordamida ushbu tangalar boshqa sulolalar tangalari bilan solishtirilib, o‘ziga xos xususiyatlari belgilangan.

Muhokama va natija. Andijon tumanining Beshbo‘ynoq mahallasida istiqomat qiluvchi Abdumannob Asronov numizmatika va tarixiy merosga alohida qiziqish bildiradi. U turli davrlarga oid tangalar, osori-atiqalar hamda turmush buyumlarini yig‘ish bilan shug‘ullanib kelmoqda. Uning kolleksiyasidagi eng e’tiborli namunalaridan biri Boburiylar sulolasi vakili Humoyun Mirzo davrida Rajastonda zarb etilgan kumush tangadir. Mazkur tangada bir tomonida hind yozuvi, ikkinchi tomonida esa ot tasviri aks ettirilgani uni numizmatik va madaniy jihatdan alohida qimmatli namuna sifatida ko‘rsatadi[1].

XVI asrda kumush tangalarning qiymati asosan mis tangalar orqali belgilangan. Uzoq vaqt davomida ularning rasmiy kursi 20–21 mis tanga miqdorida qat’iylashtirilgan bo‘lsa-da, bozordagi iqtisodiy o‘zgarishlar natijasida mazkur nisbat barqaror saqlanmagan. Ayrim davrlarda kumush tangalarning qiymati oshib yoki pasayib turgan, biroq oxir-oqibat yana belgilangan kurs darajasiga qaytgan[2].Bugungi kunda Asronovning shaxsiy kolleksiyasi boyligi bilan ajralib turadi. Unda turli davrlarda zarb etilgan va 200 dan ortiq davlatga oid ikki mingdan ziyod tangalar jamlangan. Shuningdek, xum, ko‘za, lagan, shamchiroq kabi yuzdan ortiq qadimiy buyumlar ham to‘plamdan o‘rin olgan[1]. Mazkur kolleksiya faqatgina tarixiy va badiiy ahamiyatga ega bo‘lib qolmay, balki hududda madaniy merosni asrab-avaylash, yosh avlodni tarixga qiziqtirish hamda numizmatika bo‘yicha ilmiy tadqiqotlar olib borishda muhim manba vazifasini o‘taydi. Vaqt o‘tishi bilan kumushning xalqaro savdodagi nufuzi ortib borgan va natijada Shayboniylar davrida zarb etilgan kumush tangalar mamlakat tashqarisiga katta miqdorda olib chiqila boshlagan. Ayniqsa, ushbu tangalar Boburiylar davlatiga keng kirib kelib, muomalada qonuniy ravishda amal qilgan. Ularning ba’zilari Boburiy hukmdori Akbar davrida qayta zarb etilib, ustiga podshohning ismi tushirilganligi kuzatiladi[2].

Manbalarda qayd etilishicha, Zahiriddin Muhammad Bobur diniy va ijtimoiy marosimlarda xalq bilan yaqinlikni ko‘rsatish, ularning e’tiborini jalb etish maqsadida tanga sochish an’anasidan foydalangan. Ayniqsa, musalloga – jamoaviy namoz o‘qiladigan maskanga qadam qo‘yish jarayonida Bobur tomonidan xalq orasiga tangalar tarqatilgani zikr etiladi.

Bobur elga tanga sochib,
Musalloga qadam qo‘ydi[3].

Bu holat hukmdorning siyosiy va diniy ramziylikni uyg‘unlashtirishga intilganini, shuningdek, iqtisodiy barqarorlik ramzi sifatida tanga zarbasi va muomalasiga alohida e’tibor qaratilganini ko‘rsatadi.

Hozirgi kunda “Bobur va jahon madaniyati” muzeyida Boburiy podshohlar tomonidan zarb ettirilgan tangalarning qimmatli namunalarini ko‘rish mumkin[4]. Ushbu tangalar nafaqat numizmatik yodgorlik sifatida, balki o‘z davrining siyosiy, iqtisodiy va madaniy hayotidan dalolat beruvchi tarixiy manba sifatida ham alohida ilmiy qimmat kasb etadi.

Manbalarda qayd etilishicha, Zahiriddin Muhammad Boburning onasi Qutluq Nigorxonim Kobulda vafot etib, o‘g‘li qo‘lida abadiy orom topgan. U donishmand podshoh Ulug‘bek Ko‘ragon tomonidan barpo etilgan “Bog‘i Navro‘zi”da dafn qilingan. Gulbadanbegim o‘zining “Humoyunnoma” asarida yozishicha, mazkur bog‘ egalarini rozi qilish maqsadida Bobur ularga ming tanga bergan[5]. Bu ma’lumot Bobur shaxsiy hayotidagi voqealar bilan birga, iqtisodiy munosabatlarda tangalarning amaliy rolini ham yoritib beradi.

Buxoro davlat me’moriy-san’at muzeyi-qo‘riqxonasi numizmatika bo‘limida turli sulolalar tangalari bilan bir qatorda Boburiylar podshohligi davrida zarb etilgan tangalarning asl nusxalari ham saqlanmoqda. Ushbu tangalarda hukmdorlarning nomlari va Qur’on oyatlari bitilgan bo‘lib, ular Boburiylar davrining siyosiy va diniy ramzlari, shuningdek, pul muomalasi tizimi haqida muhim tarixiy ma’lumot beradi[6]. Muzey ekspozitsiyasidagi mazkur tangalar Boburiylar davlatining iqtisodiy qudrati va xalqaro savdodagi o‘rnini yoritishda numizmatik va arxeologik manba sifatida alohida ahamiyat kasb etadi.

Xulosa va takliflar. Boburiylar davri tangalari arxeologiya uchun muhim manba bo‘lib, ular orqali davrning siyosiy tuzumi, iqtisodiy aloqalari va madaniy qadriyatlari haqida aniq dalillar olish mumkin. Qazilmalar davomida topilgan tangalar joylashuv hududlari va savdo yo‘llarini aniqlashda ham yordam beradi. Shuningdek, ularning metall tarkibi va naqshlari orqali hunarmandchilik darajasi va madaniy aloqalarni o‘rganish imkoniyati tug‘iladi.

Takliflar:

1. Boburiylar davri tangalarining raqamli katalogini yaratib, ularni 3D texnologiyada interaktiv ko‘rinishda taqdim etish orqali yoshlar va tadqiqotchilar uchun ochiq manba sifatida taqdim etish.

2. Oliy ta’lim muassasalarida maxsus ko‘rgazmalar tashkil etib, Boburiylar davri tangalarining iqtisodiy va madaniy merosdagi o‘rnini keng targ‘ib qilish.

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ASSESSMENT OF THE IMPACT OF ENVIRONMENTAL PROBLEMS ON AQUATIC ECOLOGY

Annotation*: This study evaluates the impact of major environmental problems—such as industrial pollution, agricultural runoff, and climate change—on aquatic ecosystems. The research analyzes physicochemical parameters, biodiversity indices, and ecosystem functionality in freshwater bodies. Findings show that human-induced environmental stress has led to a 25–40% decline in aquatic biodiversity and significant deterioration in water quality. Effective management strategies and restoration models are discussed to maintain aquatic ecological balance.*

Keywords*: aquatic ecology, environmental pollution, water quality, biodiversity, sustainability.*

Introduction. Water is one of the most essential components of the biosphere, supporting all forms of life. However, rapid industrialization, urbanization, and unsustainable agricultural practices have caused severe deterioration in water ecosystems. Environmental problems such as eutrophication, chemical contamination, and thermal pollution have altered the natural balance of aquatic systems. The primary goal of this study is to assess the effects of environmental degradation on aquatic ecology, focusing on key indicators like biodiversity, chemical composition, and ecosystem resilience.

Materials and Methods. The study was conducted on three major freshwater bodies located in semi-arid regions. Water samples were collected seasonally and analyzed for. Physical parameters: temperature, turbidity, electrical conductivity. Chemical parameters: pH, dissolved oxygen (DO), biochemical oxygen demand (BOD), nitrate, and phosphate levels. Biological indicators: phytoplankton, zooplankton, and macroinvertebrate diversity. Data were analyzed using multivariate statistical techniques and compared with WHO and FAO environmental standards.

Results and Discussion

The study revealed a significant correlation between anthropogenic activity and aquatic ecosystem degradation. Industrial waste discharge increased BOD by up to 60%, while agricultural runoff elevated nitrate and phosphate levels beyond permissible limits, causing algal blooms.

Table 1. Quantitative Indicators of Aquatic Ecosystem Health

№	Indicator	Unit	Optimal Range	Measured Value	Deviation (%)
1	Dissolved Oxygen (DO)	mg/L	6.0 – 8.0	4.2	-30
2	Biochemical Oxygen Demand (BOD)	mg/L	< 3.0	6.8	+55
3	Nitrate (NO_3^-)	mg/L	< 10	18.6	+46
4	Phosphate (PO_4^{3-})	mg/L	< 0.5	1.1	+55
5	pH	–	6.5 – 8.5	7.9	–
6	Turbidity	NTU	< 5	11.4	+56
7	Shannon Diversity Index (H')	–	2.5 – 3.5	1.9	-32

Results indicate that nutrient enrichment (eutrophication) and oxygen depletion are the dominant stress factors reducing aquatic biodiversity. The diversity index showed a 32% reduction compared to optimal ecological conditions. Siltation, heavy metal pollution, and thermal discharge further disrupted benthic organism populations.

Table 2. Comparative Evaluation of Aquatic Ecosystem Parameters by Pollution Source

№	Indicator	Unit	Natural Zone	Agricultural Zone	Industrial Zone	Change Rate (% vs Natural)
1	Dissolved Oxygen (DO)	mg/L	7.4	5.6	3.9	-47
2	Biochemical Oxygen Demand (BOD)	mg/L	2.4	4.2	6.9	+65
3	Nitrate (NO_3^-)	mg/L	4.8	12.3	18.1	+73
4	Phosphate (PO_4^{3-})	mg/L	0.22	0.61	1.05	+79
5	Electrical Conductivity (EC)	µS/cm	280	430	720	+61
6	Turbidity	NTU	3.5	8.9	13.7	+74
7	Temperature	°C	22.0	24.3	28.6	+30
8	Shannon Diversity Index (H')	–	3.2	2.4	1.7	-47
9	Species Richness	number	42	28	19	-55
10	Water Quality Index (WQI)	–	89 (Good)	66 (Moderate)	42 (Poor)	↓

Conclusion. Environmental degradation, primarily from anthropogenic sources, significantly impacts aquatic ecology. The decline in biodiversity, reduction in dissolved oxygen, and increase in nutrient load highlight the urgent

need for integrated water management and pollution control strategies. Restoration of riparian zones, treatment of industrial effluents, and the implementation of ecological monitoring systems are essential steps to re-establish the stability of aquatic ecosystems.

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RAQAMLI KOMPETENSIYANING MOHIYATI VA MAZMUNI

Annotatsiya. *Axborot texnologiyalari va kommunikatsiyalari bugungi kunda har bir insonning hayoti va faoliyatiga tom ma'noda singib ketgan. Raqamli ko'nikmalar amalda ulardan samarali foydalanish uchun javobgardir. Ushbu ko'nikmalar ma'lumotlarni qidirish, tahlil qilish va qayta ishlash bo'yicha bir qator ko'nikmalarni o'z ichiga oladi. Ushbu maqolada raqamli kompetensiya tushunchasining mohiyati hamda uning o'ziga xos xususiyatlari yoritib berilgan.*

Kalit so'zlar: *raqamli, kompetensiya, raqamli kompetensiya, raqamli kompetensiyalarni baholash, rivojlantirish, jamiyat, raqamli transformatsiya, yoshlar.*

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THE ESSENCE AND CONTENT OF DIGITAL COMPETENCE

Abstract. *Information technology and communications are now fully integrated into the lives and activities of every person. Digital skills ensure their effective application in practice. These skills include a range of skills in searching, analyzing, and processing information. This article examines the concept of digital competence and its characteristics.*

Keywords: *digital technology, competence, digital competence, assessment and development of digital competencies, society, digital transformation, youth.*

Bugungi dunyoda raqamli texnologiyalar kundalik hayotning ajralmas qismiga aylanib, ta'lim muassasalari ularni o'quv jarayoniga faol integratsiya qilmoqda. Ayniqsa, raqamli transformatsiya texnologiyalari yuqori sifatli zamonaviy ta'limni ta'minlash uchun ko'rib chiqilishi kerak bo'lgan tobora ustun paradigmaga aylanmoqda. Raqamli transformatsiya zamonaviy jamiyatda imkoniyatlar va muammolarni yaratgan bulutli tizimlar, katta ma'lumotlar, bashoratli tahlillar va integratsiya platformasi texnologiyalari kabi keng ko'lamli texnologiyalarni o'z ichiga oladi.

Aytish mumkinki, mamlakatimizda va butun dunyoda raqamlashtirish odamlar hayotining barcha sohalariga ta'sir qiladi. O'quv jarayonida raqamli kompetensiyalarni rivojlantirish tobora muhim ahamiyat kasb etmoqda. Bu jarayonlar bilan bog'liq holda «raqamli kompetensiyalar», «raqamli kompetensiyalar», «raqamli savodxonlik», «axborot savodxonligi» va boshqalar

kabi turli atamalar paydo bo‘ldi. Albatta, raqamli texnologiyalar jadal rivojlanib, hayotimizga kirib kelayotgan axborotlashgan va bilim jamiyatida raqamli kompetensiyani muhokama qilish dolzarb masalaga aylandi.

Ilmiy adabiyotlarda mualliflar «raqamli kompetensiyalar» tushunchasini belgilaydi, ularni turlari bo‘yicha tasniflaydi, mumkin bo‘lgan baholash usullarini tavsiflaydi va o‘z xodimlarining raqamli vakolatlarini rivojlantirishga va bo‘lajak mutaxassislarning zarur raqamli vakolatlarini rivojlantirishga qaratilgan chora-tadbirlarni taklif qiladi [7].

Ba’zi mualliflar professional axborot texnologiyalari va muhandislik darslarida ilg‘or informatika kursini yakunlash orqali ishlab chiqilgan raqamli kompetensiyalarning tuzilishi va mazmuniga yondashuvni taklif qiladi. YA’ni, ixtisoslashgan raqamli kompetensiyalar uchun spetsifikatsiyaning ikki darajasi taklif etiladi: 1) o‘rta umumiy ta’limning asosiy o‘quv dasturida informatika fanidan rejalashtirilgan o‘quv natijalarini tavsiflash; 2) o‘qituvchining ish dasturidagi modullardan biri bo‘yicha tematik o‘quv maqsadlarini tavsiflash [6].

L.R.Elbiyeva, L.X.Djabrailova, N.U.Urudjevalarning ilmiy maqolasida o‘qituvchilar uchun raqamli kompetensiyalarning tuzilishi va mazmuni axloqiy va pedagogik masala sifatida ko‘rib chiqiladi. Mualliflar «kompetentlik» tushunchasini tahlil qiladilar, zamonaviy o‘qituvchilar uchun raqamli kompetensiyaning asosiy xususiyatlarini o‘rganadilar va AKT kompetensiyasining tuzilishini taqdim etadilar[9].

N.Isaqulova ilmiy tadqiqotlari mustaqil ta’limda talabalarning raqamli ko‘nikmalarini rivojlantirish tahlil etishga qaratilgan[2].

Y.N.Ismailov asarlari zamonaviy axborot texnologiyalarining ajralmas tarkibiy qismlaridan biri bo‘lgan raqamli texnologiyalar yordamida chet tillarini samarali o‘rgatish va o‘rganishning kommunikativ jihatlariga bag‘ishlangan. Bu boradagi muammolardan biri shundan iboratki, raqamli texnologiyalar kompetensiyasi, kognitiv kompetensiya va kommunikativ kompetensiyalardan iborat «uchlik»ning uyg‘unligi va yaxlitligi, hamda ularni egallash o‘quv jarayonini har jihatdan maroqli va samarali o‘tishini ta’minlashdir [3].

M.N.Ikromova tadqiqotlarida raqamli tafakkur va uni kelajak avlod uchun zarur ko‘nikma sifatida ta’limga joriy etish bo‘yicha jahonda olib borilayotgan ishlar ilmiy manbalar asosida o‘rganilgan. Shuningdek, raqamli tafakkurni rivojlantirishda qo‘llanilayotgan yondashuv dasturlashga maktabgacha ta’lim yoshidan tayyorlash strategiyalari aniqlangan[1].

Ilmiy maqolada raqamli kompetensiya va raqamli transformatsiya borasidagi tanlanma adabiyotlar tahlili, induktiv va deduktiv, qiyosiy va tizimli tahlil kabi usullardan foydalanildi.

Butun dunyoda e’tirof etilayotgan XXI asr inson uchun muhim bo‘lgan ko‘nikma raqamli tafakkurni va uni ta’lim tizimiga qay tarzda joriy etish bo‘yicha jahonda olib borilayotgan ishlar bizda o‘rganilmaganligi bilan belgilanadi. Ilmiy nashrlarda raqamli kompetensiya tushunchasiga turli xil ta’riflar berilgan. Shu bilan birga, «raqamli kompetensiya», «raqamli savodxonlik» va «raqamli ko‘nikmalar»

tushunchalarining ta’rifi va mazmuniga yagona yondashuv mavjud emas. Ushbu tushunchalar ko‘pincha rus va xalqaro tadqiqotlarda sinonim sifatida ishlatiladi.

Xo‘sh raqamli kompetensiya nima?

«Raqamli ko‘nikma» va «raqamli kompetensiya» atamalariga raqamli jamiyatda shaxsning mavjudligi bilan bog‘liq turli ma’nolar va qadriyatlarni kiritmoqdalar. Jumladan, xorijda raqamli kompetensiya va raqamli kompetentlikni McClelland, Klemp, Boyatzis, Hornby and Thomas, Jacobs, Hogg kabilar o‘rgangan. MDH olimlaridan G.U.Soldatova, YE.Y.Zotova, M.Lebeshev, V.Shlyapnikov, T.A.Nestvik, YE.I.Rasskazova, O.V.Kalimullina, I.V.Trotsenko, G.A.Afanasyeva, A.A.Zyabkova va boshqalar raqamli kompetentlik fenomenini o‘z tadqiqotlarida turli jihatlarini tadqiq etgan.

2006-yilda Yevropa Komissiyasi raqamli kompetensiyani asosiy kompetensiya sifatida belgiladi. K. Ala-Mutka raqamli kompetensiyaning turli vaziyatlarda bilim va ko‘nikmalardan foydalanish qobiliyati sifatida amaliyotga yo‘naltirilgan asl ta’rifini o‘rganishning texnik, kognitiv va ijtimoiy-madaniy jihatlarini birlashtirgan holda ishlab chiqish va kengaytirish kerakligini ta’kidlaydi. Raqamli kompetensiyaning ta’rifi raqamli texnologiyalarni bilish va ulardan foydalanishdan kognitiv, tanqidiy va mas’uliyatli komponentlarni o‘z ichiga olgan holda rivojlanmoqda.

2013-yilda Yevropa Ittifoqi birinchi marta DigComp (Digital Competence raqamli kompetensiya) tizimini taklif qildi, keyinchalik u takomillashtirildi va 2017-yilda 5 ta sohada 21 ta raqamli kompetensiyani o‘z ichiga olgan DigComp 2.0 tizimi nashr etildi. YA’ni, Yevropa Ittifoqi tomonidan taklif qilingan fuqarolar uchun raqamli kompetensiya modeli. U raqamli kompetensiyalarning batafsil tasnifini, jumladan, beshta sohani (axborot savodxonligi, muloqot va hamkorlik, raqamli kontent yaratish, xavfsizlik va muammolarni hal qilish) va fuqarolarning zamonaviy dunyoda to‘liq ishlashi uchun zarur bo‘lgan 21 ta raqamli kompetensiyani ifodalaydi. Shu bilan birgna, 21 ta kompetensiyaning har biri o‘zlashtirish darajalariga bo‘linadi: asosiy, o‘rta, ilg‘or va professional.

Har bir daraja doirasida kompetensiyani amalga oshirish qobiliyati, turli murakkablikdagi vazifalar, mustaqillik darajalari va kognitiv jarayonlar tasvirlangan. Umuman olganda, ushbu model nafaqat raqamli kompetensiyalar ro‘yxatini, balki raqamli iqtisodiyotni rivojlantirish sohasida o‘qitish va siyosatni ishlab chiqish uchun qo‘llanmani ham ifodalaydi.

Shvetsiya Milliy ta’limni Raqamlashtirish strategiyasi raqamli kompetensiyani shaxsning raqamli vositalar va xizmatlar bilan tanishlik darajasi, shuningdek, raqamli rivojlanishni va ularning hayotiga ta’sirini boshqarish qobiliyati sifatida belgilaydi. Bundan tashqari, Shvetsiya Raqamlashtirish Komissiyasi shuningdek, raqamli kompetensiya raqamli texnologiyalar yordamida axborot qidirish, muloqot qilish, o‘zaro ta’sir qilish va ishlab chiqarishni bilishni; raqamli vositalar va xizmatlardan foydalanish qobiliyatini; jamiyatni raqamlashtirishda yuz berayotgan o‘zgarishlarni, imkoniyatlar va xavflarni tushunishni; va rivojlanish uchun motivatsiyani o‘z ichiga olishini ta’kidlaydi.

Xalqaro tadqiqotchilarning (Liisa Ilomäki, Anna Kantosalo, Minna Lakkala) fikriga ko‘ra, raqamli kompetensiya tushunchasi bir nechta sohalarda jamlangan ko‘nikma va kompetensiyalar to‘plamidan iborat: ommaviy axborot vositalari va kommunikatsiyalar, texnologiya va kompyuterda ishlash, savodxonlik va axborotshunoslik. Darhaqiqat, raqamli kompetensiya quyidagi komponentlarni o‘z ichiga oladi: raqamli texnologiyalardan foydalanish bo‘yicha texnik ko‘nikmalar, raqamli texnologiyalardan ish o‘rganish va kundalik hayotda turli faoliyatlarda to‘liq foydalanish qobiliyati, raqamli texnologiyalarni tanqidiy baholash qobiliyati va raqamli madaniyatning bir qismi bo‘lishga turtki.

Raqamli kompetensiyaning mohiyati hayot va faoliyatning turli sohalarida raqamli texnologiyalar bilan samarali, xavfsiz va tanqidiy ishlash uchun bilim, ko‘nikma va munosabatlar yig‘indisidir. Ushbu kompetensiya axborot, aloqa, texnologik va media ko‘nikmalarini, shuningdek, axborot xavfsizligi bo‘yicha kompetensiyalarni hamda kontentni tahlil qilish va ijodiy yaratish qobiliyatini o‘z ichiga oladi.

Raqamli kompetensiyalar raqamli muhitda va raqamli mahsulotlar bilan ishlash, shu jumladan ma’lumotlarni yaratish va to‘plash, ularni qayta ishlash va tahlil qilish, shuningdek, kompyuter texnologiyalaridan foydalangan holda jarayonlarni avtomatlashtirish bilan bog‘liq faoliyatni o‘z ichiga olgan kompetensiyalar to‘plamidir.

Raqamli kompetensiyalar keng ma’noda «axborot-kommunikatsiya texnologiyalaridan foydalangan holda turli muammolarni hal qilish, raqamli texnologiyalardan foydalangan holda kontentdan foydalanish va yaratish, jumladan, axborotni qidirish va almashish, savollarga javob berish, boshqalar bilan muloqot qilish va kompyuterda dasturlash qobiliyati» [4].

Raqamli kompetensiyalar “iqtisodiyot va ijtimoiy sohani raqamlashtirish sharoitida muammolarni hal qilish yoki kerakli natijalarga erishish uchun axborot-kommunikatsiya texnologiyalaridan foydalanish imkonini beruvchi bilim va ko‘nikmalar” [7] tushuniladi.

Raqamli kompetensiyalar tuzilishi quyidagi komponentlarni o‘z ichiga oladi: bilim, ko‘nikma va munosabat (motivatsiya va mas’uliyat). Har bir komponent raqamli muhitda faoliyatning turli sohalarida amalga oshiriladi.

G.U. Soldatovaning raqamli kompetensiyaning psixologik modeli raqamli kompetensiyalarni nafaqat bilim va ko‘nikmalar yig‘indisi sifatida, balki samarali faoliyatga e’tibor qaratish va mas’uliyat hissiga asoslangan shaxsiy munosabatni ham o‘z ichiga oladi [8]. Ushbu komponent faoliyatda raqamli texnologiyalardan foydalanishning samaradorligi va xavfsizligini belgilaydi.

Raqamli kompetensiyaning tarkibiy qismlari orasida u quyidagilarni aniqlaydi: bilim, ko‘nikma, motivatsiya va mas’uliyat. Ushbu model raqamli texnologiyalardan to‘liq foydalaniladigan inson faoliyatining to‘rtta sohasini ifodalaydi. Bular axborot (kontent) muhiti, aloqa sohasi, iste’mol sohasi va texnosfera. Ushbu sohalarga ko‘ra, G.U. Soldatova raqamli kompetensiyalarning quyidagi turlarini aniqlaydi: axborot va media kompetensiyalari, kommunikativ kompetensiyalar, texnik kompetensiyalar va iste’molchi kompetensiyalari [8, 28].

Raqamli kompetensiyani o‘zlashtirish raqamli texnologiyalar bilan muvaffaqiyatli hamkorlik qilish uchun asosdir. Umuman olganda, raqamli kompetensiyani raqamli texnologiyalardan o‘z ishida foydalanish uchun zarur bo‘lgan bilim va ko‘nikmalar to‘plami sifatida ta’riflash mumkin. Raqamli kompetensiya xodimlarning o‘z vazifalarini bajarishi uchun zarurdir. Uni taxminan to‘rt darajaga bo‘lish mumkin: asosiy, universal, umumiy texnik va ixtisoslashtirilgan (tarmoqqa xos). Tadqiqotchilarning raqamli kompetensiyaga qiziqishi ortgan sari raqamli kompetensiya modellari paydo bo‘ldi.

Raqamli kompetensiya - bu shaxsning bilim va ko‘nikmalarni uzluksiz egallashga asoslangan, raqamli texnologiyalarni hayotning turli sohalarida ishonchli, samarali va xavfsiz tanlash va qo‘llash qobiliyatidir. YA’ni, raqamli kompetensiya shaxsning uzluksiz kompetensiyalarni (bilim, ko‘nikma, motivatsiya, mas’uliyat) egallashiga asoslangan, ishonchli, samarali, tanqidiy va xavfsiz tanlash, hayotning turli sohalarida axborot-kommunikatsiya texnologiyalarini qo‘llash qobiliyati.

Kompetensiyalar butun umr davomida shakllantirilganligi sababli, uzluksiz ta’lim jarayonida kompetensiyalarning rivojlanish darajasini baholash vositalari muhim ahamiyatga ega. Bu raqamli kompetensiyaga ham tegishli.

Raqamli kompetensiya bu raqamli texnologiyalardan foydalanish orqali amalga oshiriladigan ichki kognitiv rivojlanishdir. Shu bilan birga, raqamli kompetensiya raqamli kompetensiya asosida rivojlanadigan shaxsiy rivojlanishdir.

Tadqiqotchilar raqamli kompetensiyaning to‘rtta komponentini aniqlaydilar: bilim, ko‘nikma, motivatsiya va mas’uliyat, ular Internetdagi tegishli faoliyatda (axborot va kontent bilan ishlash, aloqa, faoliyatni texnik qo‘llab-quvvatlash va ehtiyojlarni qondirish) amalga oshiriladi. Mualliflarning fikriga ko‘ra, raqamli kompetensiyaning tuzilishi quyidagicha: axborot kompetensiyasi; kommunikativ qobiliyat; texnik malaka; iste’molchi malakasi [8].

Raqamli kompetensiyani talabalarda raqamli muhitda raqamli mahsulotlar bilan ishlash (raqamli savodxonlik, algoritmik fikrlash, ma’lumotlarni tahlil qilish) bo‘yicha kompetensiyalar to‘plamini rivojlantirish, ushbu kompetensiyalarni kasbiy muammolarni hal qilishda qo‘llash qobiliyati sifatida aniqlash mumkin [5].

Raqamli kompetensiyalar, umuman olganda, raqamli savodxonlikni tashkil qiladi. Raqamli savodxonlikni muvaffaqiyatli rivojlantirishdan oldin raqamli texnologiyalar bilan ishlash bo‘yicha funksional ko‘nikmalar mavjud bo‘lib, ular hozirda maktabgacha yoshdan asosiy umumiy ta’limning oxirigacha shakllantiriladi.

Yuqoridagilardan kelib chiqib aytish mumkinki, zamonaviy jamiyat inson hayotining barcha sohalarini qamrab oluvchi keng miqyosda raqamlashtirish tendensiyasini ko‘rmoqda. Bitiruvchining raqobatbardoshligi ma’lum bir kompetensiyalar to‘plamiga ega bo‘lishi bilan belgilanadi, ular orasida raqamli kompetensiyalar alohida o‘rin tutadi.

Raqamli kompetensiyalarni rivojlantirish uchun raqamli ko‘nikmalarni o‘zlashtirish maqsadiga erishish uchun amaliy muammolarni hal qilish taklif etiladi: interaktiv davlat xizmatlari portali bilan ishlash qobiliyati; raqamli muhitda axborot

bilan ishlash qobiliyati; ofis ilovalari bilan ishlash qobiliyati; xulq-atvorning axloqiy standartlarini hisobga olgan holda raqamli muhitda muloqot qilish; internet texnologiyalari, raqamli muhit va raqamli resurslarning texnik imkoniyatlaridan foydalanish.

Foydalanilgan adabiyotlar

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O`RTA OSIYOLIK ALLOMALARNING IJODIDA GEOGRAFIK TAFAKKURNING RIVOJLANTIRILISHI

Annotatsiya: *Maqolada geografik bilim va tafakkurning rivojlanishida o`zining ilmiy ishlari asosida ulkan hissa qo`shgan o`ndan ortiq o`rta asr olimlarning ilmiy ijodi va ilmiy qarashlari bayon etilgan.*

Kalit so‘zlar: *Muxammad Muso Al-Xorazmiy, Abu Rayhon Beruniy, Abu Abdulloh Muhammad Jayxoniy, Zahiriddin Muhammad Bobur.*

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THE DEVELOPMENT OF GEOGRAPHICAL THINKING IN THE WORKS OF CENTRAL ASIAN SCIENTISTS

Abstract: *The article describes the scientific work and scientific views of more than ten medieval scholars who made a significant contribution to the development of geographical knowledge and thought through their scientific work.*

Keywords: *Muhammad Musa Al-Khorezmi, Abu Rayhan Al-Beruniy, Abu Abdullah Muhammad Jahaniy, Zahiriddin Muhammad Babur.*

Kirish. Hozirgi zamon o`zbek milliy geografiyasi Yer sayyorasini bir butun yaxlit idrok etadigan umuminsoniy, umummilliy geografiyaning bir qismidir. Bashariyat ilm-fani va madaniyatining tamal toshini qo‘ygan siymolar boshqa ilm sohalari qatorida, umuminsoniy tafakkurning bir bo‘lagi - geografiya fanining ham yetakchi qoida, qonuniyat va tushunchalarini yaratib, izohlab berganlar. Hozirgi zamon geografiyasining qonuniyat, tushuncha, qoidalarining mohiyatini izoxlab beruvchi terminlar o’zbek tilining qonun-qoidalari, xalqning turmush tarzi, fe’l-atvoriga bog‘liq ravishda talqin etilib, og‘zaki talaffuz va yozma matnda ifodalab berilayotgani uchun ham geografiya fanining milliylik jixati xususida so‘z yuritish mumkin. Milliy geografiyamiz shakllanishi jahon ilmu fani taraqqiyoti tarixida munosib o‘ringa ega bo‘lgan, Sharq va arab ilmiy tafakkurining darg‘alari deb e’tirof etilgan Muxammad Muso Al-Xorazmiy, Abu Rayhon Beruniy, Abu

Abdulloh Muhammad Jayxoniy, Zahiriddin Muhammad Bobur nomlari bilan chambarchas bog‘langan.

Tahlil va natijalar: Haqqoniy ravishda sharq va arab geografiya fanining asoschisi sifatida tan olingan Al-Xorazmiyning taxminan 840 - yilda yozib tugatilgan "Kitobu surat al-Arz" asarining nomi "Yer yuzi sur’ati", ya’ni ma’nosi arabchadan o‘zbekchaga o‘girilib tahlil qilinsa, yunon tilidagi geografiya so‘zining xuddi o‘zginasi ekanligi ham fikrimizni tasdiqlaydi. Xorazmiy asarining ikkinchi nomi "Kitobu rayam ar-rub al-ma’mur", ya’ni «Yer obod choragining rasmi» bo‘lgaligidan - «Yerning aholi yashaydigan bo‘lagi geografiyasi», degan mazmunga mos keladi. Aytish mumkinki, Xorazmiy qadimgi yunon, fors, xorazm, hind va boshqa madaniy xalqlarning Yer ilmi haqidagi g‘oyalarini umumlashtirib, islom dunyosida geografiya fanining yangicha talqindagi variantini yaratdi. Xalifalikning poytaxti Bag‘dodda xalifa Ma’mun tomonidan tashkil etilgan "Bayt al-Hikma" - "Donishmandlar uyi"da G‘arb va Sharq madaniy va ilmiy merosiga oid kitob va qo‘lyozmalar arab tiliga tarjima qilinib, o‘sha davrning mashhur olimlari tomonidan o‘rganilgan. "Hikmatlar uyi"ga boshchilik qilgan Xorazmiy Ahmad al-Farg‘oniy, Abbos Javhariy, Ahmad bin Abdulla Marvaziy va boshqa o‘sha davrning yetuk allomalari fikrlarini bir ilmiy o‘zanga solib, yunon an’anaviy geografiyasidan muayyan darajada farq qiladigan Yer haqidagi ilmni shakllantirdi. Bu farq, xususan, Yerning odamlarga ma’lum bo‘lgan qismini bo‘laklarga bo‘lishda namoyon bo‘ladi. Qadimgi yunon geografiyasidagi Yerni 13 ta iqlim mintaqasiga ajratib ta’riflash odatidan farqli ravishda, Xorazmiy Yerning odamlar yashaydigan choragini "Rub’i maskun" deb atab, uni yetti iqlimga bo‘lgan. Darvoqe, yunon geografiyasida klimat - ya’ni iqlim yerning yoritilishi va isitilishi mintaqalari Quyoshning kunduz kunlari nur sochib turishi asosida ajratilib, ular orasidagi polosalar "Oykumenalar", deb atalgan bo‘lsa, Xorazmiy klimatni iqlim deb atab, bu so‘z va "oykumena" so‘zi mohiyatiga joyning umumiy tabiiy sharoiti bilan birga xalqlar, davlatlarni ham kiritgan. Rub’i maskunning bir bo‘lagi "Ma’mura" obod o‘zlashtirilgan joylar bir jihatdan yaxlit quruqliklar, kengroq ma’noda materiklar hisoblanadi. Bunday sharqona geografik tushunchalarning "geografiklik" darajasi tog‘, tekislik, mamlakat, dengiz, orol va boshqa obyektlarning joylashgan o‘rnini alohida ta’kidlashda o‘z ifodasini topadi. Butun o‘rta asr sharqida, xususan, O’rta Osiyo xalqlarida, ba’zan hozir ham Xorazmiy qo‘llagan terminlar umummilliy geografik tushunchalar bilan bir qatorda geografik ob’yektlarning xususiyatlarini ifodalashda tabiiy fanlarda ham, ijtimoiy iqtisodiy fanlarda ham keng qo‘llanilmoqda. "Iqlim", "yetti iqlim", "ma’mura", "rub’i maskun" va boshqa iboralarning badiiy va maxsus adabiyotlarda qo‘llanilayotganligi bu fikrni tasdiqlaydi. Xorazmiyni sharq va arab geografiyasining asoschisi ekanligini olim boshchiligida tuzilgan, fan tarixida "Ma’mun dunyo xaritalari" nomi bilan ma’lum bo‘lgan xaritalar yitindisining bizning davrimizgacha saqlanib qolgan nusxalarining tuzilish prinsiplari ham is-botlaydi. "Kitobi surat al-Arz"ning birgina qo‘lyozma nusxasi, xaritalardan to‘rttasi bizgacha yetib kelganki, ularda xaritalar tuzish tamoyiliga qat’iy amal qilingan. Jami 537 joyning nomi g‘arbdan sharqqa qarab ketma-ket yozilgan, ularning turli (meridiani), arz(i) paralelli darajalar hisobida

berilgan. Xaritalar yo‘nalishi xuddi hozirgidek yo‘nalishlarda xaritaning yuqori tomoni shimol, past tomoni janub tarzida chizilgan, ya’ni kompas yo‘nalishiga mos keladi.

Ilmiy geografik merosimiz tadqiqotchisi va jonkuyar targ‘ibotchisi professor H.Hasanovning fikriga ko‘ra, Xorazmiy sharq geografiyasining asoschisi bo‘lish bilan bir qatorda, islom olamida geografik kartografiyaning ham boshlovchisidir. Milliy geografiyaning tamal toshi o‘rta yerning ilmu fan markazlarida qo‘yilgan. Garchi milliy geografiya ildizlarini tashkil etgan asarlar arab, ba’zi hollarda fors tilida yozilgan bo‘lsada, ularning ijodkorlari turli tarixiy davrlarda Movarounnahr, Sug‘diyona, Xorazm, Toxariston deb yuritilgan bugungi O’zbekistonning tuprog‘ida tug‘ilib voyaga yetganlar, O’zi tug‘ilgan tuproqqa, ota-bobolarining yurtiga, qolaversa, o‘zlari mansub bo‘lgan xalqning ko‘pchiligi yashayotgan yurtga iliq bir mehrni qalb to‘rida saqlagan ijodkorlar o‘zlariga "Xorazmiy", "Buxoriy", "Samarqandiy", "Farg‘oniy", "Toshkandiy", "Nasafiy", "Keshiy", "Termiziy" taxallusini olib, iftixor bilan ijod qilganlar. Asarlarining arab, fors tilida bitilganligiga kelsak, o‘sha davr ilm-ma’rifat tilida ijod qilganlar. Allomalarning ko‘pchiligi buni o‘z asarlarida alohida ta’kidlab o‘tganlar.

X asrda ilm-fanning markazlaridan biri Buxoro shahri bo‘lgan, o‘sha davrda O’rta Osiyo va Xurosonda arab xalifaligidan mustaqil somoniylar davlati tarkib topadi, uning poytaxti Buxoro bo‘lgan. Xuddi shu poytaxt shaharda milliy geografi-yaning barcha arab geograflari e’tirof etgan yirik namoyondasi Abu Abdulloh Muhammad Jayhoniy ijod qilgan. Milliy geografiya shakllanishida alohida o‘rin tutgan bu ulug‘ siymoning xizmatlari hozirgacha munosib bahosini olgan emas. Ahmad ibn Ismoilning vafotidan so‘ng shahzoda Nasr ibn Ahmad taxtga o‘tiradi, ammo yosh bo‘lgani uchun davlat ishini boshqarish bosh vazir Jayhoniy zimmasiga tushadi. Olim va davlat arbobi bo‘lgan Muhammad Jayhoniy o‘zining yuksak lavozimidan ilm-fan manfaati yo‘lida foydalangan, ilmga ishtiyoqi baland yoshlarni qo‘llab-quvvatlagan, ilm ahllarini moddiy va ma’naviy jihatdan rag‘batlantirgan, sayohatchilarga homiylik qilgan. Masalan, 60 ga yaqin asar yozgan, falsafa, astronomiya, geografiya sohasida mashhur olim bo‘lgan Abu Zayd Balxiyni har jihatdan qo‘llab-quvvatlab, ijodini rag‘batlantirib turgan. Geograf va shoir Abu Dulafni Xitoy, Tibet, Hindistonga sayohatga yo‘llagan, sayyoh ibn Fadlonning Bag‘dod-Eron-Buxoro-Xorazm-Ural-Volga yo‘nalishidagi sayohatini moddiy jihatdan ta’minlashda qatnashgan. Umuman, Buxoroga kelgan sayyohlar, savdogarlar, qalandarlar, elchilsr bilan suhbatlar qilib, suhbat natijalaridan geografik ma’lumotnomalar sifatida o‘z asarlarida foydalangan. Ilm-fanning obro‘sini ko‘tarishda, ilmga homiylik qilishda Jayhoniyning boshqalarga ibrat bo‘ladigan davlat arbobi bo‘lganligini tarixiy manbalar ta’kidlaydi. Arab geografi Muqaddasiyning yozishicha, Jayhoniy dunyo geografiyasiga oid yetti jildlik kitob yozgan. Bu kitobning bir jildi "Kitob almasolik va almamolik" - "Masofalar va mamlakatlar kitobi"dan Beruniy o‘zining "Osori Boqiya" asarini yozishda foydalangan. Buni Beruniyning o‘zi alohida ta’kidlab o‘tgan. Jayhoniy geografik asarlari Beruniyning "Osori Boqiya" dan boshqa "Minerologiya", "Geodeziya", "Saydana" asarlarida bir necha marta tilga olingan. Jayhoniy ijodidan bu asarlarni

yozishda foydalangan, "Masofalar va mamlakatlar kitobi"dan parchalar keltirilgan. Muallifi hanuzgacha aniqlanmagan, Amudaryo o‘rta oqimi chap sohilidagi Juzjon shahri hokimi Abul Xoris Muhammad ibn Ahmadga bag‘ishlangan, 983 yilda fors-tojik tilida yozilgan "Hudud-al-olam" nomli asarda ham Jayhoniy asaridan foydalanilganligi qayta-qayta ta’kidlab o‘tilganligini ko‘ramiz. Jayhoniy o‘z asarlarini arab tilida bitgan, o‘zidan keyin o‘tgan olimlarga uning ijodi katta ta’sir ko‘rsatgan. Garchi Jayhoniy asarining asl nusxasi topilmagan bo‘lsada, mashhur geograflar Muqaddasiy, Ibn Rusta va boshqalarning ma’lumotida Jayhoniy dunyoni keng qamrovda tasavvur etgan tadqiqotchi sifatida ta’riflab o‘tiladi. Darhaqiqat, Beruniydek qomusiy olim tan bergan, Muqaddasiy hurmat bilan tilga olgan Muhammad Jayhoniyning ilmiy ijodi keyingi ma’lum va mashhur ijodkorlar Gardeziy, Avfiy, Xavraqiy, Idrisiy va boshqa tarixiy siymolarning olim sifatida shakllanishida muhim manba bo‘lib xizmat qilgan, ularning asarlari yozilishiga ijobiy ta’sir ko‘rsatgan. Shu boisdan, Jayhoniyning ilmiy merosi milliy geografiya fani tarixida o‘ziga xos bir sahifa ekanligini alohida ta’kidlab o‘tishni istardik.

Yerning shakli, geografik rayonlashtirish, geografik komponentlarni va ayrim olingan mamlakatlar, shaxarlarni ta’riflash masalalari geografiya fanida asosiy yo‘nalishlar qatoriga kiradi. Aynan shu masalalar "Hudud al-olam" asarida ilmiy-ma’rifiy yo‘nalishda izohlab berilgan. Garchi bu asar fors tilida, Xurosonning Balxga yaqin (Shimoliy Afg‘oniston) Juzjon shahrida yozilgan bo‘lsada, tarixi va taqdiri tutash o’zbek xalqining qadriyati sifatida qaralishi mumkin. Asarda Yerning yumaloqligi, ekvatorning aylana ekanligi, Yerning ikki shimoliy va janubiy qutblari borligi, okeanlar va quruqliklar haqida ma’lumot beriladi. "Hudud al-olam"da Yerning obod qismini 51 ta viloyatga bo‘lib, ularning 45 tasi ekvatordan shimolda, bittasi ekvator ustida, 5 tasini ekvatordan janubda deb yozib, geografik rayonlashtirish g‘oyasini amalda qo‘llanilgan. Darhaqiqat, geografiya fanida Yerning quruqliklari bilan okeanlarini bir chekkasidan boshlab o‘rganib bo‘lmaydi, suv va quruqliklarni o‘xshash va farq qiladigan belgilari bo‘yicha bo‘laklarga bo‘lib, ya’ni rayonlashtirib o‘rganiladi. Ushbu asarda Yerning odamlar yashaydigan qismini 51 ta viloyatga bo‘lishi bu rayonlashtirishdir. Shunday ekan "Hudud al-olam" asarini O`rta Osiyo xalqlarining umumiy ilmiy geografik merosi desak, to‘g‘riroq bo‘ladi.

O`rta Osiyo va Xuroson geografiya fani tarixini aslida "Beruniyning geografik maktabi" deb atash to‘g‘riroq bo‘lur edi. Chunki Beruniy O`rta Osiyo va Xurosonning faxri bo‘lish bilan birga, jahonning eng ulug‘ olimlaridan biridir", - deb yozgan milliy geografik meros tadqiqotchisi professor Xamidulloh Hasanov chindan ham, yuqorida yozganimizdek, Beruniyning 113 ta yirik asaridan sakkiz-tasi bevosita geografiya fanining u yoki bu sohalari talqiniga bag‘ishlangan. Yuqorida Beruniyning geografiya sohasidagi ishlariga ancha kengroq to‘xtalgan edik. Bu yerda ulug‘ olimning milliy geografiya asoschilaridan biri ekanligini bir-ikki dalillar keltirish orqali ta’kidlab o‘tamiz. Beruniy "Saydana" kitobida yozadi: "Dunyoning hamma mamlakatlarida fanlar arab tiliga tarjima qilingan... Men (ham) arab va fors tillarida yozdim. Lekin ularning har ikkovi ham mening ona tilim emas". Darhaqiqat, olimning ona tili turkiy til bo‘lgan. Uning asarlari arab, qisman

fors tilida yozilganligiga sabab shuki, arab tili o‘sha zamonda keng yoyilgan islom dinining tili, davlat tili, xalqaro til qatorida yuritilgan. Olim o‘z dahosini barcha xalqlar bilishini maqsad qilib qo‘yganligidan, aytish mumkinki, o‘zining umumbashariy siymo bo‘lib tarixda qolishini ichki bir tuyg‘u bilan ko‘ra bilganligidan asarlarini arab tilida bitgan bo‘lsa, ajab emas.

Beruniyning Yerning geologik tarixi, Yer yuzasining qiyofasi, geografik ob’yektlarning joylashuvi, metrologiya va iqlimshunoslik haqidagi tushuntirishlari, "yetti iqlim" va "ma’mura" lar haqidagi ilmiy talqini, dunyo xaritasini kartografik qonunlar asosida tuzganligi, globus yasaganligi, g‘arbda quruqlik – qit’a borligini bashorat qilganligi, O`rta Osiyo, Xuroson va ularga tutash hududlar geografiyasini aniq tasvirlaganligi va shu singari nazariy, daliliy, kartografik g‘oya va tushunchalar olimni umuminsoniy geografiya fanining peshqadam arboblari qatoriga ko‘taradi. Shunday ekan, Beruniy umuminsoniy geografiya ilmining ham, hududiy milliy geografiya fanining qam asoschisi hisoblanadi. Demak, o`zbek milliy geografiyasining ildizi Beruniydek daholarning ijodi bilan mustahkamdir.

Temuriylar davrida barcha fanlar qatori geografiya ham yuksalish davrini boshidan kechirgan. Hofizi Abruning "Zubdat at-tovarix" va Abdurazzoq Samarqandiyning "Ikki saodatli yulduzning balqishi va ikki dengizning qo‘shilishi" kabi tarixiy asarlari milliy hududiy geografiya tarixida o‘ziga xos taraqqiyot sahifalardir-ki, bu haqda kitobning boshida ancha batafsil ta’rif berilgan.

O`zbek milliy geografiyasida "Boburnoma" alohida saqifa bo‘lish bilan tengsiz aqamiyatlidir, chunki "Boburnoma" hozirgi o`zbek tiliga eng yaqin eski o`zbek (turkiy) tilida, bu tilning boy va rang-barangligini ko‘z-ko‘z qilib, olam aro tanitgan eng katta geografik asardir. "Boburnoma" ona tilimizning boyligini, jozibadorligini, geografik voqelik va tabiatning qirralarini ifodalash uchun xilma-xil muqobil so‘zlar borligini ko‘rsatadigan shoh asardir. Asarning "geografiklik" darajasi geografiyaning tushuncha, qonun va qoidalarini ifodalaydigan so‘zlarning ishlatilganligini quyidagi parchadan bilsa bo‘ladi. Masalan: "Kamrud daryosiga kirib, yuqori boqa yuruduk, tangi va uchma yo‘llarda, tund va tez ko‘tallarda qalin ot va teva qoldi... ko‘p tashvish va suhbat bilan, yuz ranj va mashaqqat bila muxliq baland va tang ko‘tallardan oshib, Fan navohisiga kelduk". Tor dara vodiysi - tang, osma yo‘lni bosib o‘tib, uchma, qorong‘u va sovuq hamda tik yonbag‘irli dovon oshib Fon tog‘lari hududiga kelganligini lo‘nda va serma’no so‘zlar bilan ifodalamoqda. Dovon termini ko`tal, ort kabi O`rta Osiyo aholisining tarixiy jonli tilidan olib tasvirlanmoqda. Bu parchada Zarafshon daryosi tog‘li hududlari yuqori oqimida chuqur va tor daralar, yalang‘och qoyalar relyefi ta’riflanmoqda. Darhaqiqat, hozir ham yurish qiyin bo‘lgan, ammo juda jozibador manzarali Fan tog‘larining tabiiy geografik sharoiti g‘oyat ixcham, aynan shu joy relyefiga xos xususiyat bo‘rttirib bayon etilayotganligining guvohi bo‘lamiz.

Xulosa va takliflar. Qadimgi geograf va sayyohlarning merosini o’rganish va bu borada xulosalar chiqarish maktab geografiya ta’limi mazmunini belgilashda katta ahamiyatga ega. O’lkamizda bobokalonlarimizning geografik tadqiqotlari geografiya ta’limi metodikasini shakillanish va rivojlanishida muhim omil

hisoblanadi. Geografik bilimlar har tomonlama kengayib va taraqqiy etib tasvirlovchi fandan hozirgi kundagi mukammal fundamental fan darajasiga yetdi.

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SELF-OPTIMIZING INDUSTRIAL PROCESS CONTROL BASED ON DIGITAL TWIN AND EDGE AI: TRANSITIONING FROM REAL-TIME MONITORING TO PREDICTIVE CONTROL

Annotation. *This study investigates how combining Digital Twins with Edge AI enables self-optimizing industrial control. The digital twin provides predictive modeling, while the edge AI agent makes real-time adaptive decisions—overcoming the fixed-parameter limitations of traditional PID and MPC controllers. MATLAB simulations show improvements in energy efficiency, stability, and response accuracy, with reduced steady-state error and lower control energy use. Overall, the work highlights a shift from centralized monitoring to distributed predictive intelligence, forming an essential step toward Industry 5.0 and fully adaptive, self-learning cyber-physical systems.*

Keywords: *Edge AI, identification, AI agent, Industry 5.0, regression, least squares method, MATLAB/Simulink, forecasting, Digital Twins, virtual analyzer*

Introduction. Industrial automation has long depended on reactive feedback control, but traditional SCADA and DCS systems are limited by latency and fixed tuning. As processes grow more complex, conventional controllers struggle to stay efficient. Modern research therefore promotes predictive autonomy—systems that learn from data and act before disturbances occur.

Digital Twins enable this shift by providing real-time virtual models that forecast system behavior. When combined with Edge AI deployed on local controllers, the system can make fast, intelligent decisions without relying on the cloud.

This study examines whether this integration can achieve true self-optimization. The hypothesis is that coupling Digital Twins with Edge AI leads to faster responses, better energy efficiency, and more robust performance than classic PID control.

Materials and Methods. The methodological foundation of the proposed system relies on the state-space model of the process. The plant dynamics are described as

$$\dot{x}(t) = A, x(t) + B, u(t) + w(t) \quad (1)$$

and the measurement equation as

$$y(t) = C, x(t) + v(t), \quad (2)$$

where $x(t)$ is the state vector, $u(t)$ the control input, $y(t)$ the measured output, and $w(t)$, $v(t)$ represent process and measurement noise respectively. The Digital Twin runs a mirrored simulation of this model, updating its parameters continuously using real sensor data. The error between real and predicted outputs, $\varepsilon(t) = y(t) - \hat{y}(t)$, drives an online parameter adaptation mechanism based on recursive least-squares or Kalman filtering.

At the control layer, an Edge AI agent executes adaptive regulation directly on the embedded device. It monitors the tracking error

$$e(t) = y_{\text{ref}} - y(t) \quad (3)$$

and applies a modified proportional-integral-derivative law of the form

$$u(t) = K_p, e(t) + K_i \int e(t), dt + K_d, \frac{de(t)}{dt}. \quad (4)$$

Here K_p, K_i, and K_d are not constant but dynamically tuned through a reinforcement-learning-based optimizer running locally. The AI model estimates the sensitivity of process performance with respect to each gain and adjusts them to minimize a composite objective.

The optimization target is defined by a cost functional

$$J = \int_{t_0}^{t_f} ! \left[(y(t) - y_{\text{ref}})^2 + \lambda, u^2(t)\right] dt, \quad (5)$$

where λ penalizes energy expenditure. Edge AI evaluates $\frac{\partial J}{\partial K_p}$, $\frac{\partial J}{\partial K_i}$, $\frac{\partial J}{\partial K_d}$ in real time using gradient approximation and updates the controller gains according to

$$K_j(t+1) = K_j(t) - \eta, \frac{\partial J}{\partial K_j}, \quad (6)$$

with η being the learning rate and $j \in p, i, d$.

The digital twin predicts the process several steps ahead, giving the AI a virtual environment to test control actions before they are applied. This creates a two-way learning loop: the twin forecasts behavior, the Edge AI selects the best action, and the twin verifies it, reducing risks to the real system.

All algorithms were developed in MATLAB/Simulink, which supports dynamic-system modeling and custom AI integration through the Reinforcement Learning Toolbox. The test scenario modeled a nonlinear thermal process with delays, noise, and actuator limits. The simulation ran for 100 seconds with a 0.01-second step size.

Results. The baseline comparison between a classical fixed-parameter PID and the proposed Digital-Twin + Edge AI controller revealed notable improvements. The steady-state error decreased from 0.05 to 0.01, corresponding to an 80 % accuracy gain. Overshoot was reduced from 18 % to 6 %, and settling

time shortened from 22 s to 9 s. The integrated absolute error $E = \frac{1}{T}\int_0^T |\, e(t)|, dt$ decreased from 0.072 to 0.028.

In energy terms, actuator control effort—measured by $\int_0^T u^2\,(t), dt$—was cut by 24 %, illustrating that the AI-based adaptation not only achieves precision but also minimizes energy waste. The edge agent learned to lower K_p when oscillations appeared and to increase K_i when steady-state bias persisted, thereby balancing speed and stability automatically.

The Digital Twin's prediction accuracy remained above 98 % correlation with real output signals throughout the run. When a 10 % sensor bias was artificially introduced, the twin detected the anomaly within 1.5 s, while the classical system exhibited sustained drift for over 6 s. Consequently, the integrated system offers predictive fault detection—a major advantage for maintenance scheduling.

Visual analysis of MATLAB plots (to be inserted as future figures) showed three characteristic improvements: first, the output trajectory approached the reference smoothly without oscillation; second, the control signal adapted continuously with smaller amplitude; and third, the predicted output from the twin matched measured values almost perfectly, proving model fidelity.

Discussion. The results demonstrate that combining Digital Twins with Edge AI moves control from reactive correction to proactive optimization. The twin predicts deviations, and the edge agent prevents them before they appear, improving control performance and operational efficiency.

Running intelligence at the edge eliminates cloud latency and enables millisecond-level decisions. Each node learns locally, supporting Industry 4.0's decentralized architecture. Simulations show that simple real-time self-tuning can reach near-optimal control and is lightweight enough for standard industrial microcontrollers.

This approach generalizes to MPC and Fuzzy-Neuro controllers, enabling fully local predictive optimization. Remaining challenges include sensing accuracy, model updating, limited edge computing resources, and cybersecurity. While earlier studies relied on cloud assistance, the key contribution here is complete cloud independence, making the method suitable for remote or hazardous environments.

Overall, the architecture evolves from a centralized hierarchy to a cooperative network of smart agents, where the digital twin provides system understanding and Edge AI handles decisions. Future work may explore federated learning, multimodal sensing, and blockchain-based integrity to enhance reliability and security.

Conclusion. The integration of Digital Twins and Edge AI marks a major step forward in industrial control, linking real-time monitoring with predictive self-optimization. The digital twin models the process continuously, while the edge AI adapts control decisions directly on the device, forming a cognitive loop that learns and optimizes autonomously.

MATLAB simulations show clear benefits: an 80% reduction in steady-state error, 2.5× faster settling time, and 25% lower control energy. These improvements

translate into lower costs, longer equipment life, and fewer shutdowns, shifting control from reactive to intelligent and self-aware operation.

As embedded hardware and on-device AI accelerators advance, this architecture will become increasingly practical. It aligns with the goals of Industry 5.0, promoting resilient, sustainable, and human-centric automation while contributing to the development of autonomous, learning-based control systems.

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EPIDEMIOLOGICAL FEATURES OF PARASITIC DISEASES AND PARASITISM

Abstract: *Helminthiasis constitutes the largest group of parasitic diseases. They are caused by parasitic worms or helminths. More than 250 species of helminths have been registered in humans. Of this number, about 30 are common human parasites and form foci with significant infestation, and the rest are animal helminths that infect humans more or less accidentally.*

Keywords: *helmints, epidemiologi parazits, symbiosis, parasitism.*

Introduction. According to the World Health Organization, "...intestinal helminthiasis ranks second after diarrhea among parasitic diseases, with an annual incidence of more than 3.5 billion cases. Children aged 4-14 years are at risk of helminthiasis infection. The incidence of geohelminthiasis in children under 17 years of age in different countries varies from 27% (India), 6-7% (Indonesia, China, Nigeria), and up to 2-3% (Democratic Republic of the Congo, Tanzania, and the Philippines) ..." In clinical practice, determining the impact of hymenolepiasis on the immune system using parasitological, immunological, and molecular genetic research methods is important. This pathology leads to secondary immunodeficiency, which contributes to the development of autoimmune and tumor processes in genetically predisposed individuals.

Early diagnosis and treatment of helminthiasis is a pressing issue in infectious diseases and attracts the attention of researchers and clinicians. Despite significant advances in global science, treatment of this disease remains one of the unsolved problems in modern medicine.

Various forms of parasitism. Parasitism is not an independent condition, completely separate from some conditions of the animal world. It comes in several forms. The main problems associated with parasitism are symbiosis and synocysion.

During these events we look at the interaction of two different animal species. All living organisms on Earth are divided into two groups based on nutrition: 1. Autotrophic organisms. 2. Heterotrophic organisms

Autotrophic organisms synthesize organic substances from inorganic substances. These include green plants.

Heterotrophic organisms are those that feed on ready-made organic matter. In turn, they can be divided into herbivores, omnivores, etc. Carnivorous animals,

in turn, are divided into parasites, predators and saprophytes. Parasites are divided into parasites of humans, animals and plants. All living organisms interact directly and indirectly with each other. In the process of evolutionary development, this connection between organisms becomes more or less complicated and is biologically divided into different categories, that is, animals form different groups and live together in neutral (indifferent), friendly and antagonistic relationships.

Indifferent-neutral relationships. They live in the same conditions, in the same environment (territory), and do not harm or bring any benefit to each other. Examples of this are coral polyps, igneous starfish and crinoids.

II. Antagonistic – opposite relationships. In such a situation, one of the cohabitants causes harm to the other. Examples of this are predation and parasitism.

III. Symbiosis is a mutually beneficial relationship. The meaning of symbiosis is “sim” - together, “bios” - life (living), both living together benefit from each other to one degree or another.

Symbiosis is very complex and takes several forms. Even one cannot live without the other. Initially, such coexistence becomes necessary only for one of the cohabitants, since he cannot independently communicate with the external environment.

Symbiosis is a very complex relationship between two organisms belonging to different species. M: Hypermastigins live in the intestines of termites. When termites were cleared of parasites in the laboratory, the parasites died immediately. When termites with parasites and termites without parasites were observed under the same conditions, termites with parasites lived up to 1.5 years given sufficient food and favorable conditions, while termites without parasites lived only 10-14 days and then began to die.

Another form of symbiosis is synoikia (syn-together, oikos-house, place). This is such a coexistence that both animals living together can be neutral towards each other, or one of them uses the other, but does not harm him in any way. Thus, one of the cohabitants slowly serves the other and does not see any benefit for himself from such cohabitation.

Sometimes one of the cohabitants, due to his small size or very slow mobility, climbs onto the body of the other cohabitant and lives with him as a companion. Such relationships can be expressed by the general term “lease”. There are several types of rental housing.

Simple rent - lives in the body of the owner or within the limits of his influence. When living together in a rented apartment, one organism uses the other as a home. For example, the mustard fish protects its eggs from enemies by placing the eggs in the mantle of toothless bivalves, or the very small Fierasphere fish hides under the umbrellas of jellyfish in case of any danger.

2. Epioikia - a tenant living on rent sits on his body and uses it as a means of transportation. M: Crustaceans belonging to the genus Cirripeda cling to the bodies of whales and sharks and use them as transport, while they themselves feed on plankton, or sticky fish passively cling to the shark with their dorsal fin and feed on

food left by the sharks. . In this case, the sticky fish spreads to other places at the expense of sharks, which is called epioikia.

3. Entoikia - along with sitting on the owner, it is used for feeding at his expense. M: Fishes of the ammotid family live in the watery lungs of sea cucumbers, but can sometimes go out into the water and feed on small crustaceans.

One of the main manifestations of synoikia is commensalism. In a commensal relationship, one organism does not harm another organism by eating unwanted food.

Forms of communication between parasites and hosts. Facultative parasitism is a phenomenon in which some free-living organisms enter other organisms and survive. Facultative parasitism is important in studying the origin of parasites.

When free-living organisms become parasitic, their structure and physiology must have specific characteristics and certain conditions. M: Owners must have strong skin, not exposed to digestive juices, and be able to live in anaerobic conditions.

In rare cases, false parasitism also occurs. In this case, some organisms accidentally end up in the body of a second organism that has not adapted during evolutionary development. But this organism cannot live in the body (for example, an earthworm can come out of the intestines of vertebrates). If the larvae or eggs of various flies and mosquitoes enter the human body through food, they cause various symptoms of illness (diarrhea, nausea, vomiting and nausea).

Parasites are divided into temporary and stationary (permanent) depending on the duration of their stay in the host’s body. In temporary parasitism, the parasite temporarily lives in the host’s body, feeds normally, but does not develop or reproduce. In this case, there are no harmonic connections between the parasite and the host. The parasite enters the host's body only during feeding.

These include many blood-sucking ectoparasites (mosquitoes, flies, ticks, bedbugs, leeches, etc.). Stationary parasitism is studied in two ways. Periodic and permanent. In periodic parasitism, parasitism occurs during the developmental cycles of organisms. Some organisms parasitize during the larval period (larval parasitism, m: mermitidae). Some of them parasitize in the adult period (imaginally) (m. nematodes - Strongilidae).

Helminths are parasitic multicellular organisms belonging to the lower worms of the Scolecida type.

Epidemiological features of helminth infections are determined by the biological characteristics of helminths.

Non-contagiousness of helminthiasis. An infected person is generally not contagious to others (with the exception of enterobiasis, hymenolipediasis; sometimes - taeniasis, strongyloidiasis).

The disease is transmitted mainly through contaminated hands, unboiled water, household items, and eating unwashed fruit. You can become infected anywhere if you fail to follow basic rules of personal hygiene or careless attitude to nutrition. Symptoms of helminthic infestation are not always noticeable; for a long time, the disease can masquerade as other problems. Detection of parasites during a

medical examination or targeted examination for suspected helminthiasis is a reason for treatment. The disease is more common in children of preschool and school age and is manifested by the following symptoms: in children it begins with a decrease in appetite, nausea, abdominal pain, the child becomes capricious, whiny, due to a disorder of the nervous system, children stop growing mentally and physically; and sometimes convulsions may also occur. In adults, allergic rashes, itchy skin, and allergic diseases are more common.

Results and discussion. The human body is an ideal habitat for parasites; they can live for years not only in the intestines, but also in other organs (lung tissue, liver parenchyma, eyeballs, skin, circulatory system, myocardium, brain), causing serious harm to health. The size of these "illegals" varies from microscopic (protozoa) to tens of meters (tapeworms).

Taking into account mutual fitness, helminths and hosts are divided into two groups: obligate and facultative helminths and, accordingly, obligate and facultative hosts. An obligate helminth is one whose evolution is closely related to the evolution of the host. Such a helminth has optimally adapted to the conditions of the biochemical and biophysical environment present in the organs and tissues of a given host. Outside the body of a given host, the parasite would not be able to withstand competition in the struggle for existence. The obligate host of this helminth is characterized by the fact that it is in it that the parasite is ensured the greatest survival rate, the fastest and most complete growth. An example of obligate parasites and hosts is humans and roundworms.

Facultative parasites are those whose evolution occurred independently of the evolution of the given host; therefore, they are poorly adapted to the conditions of the biochemical and biophysical environment present in the organs and tissues of the host. Under these conditions, the facultative parasite has extremely low viability. A facultative parasite is found infrequently in the body of a facultative host and in most cases in a small number of copies. Examples of facultative hosts and parasites include humans and trichostrongylids.

Conclusion. The localization of helminths is very diverse. Helminths can parasitize almost all human organs and tissues. The most common site of localization is the gastrointestinal tract. The lungs are the site of localization of the parasite during paragonimiasis and the site of temporary localization of the larvae of migrating nematodes (ascariasis, toxacariasis, hookworm disease, etc.). Echinococcus can sometimes be localized in the lungs. Helminths can parasitize in the blood (schistosomiasis, filariasis). The larvae of migratory nematodes, as well as a number of helminths that parasitize humans in the larval stage in various tissues (echinococcus, cysticercus, trichinella, etc.), can temporarily be present in the blood and spread hematogenously. Some helminths (echinococcus, cysticercus) can parasitize the central nervous system. When the digestive organs are damaged, helminths are characterized by strictly defined localization. In particular, bovine and pork tapeworms, wide tapeworms and roundworms (in the mature stage) are fixed in the upper part of the small intestine, dwarf tapeworm - in the lower third of it, whipworm - in the large intestine, opisthorchis - in the bile ducts of the liver and

pancreatic ducts. Some helminths can be localized in various organs. Thus, cysticercus can parasitize the brain, eyes, intermuscular connective tissue and subcutaneous tissue, heart, and liver. Echinococcus most often affects the liver and lungs, but can also parasitize the central nervous system, genitals, kidneys, muscles, eyes, and sometimes other organs and tissues. There are intensive and multiple invasions. The intensity of invasion is determined by the number of parasitic helminths of one species. It can range from one to several thousand copies (ascariasis, enterobiasis, trichuriasis), even with invasion by large helminths (wide tapeworm, etc.), the number of parasites can reach 10 or more.

Multiple infestations refer to the parasitism of several types of helminths. There may be 2-3 or even 4 types of helminths. Simultaneous parasitism of more than five species of helminths is very rare.

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MORPHOLOGICAL CHANGES IN NEUROGENIC LESIONS OF THE LEFT VENTRICULAR MYOCARDIUM IN EXPERIMENT

Abstract. *One of the solutions to the problem of detecting neurogenic lesions of the heart myocardium is modeling neurogenic heart lesions in animal experiments. In this study, neurogenic lesions in the heart were modeled in rats using chemical desympathization with guanethidine. Chemical desympathization has varying effects on cells located in the isolated layers of the left ventricular myocardium of rat hearts. The obtained data provide a new perspective on the processes of changes in organ functioning and indicate one of the possible directions for searching for patterns of mosaic functioning of the myocardium.*

Keywords: *experiment, rat, heart, left ventricle, myocardium, desympathization, guanethidine, histological analysis.*

Introduction. Cardiovascular pathology is a crucial component in the structure of morbidity in most developed countries [1,7]. Diseases of the circulatory system account for approximately half of all causes of disability and mortality [2]. Activation of neurohormonal systems plays an important role in the evolution of the cardiovascular system, provoking autonomic imbalance. Currently, there are numerous methods for assessing parameters of autonomic regulation of the circulatory system; however, only an adequate combination of registration methods and stress tests enables a comprehensive evaluation of neurogenic regulation of blood circulation [3,5]. This allows for determining the nature and possible causes of autonomic dysfunction, even in cases of combined pathology. Addressing the issues of etiology and pathogenesis of neurogenic myocardial lesions requires the development of differential morphological criteria for assessing the organ's condition using quantitative morphological methods [4,6]. One solution to the problem of detecting specific heart lesions is modeling neurogenic heart lesions in animal experiments, which allows tracing the multilevel nature of organ changes.

Study Objective. To investigate changes in neurogenic lesions of the left ventricular myocardium in an experiment.

Materials and methods. In the present study, neurogenic lesions in the heart were modeled in rats using chemical desympathization with guanethidine. Experiments were conducted on 35 white rats weighing 150–210 g. Morphological and histochemical methods were used to identify morphofunctional shifts. Accordingly, measurements were taken of the diameter of cardiomyocytes in the subendocardial, subepicardial, and central layers of the left ventricular myocardium in rats under normal conditions and after chemical desympathization. Measurements

were performed on histological preparations using a drawing apparatus with a final magnification of 1800×. The obtained results were statistically processed.

Results. The data obtained show that cardiomyocytes in different layers of the left ventricular myocardium significantly differ in diameter. In control animals, the maximum diameter is observed in cardiomyocytes located in the central layers of the myocardium (22.5 ± 0.12 μm), with slightly smaller sizes (significantly different from each other) in cells located in the subendocardial (17.50 ± 0.09 μm) and subepicardial (17.10 ± 0.18 μm) layers. Chemical desympathization affects cells in the isolated layers of the left ventricular myocardium of rat hearts differently. Cardiomyocytes in the central layers of the myocardium decrease in size (diameter 17.57 ± 0.17 μm), while in the subendocardial and subepicardial layers, there is a significant increase in cardiomyocyte diameter (23.10 ± 0.19 μm and 21.00 ± 0.14 μm, respectively).

Conclusion. The obtained data provide a new perspective on the processes of changes in organ functioning and indicate one of the possible directions for searching for patterns of mosaic functioning of the myocardium. The literature has repeatedly noted that establishing a new level of organ functioning is determined by multidirectional processes; however, there are no indications in the available literature regarding the preferential association of these processes with specific layers of the myocardium.

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FARMATSEVTIKAGA SUN'IY INTELLEKT NEGA KERAK

Annotatsiya: *Farmatsevtika sohasi so‘nggi o‘n yilliklarda texnologik innovatsiyalarning eng faol foydalanuvchilaridan biriga aylandi. Sun’iy intellekt (SI) dori vositalarini kashf qilish, klinik tadqiqotlarni samarali boshqarish, shaxsiylashtirilgan davolash yondashuvlarini ishlab chiqish hamda ishlab chiqarish jarayonlarini optimallashtirishda keng qo‘llanilmoqda. Ushbu maqolada sun'iy intellektning farmatsevtika sohasidagi qo‘llanish imkoniyatlari, uning afzalliklari va kelajakdagi istiqbollari ilmiy tahlil qilinadi. SI yordamida farmatsevtika jarayonlari tezkor, arzon va samarali bo‘lishi ta’kidlanadi.*

Kalit so‘zlar: *sun’iy intellekt, farmatsevtika, dori kashfiyoti, klinik tadqiqotlar, shaxsiylashtirilgan tibbiyot, bioinformatika, farmakogenomika.*

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WHY DOES PHARMACEUTICALS NEED ARTIFICIAL INTELLIGENCE

Abstract: *The pharmaceutical industry has become one of the most active users of technological innovations in recent decades. Artificial intelligence (AI) is widely used in drug discovery, effective management of clinical trials, development of personalized treatment approaches, and optimization of manufacturing processes. This article provides a scientific analysis of the application possibilities of AI in the pharmaceutical industry, its advantages, and future prospects. It is emphasized that AI can make pharmaceutical processes faster, cheaper, and more efficient.*

Keywords: *artificial intelligence, pharmaceuticals, drug discovery, clinical trials, personalized medicine, bioinformatics, pharmacogenomics.*

Farmatsevtika sohasi global sog‘liqni saqlash tizimining eng muhim tarkibiy qismi bo‘lib, dori vositalarini ishlab chiqish va aholiga yetkazib berish orqali insoniyat hayot sifatini oshirishga xizmat qiladi. An’anaviy farmatsevtika jarayonlari murakkab, uzoq vaqt talab qiluvchi va yuqori xarajatli bo‘lgani uchun butun dunyo ilmiy hamjamiyati yangi yechimlar izlashga majbur bo‘lmoqda. Sun’iy intellekt ushbu jarayonlarni tubdan o‘zgartiruvchi vosita sifatida shakllanmoqda.

Sun'iy intellekt farmatsevtika kompaniyalariga qanday yordam beradi?

Dori-darmonlarni ishlab chiqish jarayonidan tortib, ularni bemorning dorixonadan sotib olishigacha, farmatsevtika ulkan hajmdagi ma'lumotlar bilan ishlashi kerak. Laboratoriya diagnostikasi, bemorlarning holatini kuzatish, forumlar

va ijtimoiy tarmoqlardagi dori samaradorligi haqidagi xabarlar - bularning barchasi farmatsevtika kompaniyasi uchun foydali ma'lumotlardir. Biroq, bu ma'lumotlar ko'pligi va tarqoqligi sababli, ishlab chiqaruvchi kompaniya ularni qayta ishlashga, o'zlashtirishga va, ayniqsa, qo'llashga ulgurmaydi. Bu va boshqa muammolarni hal qilishda CNN (Convolutional Neural Network), RNN/LSTM (Recurrent Neural Network), GNN (Graph Neural Network) kabi neuron tarmoqlar yordam beradi.

Farmatsevtika kompaniyalarining katta hajmdagi ma'lumotlarni yig'ish, tizimlashtirish va tahlil qilishga intilishi ularni sun'iy intellekt texnologiyalariga murojaat qilishga majbur qildi. Olimlar tomonidan yaratilgan neyron tarmoqlar dori-darmonni yaratish jarayonida ham, bemorlardan qayta aloqa olishda ham kerakli ma'lumotlarni yig'ish bilan osonlikcha shug'ullana oladi.

Sun'iy intellekt foydali bo'ladigan yana bir vazifa - dori vositalarini ishlab chiqish muddatini qisqartirishdir.

Semantic Hub SA(*Semantic Hub SA — 2015 -yildaShveytsariyaning Lozanna shahrida ta’sis etilgan, sog’liqni saqlash va biotexnologiya sohasiga yo’naltirilgan sun’iy intellekt (AI) va tabiiy tilni qayta ishlash (NLP) kompaniyasidir*)tomonidan tashkil etilgan "Farmatsevtikadagi katta ma'lumotlar" konferensiyasida farmatsevtika sohasi vakillari sun'iy intellekt yordamida dori-darmonlarni ishlab chiqish muddatini qisqartirishni xohlashlarini bildirishdi. Bugungi kunda bozorda bitta yangi dori vositasini taqdim etish uchun kamida 10 yil va bir necha milliard dollar talab qilinadi. Shu bilan birga, bu dorining sotilishi ehtimoli taxminan 10% ni tashkil etadi. Bundan tashqari, yangi dorini yaratish xavfsizlik yoki samarasizlik tufayli dastlabki bosqichlarda to'xtatilishi mumkin. Natijada, pul behuda sarflanadi.

Yangi dori vositalarini ishlab chiqish bo'yicha qarorlar qabul qilishda xavfni kamaytirish va yaratishning keyingi bosqichlarida muvaffaqiyatsizlikka uchramaslikka analitika va kompyuter modellashtirish yordam beradi. Masalan, AQShdagi Tizimli Biologiya Institutida ma'lum kasalliklarga chalingan virtual bemorlarning modellari yaratiladi va ularda dori-darmonlarning samaradorligini aniqlashga harakat qilinadi.

Dori kashfiyotida sun’iy intellektning o‘rni

SI algoritmlari orqali yangi molekulalar samarali aniqlanmoqda. Prediktiv modellar dori moddalarining biologik nishonlarga ta’sirini tezkor baholash imkonini beradi. Natijada, farmatsevtika kompaniyalari klinik bosqichga o‘tishi mumkin bo‘lgan molekulalarni qisqa muddatda aniqlamoqda.

Klinik sinovlarni optimallashtirish

Klinik tadqiqotlar eng ko‘p mablag‘ talab qiladigan bosqichdir. Sun'iy intellekt yordamida bemorlarni tanlash, xavf prognozini tuzish va natijalarni tahlil qilish aniqroq amalga oshirilmoqda. Bu esa sinov muddatini qisqartirish va samaradorlikni oshirishga olib kelmoqda.

Shaxsiylashtirilgan tibbiyot

Genomik va klinik ma’lumotlarni chuqur o‘rganish orqali sun’iy intellekt bemorga mos terapiya variantlarini ishlab chiqadi. Farmakogenomika dori-darmonlarning individual metabolizmini prognoz qilish imkonini berib, davolashda yuqori aniqlik ta’minlaydi.

Ishlab chiqarish va ta’minot zanjiri SI yordamida ishlab chiqarish jarayonlari raqamlashtirilib, sifat nazorati avtomatlashtirilmoqda. Bundan tashqari, global ta’minot zanjirida dori yetkazib berishni samarali rejalashtirish imkoniyatlari paydo bo‘lmoqda.

Muhokama

Olingan natijalar shuni ko‘rsatadiki, sun'iy intellekt farmatsevtika sohasining barcha bo‘g‘inlarida samaradorlikni oshiradi. Ammo SI ni keng joriy etishda axloqiy va huquqiy masalalar ham mavjud: ma’lumotlar maxfiyligi, klinik natijalar ishonchliligi va inson nazoratining yetarliligi kabi omillarni hisobga olish talab etiladi. Shu sababli, SI ni amaliyotga joriy etishda xalqaro standartlar va tartibga soluvchi me’yorlar ishlab chiqilishi zarur.

Xulosa

Sun’iy intellekt farmatsevtika sohasida dori vositalarini ishlab chiqishdan tortib, shaxsiylashtirilgan davolash rejalarigacha bo‘lgan jarayonlarda inqilobiy imkoniyatlarni taqdim etmoqda. U nafaqat ilmiy jarayonlarni tezlashtiradi, balki iqtisodiy samaradorlikni oshiradi va jamiyat uchun yanada xavfsiz, arzon hamda samarali dori vositalarini yaratishda cheksiz xizmat qiladi.

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DETERMINATION OF INDUSTRIAL ZONES, LARGE TRANSPORT INFRASTRUCTURES AND THEIR ENVIRONMENTAL PROBLEMS OF SAMARKAND REGION

Abstract. *This article analyzes the industrial zones formed in the Samarkand region, large transport infrastructures and the environmental problems arising from them. During the study, evidence-based conclusions were drawn based on statistical data from open sources, regional development programs and environmental monitoring reports. The results revealed the impact of industrial and transport activities on the environment and discussed ways to reduce the problems.*

Keywords: *free economic zones, soil degradation, biological diversity, ecological monitoring.*

Introduction. Industrial zones play an important role in the economic development of the Samarkand region. Over the past decade, the state has established small industrial zones and free economic **zones (FEZs), which are aimed** at deep processing of local raw materials, creating new jobs, and increasing export potential [1].

Main part. ***Main industrial zones***

Urgut Free Economic Zone

- **Specialization:** chemical industry, pharmaceuticals, building materials, electrical engineering, food and textile products.
- **Territory:** Covers an area of more than 400 hectares.
- **Environmental impact:** Chemical waste and emissions are the main sources of risk [2].

Small industrial zone of Samarkand city

- **Specialization:** food products (flour, bread, butter, etc.), metal processing, light industry (sewing and knitting).
- **Location:** on the outskirts of the city.
- **Environmental impact:** the problem of transport waste and household waste.

Kattakurgan Industrial Zone

- **Specialization:** construction materials (cement, brick, marble), oil and grease production.
- **Territory:** Located on the banks of the Zarafshan River.
- **Environmental impact: there is a risk of** industrial effluents falling into the river [3].

Bulungur industrial zone

- **Specialization:** processing of agricultural products (vegetables, fruit juices, canning).
- **Environmental impact:** the sewage and organic waste treatment system is inadequate.

Jomboy Industrial Zone

- **Specialization:** livestock and dairy processing, oil and fat industry.
- **Environmental impact:** There is a problem of odor in organic waste and surrounding areas [4].

Environmental problems in industrial zones

1. Atmospheric air pollution (dust, gas emissions).
2. Industrial wastewater flowing into the Zarafshan River.
3. Soil degradation and improper waste storage.
4. Public health risks due to exhaust gases and chemicals.

Industrial zones in Samarkand region play a leading role in economic development, but they also require attention as a source of environmental risk. Therefore, it is necessary to strengthen environmental monitoring, and modernize waste processing and treatment facilities.

Table 1

No.	Ecological problem	Main sources/causes	Consequences / effects	Source
1	Air pollution	transport, industrial enterprises, thermal energy facilities	Deteriorating air quality, increasing respiratory diseases	[3]
2	Pollution of water resources	Industrial wastewater, pesticides and fertilizers, household waste	Degradation of drinking water quality, reduction of water usage opportunities	[7]
3	Soil degradation and salinization	Improper watering, chemicals, construction waste	Decrease in productivity, degradation of land resources	[6]
4	Waste problem	Industrial, construction and household waste; landfills not meeting demand	Pollution of soil and underground water, deterioration of sanitary conditions	[5]
5	Noise and vibration	Road transport, railway, airport	Negative impact on quality of life, risk to mental and physical health	[3]
6	Loss of biological diversity	Urbanization, new construction, loss of natural habitat	Decline in plant and animal species, disruption of ecological balance	[4]

Environmental problems in Samarkand reg

60,000 saplings were planted around 36 large industrial enterprises and a "green belt" was established.

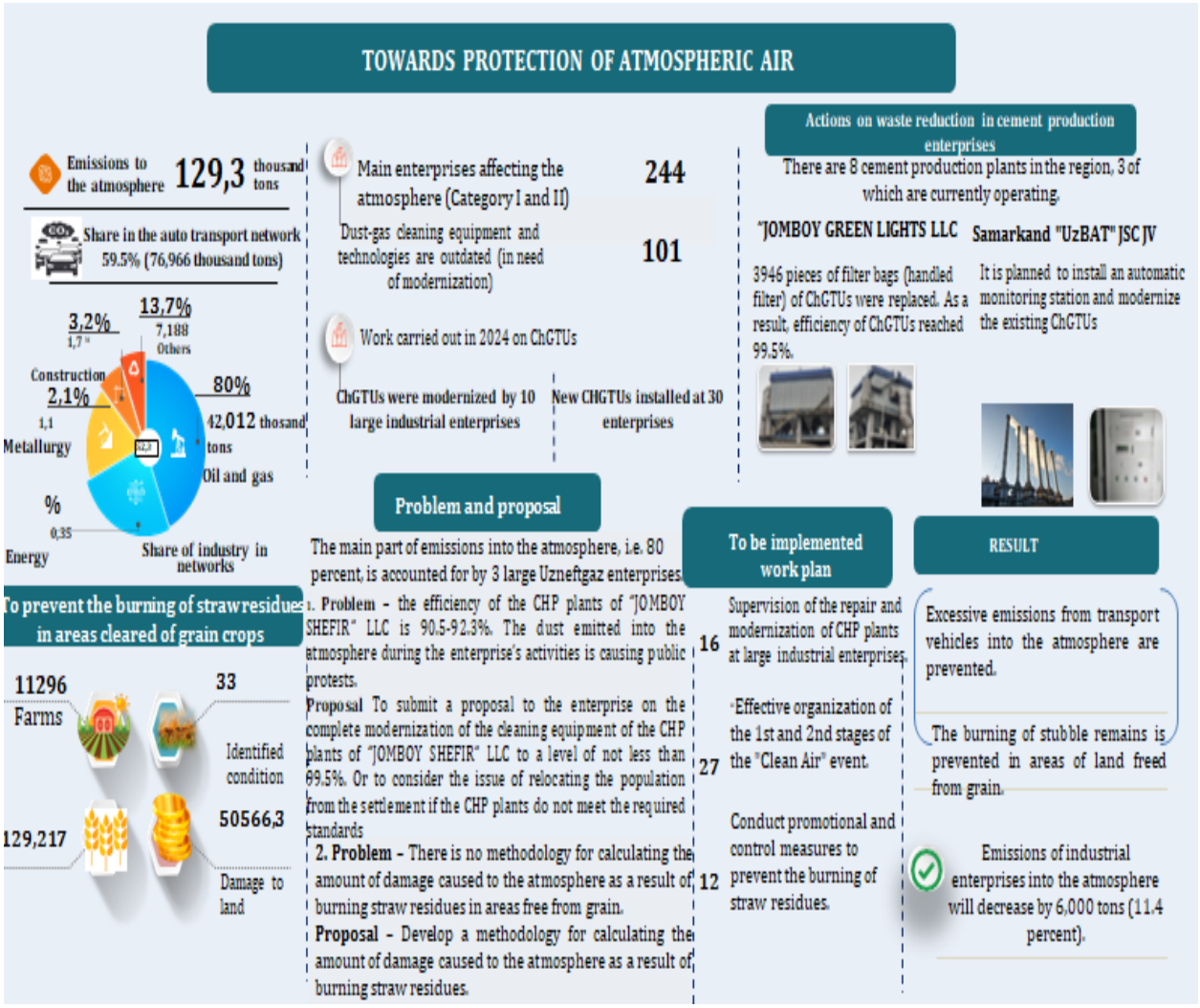




16,000 saplings were planted around 10 household waste landfills and a "green belt" was established.

During 2024:

INFORMATION FROM THE DEPARTMENT OF ECOLOGY, ENVIRONMENTAL PROTECTION AND CLIMATE CHANGE OF SAMARKAND REGION



Major transport infrastructure in the Samarkand region

Samarkand region is located in the central part of Uzbekistan, making it a convenient region in terms of transport and communication infrastructure. Highways of international and republican importance, railway networks and air transport system pass through the region. This infrastructure plays an important role in economic development, tourism and foreign trade relations [1].

Motorways

- **The M37 highway**, passing through Samarkand, is of international importance in the direction of Tashkent - Bukhara - Turkmenistan - Iran.
- **Highways A377 and A378** connect the interior of the region with other regions of the Republic.
- **The Tashkent-Samarkand-Termez road is the** most important transport artery in the region, and is of great importance for freight and passenger transportation.
- **Environmental problems:** traffic emissions from roads emit harmful gases into the air, noise levels are high, and dust from asphalt pavement is observed [8].

Railway infrastructure

- **The Tashkent - Samarkand - Karshi railway line is the** largest highway served by high-speed trains (the "Afrosiab" electric train).
- **The Samarkand-Bukhara-Khiva line** connects the region with Western Uzbekistan.
- **Freight transportation** - mainly construction materials, fuel, and agricultural products.
- **Environmental problems:** noise, vibration, and oil-based fuels from rail transport emit additional pollutants into the air [9].

Air transport

- **Samarkand International Airport is** one of the largest airports of the republic and regularly operates international (Russia, Turkey, UAE, Korea, Kazakhstan) and domestic routes.
- **Freight transportation** - although limited, serves mainly for export-import products.
- **Environmental problems:** during aircraft flights, CO2 and NOx emissions are observed, as well as high noise levels around the airport [10].

In Samarkand region, large transport infrastructure plays a major role in economic and tourism development. However, their environmental impact is also significant, and it is necessary to reduce transport emissions, introduce electric transport, and strengthen environmental monitoring.

Generalization of environmental problems in Samarkand region

1. Air pollution

- **Sources:** road transport, industrial enterprises (Urgut SEZ, Kattakurgan cement plant), thermal energy production facilities.
- **The main problem: the release of** CO_2, CO_2, NOx, dust, and other harmful substances into the air.

- **Result:** deterioration of air quality in the center of Samarkand city, increase in respiratory diseases [3].

2. Pollution of water resources

- **Sources:** industrial wastewater, excessive use of pesticides and fertilizers in agriculture, and household waste.
- **Area:** The Zarafshan River and its tributaries are at risk of pollution.
- **The result:** a decline in the quality of drinking water and a decrease in the availability of water resources [7].

3. Soil degradation and salinization

- **Sources:** improper irrigation system, excessive use of mineral fertilizers and chemicals, construction waste.
- **Area:** Bulungur, Jambay, Pastdargam districts have high salinity.
- **The result:** reduction of agricultural productivity, deterioration of land resources [6].

4. Waste problem

- **Sources:** industrial waste, construction waste, household waste.
- **The problem: there are** not enough waste processing plants, and landfills do not fully meet environmental requirements.
- **The result:** pollution of soil and groundwater, deterioration of sanitary conditions [5].

5. Noise and vibration problem

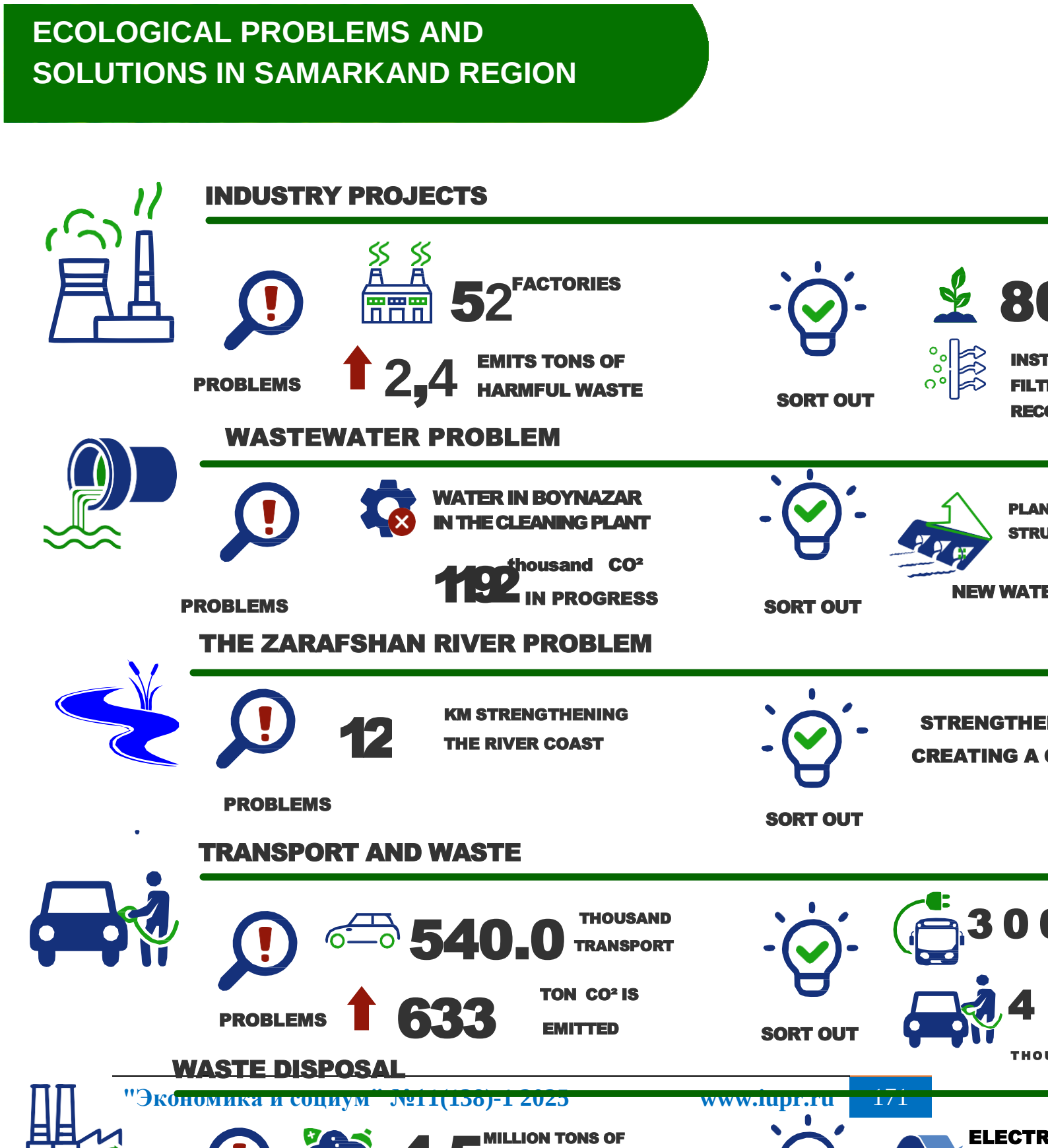
- **Sources:** road transport, railway, airport.
- **Area:** Samarkand city center and areas along transport routes.
- **Result:** negative impact on the quality of life of the population, threat to mental and physical health.

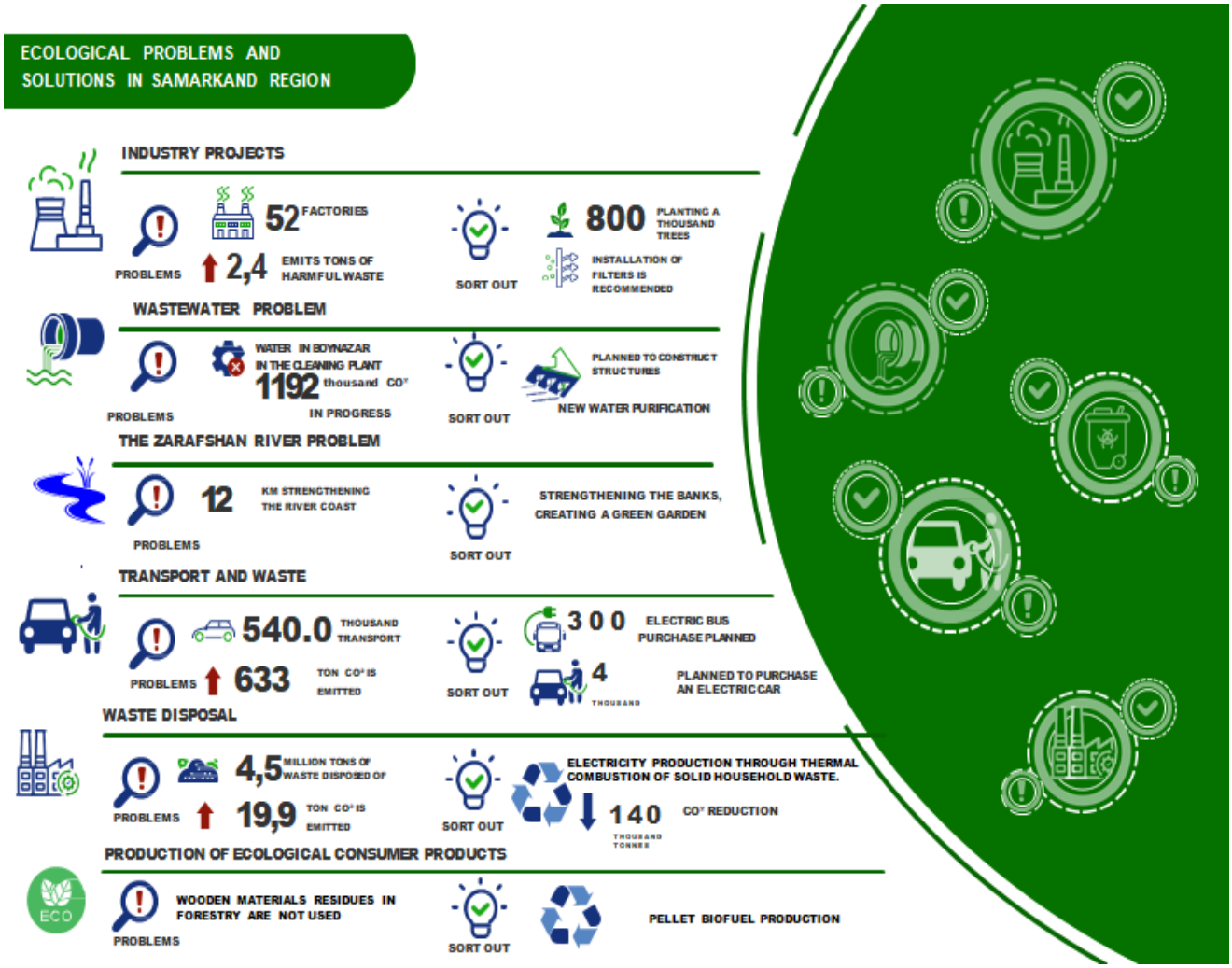
6. Reduction of biological diversity

- **Sources:** urbanization, new construction, reduction of natural habitats.
- **Area:** Zarafshan valley, mountain slopes.
- **The result:** the decline of some plant and animal species, disturbance of the ecological balance [4].

Conclution. The main environmental problems in Samarkand region are atmospheric pollution, degradation of water and soil resources, waste problem, noise and biological diversity. To solve these problems:

- strengthening environmental monitoring,
- development of the waste recycling system,
- introduction of environmentally friendly technologies in transport,
- efficient use of water resources will be necessary.


ECOLOGICAL PROBLEMS AND SOLUTIONS IN SAMARKAND REGION
INDUSTRY PROJECTS
PROBLEMS
52 FACTORIES
2,4 EMITS TONS OF HARMFUL WASTE
SORT OUT
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WATER IN BOYNAZAR IN THE CLEANING PLANT
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ECOLOGICAL PROBLEMS AND SOLUTIONS IN SAMARKAND REGION
INDUSTRY PROJECTS
PROBLEMS
52 FACTORIES
2,4 EMITS TONS OF HARMFUL WASTE
SORT OUT
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IN PROGRESS
SORT OUT
PLANNED TO CONSTRUCT STRUCTURES
NEW WATER PURIFICATION
THE ZARAFSHAN RIVER PROBLEM
PROBLEMS
12 KM STRENGTHENING THE RIVER COAST
SORT OUT
STRENGTHENING THE BANKS, CREATING A GREEN GARDEN
TRANSPORT AND WASTE
PROBLEMS
540.0 THOUSAND TRANSPORT
633 TON CO² IS EMITTED
SORT OUT
300 ELECTRIC BUS PURCHASE PLANNED
4 THOUSAND
PLANNED TO PURCHASE AN ELECTRIC CAR
WASTE DISPOSAL
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4,5 MILLION TONS OF WASTE DISPOSED OF
19,9 TON CO² IS EMITTED
SORT OUT
ELECTRICITY PRODUCTION THROUGH THERMAL COMBUSTION OF SOLID HOUSEHOLD WASTE.
140 THOUSAND TONNES
CO² REDUCTION
PRODUCTION OF ECOLOGICAL CONSUMER PRODUCTS
ECO
PROBLEMS
WOODEN MATERIALS RESIDUES IN FORESTRY ARE NOT USED
SORT OUT
PELLET BIOFUEL PRODUCTION

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SUN’IY INTELLEKT TEXNOLOGIYALARINING TA’LIM JARAYONIDA TUTGAN O‘RNI VA IMKONIYATLARI

Annotatsiya: *Ushbu maqolada zamonaviy ta’lim jaroyonida bo‘lajak pedagoglarning sun’iy intellekt texnologiyasidan samarali foydalanishi natijasida SI asosidagi adaptiv ta’lim tizimlari ta’lim oluvchilarning bilim darajasi, o‘quv tezligi va qiziqishlarini oshirib borishi yoritib berilgan.*

Kalit so‘zlar: *sun’iy intellekt, adaptive ta’lim, Khan Academy, Duolingo, Rosetta Stone, masofaviy ta’lim, shaxsiylashtirish.*

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THE ROLE AND POTENTIAL OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN THE EDUCATIONAL PROCESS

Annotation: *This article highlights how the effective use of artificial intelligence technologies by future educators in the modern educational process contributes to the development of AI-based adaptive learning systems, which enhance learners’ knowledge levels, learning speed, and motivation.*

Keywords: *artificial intelligence, adaptive learning, Khan Academy, Duolingo, Rosetta Stone, distance learning, personalization.*

Zamonaviy sun’iy intellekt (SI) texnologiyalari ta’lim sohasida inqilobiy o‘zgarishlar keltirib, an’anaviy ta’lim tashkiliy shakllarini tubdan qayta shakllantirish imkonini bermoqda. SI nafaqat o‘quv jarayonini samaraliroq va moslashuvchan qilishga xizmat qilmoqda, balki pedagoglar va ta’lim oluvchilar uchun yangi imkoniyatlar eshigini ochmoqda. Mutaxassislarning fikriga ko‘ra, sun’iy intellektning ta’limdagi eng muhim afzalliklaridan biri bu o‘quv jarayonini shaxsiylashtirish, ya’ni har bir ta’lim oluvchining individual ehtiyojlari, qobiliyatlari va o‘quv uslubiga moslashtirilgan ta’lim tajribasini ta’minlashdir[5].

Sun’iy intellekt ta’lim oluvchilarning o‘ziga xos ehtiyojlariga mos keladigan shaxsiy ta’lim traektoriyalarini yaratish imkonini beradi. SI asosidagi adaptiv ta’lim tizimlari ta’lim oluvchilarning bilim darajasi, o‘quv tezligi va qiziqishlarini tahlil qilib, ularga mos dasturlar va materiallar taklif qiladi. Masalan, iqtidorli ta’lim oluvchilar uchun qiyinroq vazifalar yoki chuqurroq mavzular taqdim etilsa, orqada

[5]https://www.edweek.org/technology/chatgpt-bard-copilot-khanmigo-what-ai-tools-do-teachers-use/2024/02#:~:text=AI%20experts%20have%20touted%20the,cause%20huge%20data%20privacy%20problems

qolayotgan talabalar uchun qo‘shimcha tushuntirishlar va mashqlar beriladi. Bu yondashuv har bir ta’lim oluvchining potensialini maksimal darajada ro‘yobga chiqarishga yordam beradi. Masalan, Khan Academy yoki Duolingo kabi platformalar SI dan foydalanib, ta’lim oluvchilarning o‘ziga xos ehtiyojlariga moslashtirilgan mashqlar va darslarni taklif qiladi.

Sun’iy intellekt yordamida ishlab chiqilgan adaptiv ta’lim tizimlari real vaqt rejimida ta’lim oluvchilarning bilim darajasini baholaydi va ularga mos keladigan o‘quv materiallarini taklif qiladi. Bu tizimlar ta’lim oluvchining xatolarini tahlil qilib, qaysi mavzularda qiyinchiliklar borligini aniqlaydi va shu asosda moslashtirilgan yechimlar ishlab chiqaradi. Masalan, agar ta’lim oluvchi algebra bo‘yicha muayyan masalalarni yechishda qiynalayotgan bo‘lsa, tizim unga shu mavzu bo‘yicha qo‘shimcha videodarslar yoki amaliy mashqlar taklif qilishi mumkin. Bu jarayon nafaqat ta’lim oluvchining bilim olishini osonlashtiradi, balki pedagogning vaqtini ham tejaydi.

Sun’iy intellekt ayniqsa, turli darajadagi qobiliyatga ega ta’lim oluvchilar bilan ishlashda samarali vosita sifatida ko‘zga tashlanadi. Iqtidorli talabalar uchun SI murakkabroq va ijodiy vazifalar taklif qilib, ularning intellektual salohiyatini yanada rivojlantiradi. Masalan, SI asosidagi platformalar talabaga fanlararo loyihalar yoki muammolarga asoslangan o‘quv vazifalarini berishi mumkin. Orqada qolayotgan talabalar uchun esa tizim qo‘shimcha tushuntirishlar, vizual materiallar yoki bosqichma-bosqich yo‘riqnomalar orqali o‘quv jarayonini soddalashtiradi. Bu yondashuv guruhdagi har bir ta’lim oluvchining ehtiyojlariga individual yondashish imkonini beradi, bu esa an’anaviy ta’lim usullarida ko‘pincha qiyinchilik tug‘diradi. Sun’iy intellekt nafaqat ta’lim oluvchilar, balki pedagoglar uchun ham muhim yordamchi sifatida xizmat qilmoqda. SI pedagoglarga dars rejasini tuzish, o‘quv materiallarini tayyorlash, talabalarning o‘zlashtirish darajasini tahlil qilish va hattoki baholash jarayonlarini avtomatlashtirishda yordam beradi. Masalan, SI asosidagi vositalar ta’lim oluvchilarning test natijalarini tezkor tahlil qilib, qaysi mavzular qayta o‘tilishi kerakligini aniqlaydi. Bundan tashqari, pedagoglar chat-botlar yoki virtual yordamchilar orqali ta’lim oluvchilarning savollariga tezkor javob berish yoki qo‘shimcha resurslar taklif qilish imkoniyatiga ega. Bu pedagoglarning ish yukini kamaytirib, ularga o‘quv jarayonining ijodiy va strategik jihatlariga ko‘proq e’tibor qaratish imkonini beradi. SI ning ta’limdagi bir qancha afzalliklari:

- Avtomatlashtirilgan baholash: SI yordamida testlar, insholar va boshqa vazifalarni tezkor va xolis baholash mumkin. Masalan, Grammarly yoki Turnitin kabi vositalar talabalarning yozma ishlarini tahlil qilib, xatolarini aniqlaydi va takliflar beradi.

- Masofaviy ta’limni qo‘llab-quvvatlash: SI masofaviy ta’limda ta’lim oluvchilarning faolligini monitoring qilish, virtual guruhlarni boshqarish va o‘quv materiallarini taqdim etishda muhim rol o‘ynaydi.

- Til o‘rganishda yordam: Duolingo yoki Rosetta Stone kabi SI asosidagi ilovalar ta’lim oluvchilarga til o‘rganishda shaxsiy yondashuvni ta’minlaydi, ularning talaffuzi va grammatikasini tuzatadi.

- Ta’lim oluvchilarning motivatsiyasini oshirish: SI gamifikatsiya elementlari orqali o‘quv jarayonini qiziqarli qiladi, masalan, ballar, reytinglar va virtual mukofotlar tizimi orqali ta’lim oluvchilarni rag‘batlantiradi.

SI ning ta’limdagi ulkan salohiyatiga qaramay, bir qator muammolar ham mavjud. Masalan, SI tizimlarining samaradorligi ular ishlatadigan ma’lumotlar sifatiga bog‘liq. Agar ma’lumotlar noto‘g‘ri yoki bir yoqlama bo‘lsa, tizimning taqdim etadigan yechimlari ham xato bo‘lishi mumkin. Shuningdek, SI ning haddan tashqari ishlatilishi pedagog va ta’lim oluvchi o‘rtasidagi shaxsiy muloqotni kamaytirishi va ta’limning insoniy jihatlariga putur yetkazishi mumkin. Axborot xavfsizligi va maxfiylik masalasi ham dolzarb bo‘lib, ta’lim oluvchilarning shaxsiy ma’lumotlari himoyasini ta’minlash zarur. Zamonaviy sun’iy intellekt (SI) texnologiyalari ta’lim sohasida misli ko‘rilmagan o‘zgarishlarni amalga oshirib, an’anaviy ta’lim tashkiliy shakllarini tubdan qayta shakllantirish imkonini bermoqda. SI nafaqat o‘quv jarayonini yanada samarali va moslashuvchan qilmoqda, balki pedagoglar, ta’lim oluvchilar va ta’lim tizimi uchun yangi imkoniyatlar yaratmoqda. Mutaxassislarning ta’kidlashicha, SI ning ta’limdagi eng muhim afzalliklaridan biri bu o‘quv jarayonini shaxsiylashtirishdir, ya’ni har bir ta’lim oluvchining individual ehtiyojlari, qobiliyatlari va o‘quv uslubiga mos keladigan ta’lim tajribasini ta’minlashdir. Shu bilan birga, SI pedagoglarga yordamchi vosita sifatida xizmat qilib, dars jarayonini boshqarish va optimallashtirishda muhim rol o‘ynamoqda.

Xulosa qilib aytganda, sun’iy intellektning ta’limdagi eng muhim yutug‘i bu har bir ta’lim oluvchi uchun shaxsiy ta’lim traektoriyasini yaratish qobiliyatidir. SI ta’lim oluvchilarning bilim darajasi, o‘quv tezligi, qiziqish sohalari va hatto o‘quv uslubini tahlil qilib, ularga moslashtirilgan o‘quv materiallari, mashqlar va vazifalarni taklif qiladi. Bu shaxsiylashtirilgan yondashuv ta’lim oluvchilarning o‘z potensialini to‘liq ro‘yobga chiqarishiga yordam beradi. Masalan, matematikadan zaif natija ko‘rsatayotgan ta’lim oluvchiga SI qo‘shimcha tushuntirishlar va oddiyroq mashqlar taklif qilsa, iqtidorli ta’lim oluvchi uchun murakkab masalalar yoki fanlararo loyihalar taqdim etilishi mumkin. Khan Academy, Coursera yoki Smart Sparrow kabi platformalar SI yordamida shaxsiylashtirilgan ta’lim tajribasini muvaffaqiyatli amalga oshirayotganiga misol bo‘la oladi.

Foydalanilgan adabiyotlar ro‘yhati.

1. https://www.edweek.org/technology/chatgpt-bard-copilot-khanmigo-what-ai-tools-do-teachers-use/2024/02#:~:text=AI%20experts%20have%20touted%20the,cause%20huge%20data%20privacy%20problems
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SOME ECOLOGICAL CONSEQUENCES OF SOIL SALINIZATION (ON THE EXAMPLE OF NAMANGAN REGION)

Annotation: *The article examines some of the environmental consequences of soil salinization using the example of the Namangan region. The main focus was comparing the chemical composition of saline and non-saline soils with the average chemical composition of the Earth's crust and identifying the differences between them. An attempt was made to determine the extent to which the chemical composition of certain crops grown in saline and non-saline soils depends on the chemical composition of the soil. It was emphasized that there is a need to widely strengthen scientific research in this area.*

Keywords: *Earth's crust, saline soil, non-saline soil, chemical composition, chemical analysis, K, Ca, Cl.*

As the world's population continues to grow, the demand for land and water resources is increasing. The development of non-farm and irrigated agriculture is no exception. It is not for nothing that the UN Sustainable Development Goals report states that "the degradation of agricultural and irrigated lands, the decline in soil fertility, continues, and this process not only hinders the development of all countries, but also threatens their security".

Asia leads the world in terms of water use. The continent has irrigated land of 211.8 million ha, accounting for 70% of global water use. America has 48.9 million ha (16%), Europe has 22.7 million ha (8%), Africa has 13.6 million ha (5%), and Oceania has 4 million ha (1%). It is known that artificial irrigation ultimately leads to soil salinization and exacerbates negative ecological processes.

According to world statistics, there are more than 833 million hectares of saline lands on Earth. These saline lands cover 8.7% of the planet's territory, mainly in arid and semi-arid regions of Africa, Asia and Latin America. 20-50% of them are highly saline. Therefore, more than 1.5 billion people in the world face serious problems in growing food due to land degradation.

The Central Asian region also faces serious problems related to land and water resources, and the proper use of water resources is the most urgent task today. The area of irrigated land in Central Asia is 10,018,151 ha, of which 3,971,782 ha are affected by salinity. 83.84% of the 1,995,000 ha of irrigated land in Turkmenistan, 44.43% of the 4,214,300 ha in Uzbekistan, 45% of the 719,200 ha in Tajikistan, and 33% of the 2,313,000 ha in Kazakhstan are saline lands.

The total irrigated area in Namangan region is 288 thousand hectares, of which 24,800 hectares are affected by salinity. The saline lands of the region are mainly in Mingbulok and Pop districts. 16 thousand 100 hectares in Mingbulok district, 7 thousand 600 hectares in the Pop district are saline. The need to study problems such as the abundance of salt particles in the air of saline lands in the region, their impact on the climate, and the increase in certain diseases among the population as a result of consuming crops grown in saline lands determines the relevance of the topic.

Among the first studies on the impact of soil salinity on the human body are the works of German scientists Wynder E.L. Hultberg S, Jacobsson F, Bross I.J. “Ecological factors in cancer of the upper digestive tract”[5], J.Kmet, E.Makhbubiy “Esophageal cancer”[6]. Huseynov “Soil salinity and esophageal cancer”[2]. In this regard, Uzbek scientists I.Asqarov, M.Ashuraliyeva. “Chemical elements in the human body”, O.K. Komilov “Reclamation of saline lands of Uzbekistan”, Kh.Kh. Tursunov, R.Kurvontoyev. Information on the topic is given in the works of G.Yuldoshev “Properties, ecological and reclamation status and fertility of irrigated soils of the Fergana Valley” and “Soil chemistry”. In their article "On the Need to Study the Effects of Soil Salinity on Diseases"[3], the authors discussed the consequences of digestive system diseases, diseases of the blood-forming organs, certain disorders related to the immune mechanism, and infant mortality in saline areas.

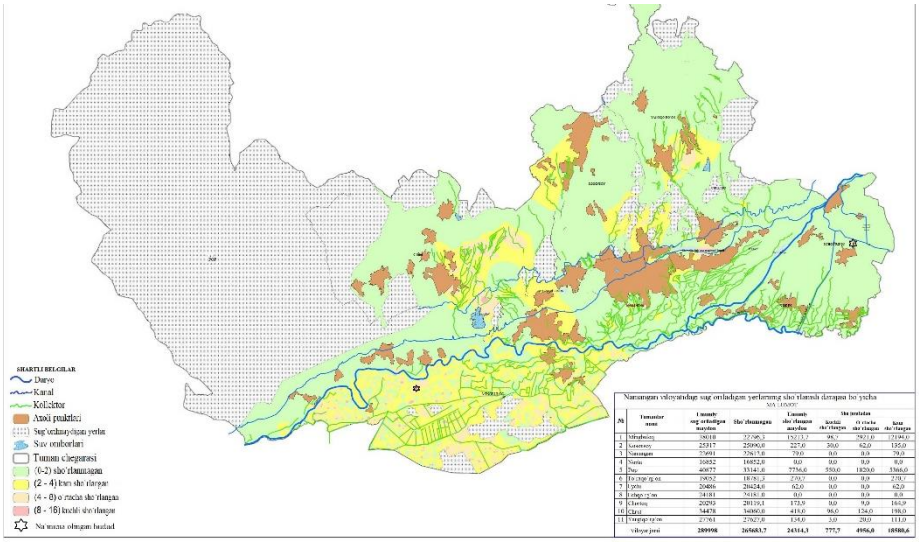
When assessing the level of study of the problem, it should be noted that there are significant uncertainties in the saline soils in the Namangan region [4]. Saline lands of varying degrees are most common in the Mingbulok (15213.8 ha) and Pop (7736.6 ha) districts of the Namangan region. Saline lands are not so extensive in the Chust (419.0 ha), Turakurgan (270.7 ha), Chortoq (173.9 ha), and Namangan (79.3 ha) districts of the region. To determine the difference in the chemical composition of saline and non-saline lands, samples were taken from the village of Gulistan of the Mingbulok district and the village of Kogay of the Uchkurgan district.

Main part. The study of saline areas and processes in them in Namangan region was carried out in Mingbulok district, where there are many saline areas, and in Uchkurgan district, where there are few saline areas.

The saline soil experimental site is the village of Gulistan, Mingbulok district, which is completely exposed to salinization. The selected area is located 12 km south of the Syrdarya basin and 10 km southwest of the village of Yangi Gulbog. The relief is flat. The area is open, with sparse vegetation.

Location of experience points

Figure 1.



The experimental site with non-saline soils is located in the village of Kogai Olmas, Uchkurgan district, 8 km southwest of the Naryn River basin and 3 km southeast of the village of Kogai. The relief is flat, the surrounding area is open, and rich in vegetation.

Soil samples were taken from these points and analyzed in the chemical laboratory of the Institute of Nuclear Physics of the Academy of Sciences of Uzbekistan. The results are presented in Table 1. This table presents the average chemical composition of the earth's crust for comparison with the data of A.P. Vinogradov [1].

Table 1

Comparison of the chemical composition of saline and non-saline soils with the chemical composition of the earth's crust.

Elements	In the Earth's crust (A.P. Vinogradov, 1962)	Saline soil	Non-saline soil
Fe	4,65	2,59	2,36
K	2,5	2,04	1,98
Ca	2,96	6,86	4,93
Na	2,5	0,99	0,65
Mg	1,87	2,15	2,21
Mn	0,1	0,049	0,056
Ba	0,065	0,09	0,077
Sr	0,034	0,028	0,022
Rb	0,015	0.0098	0,0089
Cl	0,017	4,76	3,61
Zn	0,0083	0,0096	0,0088

La	0,0029	0,0034	0,0035
Cr	0,0083	0,0055	0,0048
Ni	0,0058	0,0024	0,0022
Cu	0,0047	0,0048	0,0037
Sc	0,0011	0,00085	0,00079
Co	0,0018	0,00093	0,0009
Cs	0,00037	0,00077	0,00068
Hf	0,0001	0,00037	0,00036
Br	0,00021	0,00054	0,00039
As	0,00017	0,00094	0,00091
Mo	0,00011	0,00036	0,00035
Sb	0,00005	0,002	0,00019
Se	0,000005	0,000039	0,000046
Ag	0,000007	0,000014	0,000012
Au	0,0000009	0,000001	0,000001

Based on this table, their correlation graphs were constructed (Figure 2-3).

Figure 2

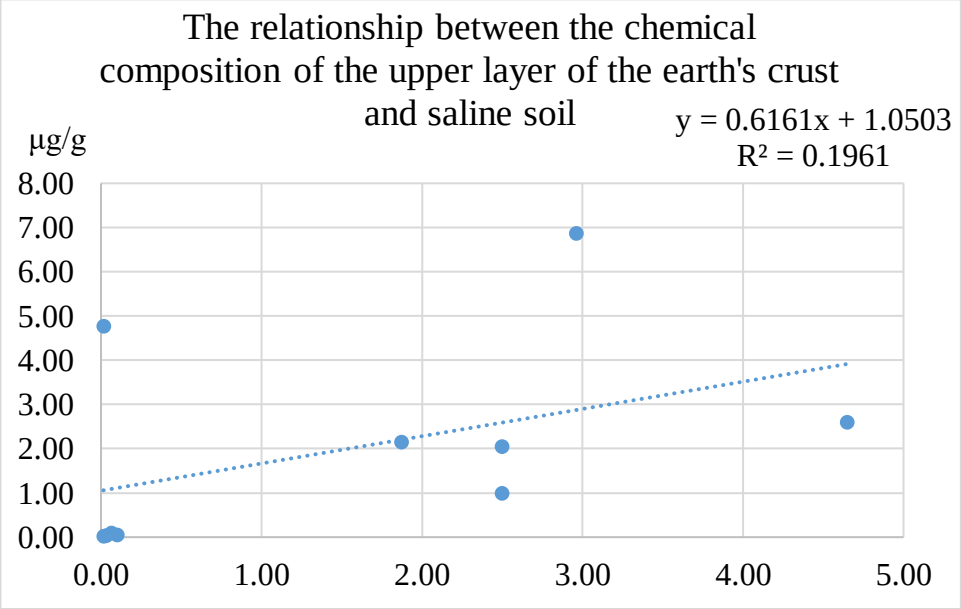
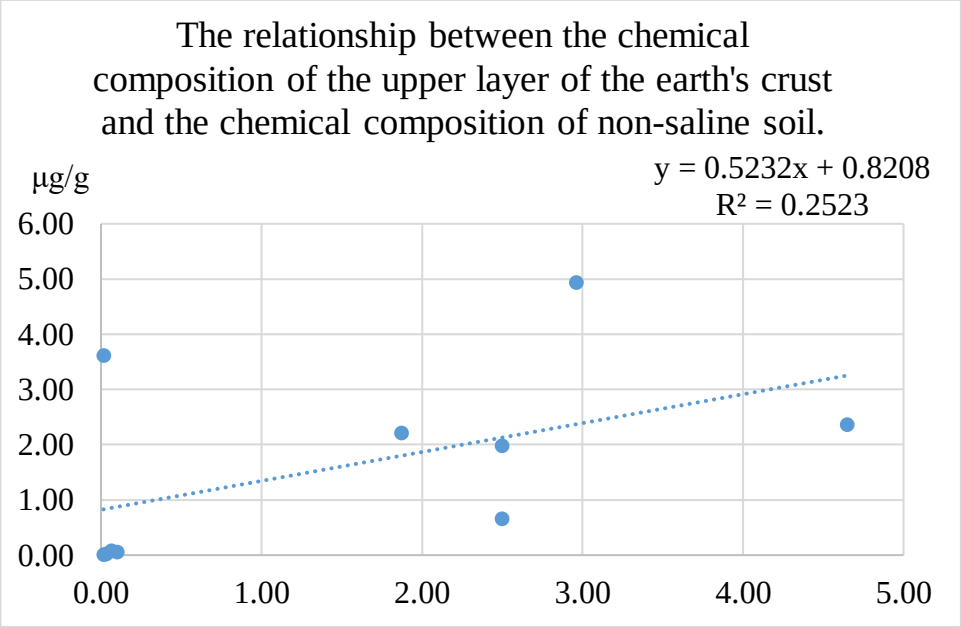


Figure 3



The graphs show that the correlation is positive in both cases. However, the degree of correlation is weak. The correlation between the chemical composition of non-saline soil and the topsoil is 0.5, and the correlation between saline soil and the chemical composition of the topsoil is 0.4, indicating that the correlation is somewhat weaker in saline soil.

Based on the graphs and tables, the total proportion of chemical elements that have a significant share in the composition of the upper layers of the soil and the soils is 15.79 µg/g in non-saline soils. It was 19.44 µg/g in saline soils. The proportion of the same elements in the topsoil is 14.59 g/t, and the chemical composition of non-saline soil and topsoil is very close to each other. Based on these data, elements that have a significant share in the chemical composition were identified. Based on them, the differences in the chemical composition of saline and non-saline soils were determined, and the results are presented in Table 2.

Table 2

Differences in chemical composition of crustal (1), saline (2) and non-saline (3) soils (%)

№	Elements	A.P. Vinogradov (gr/t)	Salty soil (µg/g)	non-saline soil (µg/g)	1-2	1-3	2-3
1	Fe	4,65	2,59	2,36	2,06	2,29	0,23
2	K	2,5	2,04	1,98	0,46	0,52	0,06
3	Ca	2,96	6,86	4,93	-3,9	-1,97	1,93
4	Na	2,5	0,99	0,65	1,51	1,85	0,34
5	Mg	1,87	2,15	2,21	-0,28	-0,34	-0,06
6	Mn	0,100	0,049	0,056	0,051	0,044	-0,007
7	Cl	0,017	4,76	3,61	-4,743	-3,593	1,15

The differences in the chemical composition of saline and non-saline soils are presented in Table 3. In saline soils, the elements Fe, K, Na were significantly higher than in non-saline soils. According to Table 2, the content of Ca in saline soils was 1.4 times higher than in non-saline soils, and the content of Cl in saline soils was 1.3 times higher than in non-saline soils. In non-saline soils, Mg was 1.02 times higher than in saline soils, and Mn was 1.14 times higher than in saline soils. These data indicate the main differences in the chemical composition of saline and non-saline soils.

Thus, the chemical composition of agricultural products grown on saline and non-saline soils, potatoes, tomatoes, carrots, onions, radishes, peppers, garlic, was analyzed in the above-mentioned chemical laboratory (Table 3).

Table 3

Chemical composition of soil and crops grown in it (µg/g)								
Elements	Saline soil		Non-saline soil		Saline soil		Non-saline soil	
	Soil	Plant	Soil	Plant	Soil	Plant	Soil	Plant
	Potato				Onion			
Fe	2,59	23	2,36	26	2,59	22	2,36	26
K	2,04	21000	1,98	21000	2,04	18000	1,98	13400
Ca	6,86	380	4,93	325	6,86	1800	4,93	1450
Na	0,99	57	0,65	61	0,99	500	0,65	420
Mg	2,15	1300	2,21	1260	2,15	1300	2,21	1240
Cl	0,049	970	0,056	550	0,049	900	0,056	380

Many elements are present in very small quantities both in the soil and in crops. Based on the table, a graph of the relationship between the chemical

composition of the soil and the yield was constructed, and elements found in quantities exceeding 0.1 μg/g were identified (Table 3). The percentage of chemical elements found in significant quantities in the soil and in the yield is given in Table 3 for potatoes. According to the table, the content of the element K in potatoes does not differ at all in saline and non-saline soils, but has a large amount (21,000 μg/g), which approximately corresponds to its value in the soil. Despite the high content of the element Mg in the soil, its percentage in saline and non-saline soils is the same, but in both cases it is 15 times less in the crop. The element Na is 1.5 times less in non-saline soils than in saline soils. You will hardly notice any difference between the fruit from saline soil and the fruit from non-saline soil.

The Ca element in saline soil is 1.4 times more than in non-saline soil. The amount of Ca element in its crop is less. The Cl element in saline soil is 1.3 times more than in non-saline soil. The absorption of Cl element by plants is also significantly lower. Thus, the absorption of Cl element was the same in both cases. The amount of Mg element was the same in both cases. Based on the above, it can be concluded that there are significant differences in the chemical composition of the soil in the saline area compared to the non-saline area. The largest difference is observed in the elements K and Ca. It is known that soil salinity also has a strong impact on productivity. In our example, cotton and grain yields in Mingbulak district are 1.5 times lower than in Uchkurgan district.

Table 3

Cotton and grain yields in Mingbulak-Uchkurgan districts (2010-2022)

Name of the districts	Years	Grain area (ha)	Yield (s/ha)	Cotton area (ha)	Yield (s/ha)
Mingbulak	2010	8955	43,5	15856	21,7
Uchkurgan	2010	6622	66,7	10336	33
Mingbulak	2011	9065	44,9	15856	23,1
Uchkurgan	2011	6790	62,4	10336	35,6
Mingbulak	2012	8665	52,9	15856	23,1
Uchkurgan	2012	6990	71,1	11320	34,1
Mingbulak	2013	9365	51,7	15056	22,9
Uchkurgan	2013	7490	72,3	10336	34
Mingbulak	2014	8965	52,9	16056	23
Uchkurgan	2014	6790	75,1	10336	34,1
Mingbulak	2015	9201	57,2	16056	22,3
Uchkurgan	2015	7683	78,1	10336	33,6
Mingbulak	2016	8965	27	15906	17
Uchkurgan	2016	6790	36,4	10336	28
Mingbulak	2017	8965	55,7	15906	22,9
Uchkurgan	2017	6790	78,2	9836	26,6
Mingbulak	2018	8965	59,6	12916	25,2
Uchkurgan	2018	6790	77,5	9836	24,1

Mingbulak	2019	8965	61,4	12916	28,9
Uchkurgan	2019	6790	73,3	9436	32,3
Mingbulak	2020	9085	61,3	12916	30,5
Uchkurgan	2020	6890	69,1	9436	36
Mingbulak	2021	9085	70,3	12916	34
Uchkurgan	2021	6890	70,8	9436	33,7
Mingbulak	2022	9085	71,4	12916	38,5
Uchkurgan	2022	6890	73,5	9436	31,5
1 s=100 kilogramms. 1 ha=10000 m^2					

The table was compiled by the author based on data from the Namangan Regional Department of Agriculture.

Soil salinization can significantly change its chemical composition, which can also affect the chemical composition of crops grown in it. The high level of damage caused by soil salinization indicates the need for extensive scientific research and practical work to combat it.

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ZARAFSHON DARYOSI O‘RTA OQIMI SUV OMBORLARI GIDROLOGIK REJIMI (QAROVULTEPA, QORATEPA VA OQDARYO SUV OMBORLARI MISOLIDA)

Annotatsiya: *Ushbu maqolada Zarafshon daryosi hududidagi iqlimiy omilarning o’zgarishini baholash va ularni tahlil qilish hamda O’zbekiston hududidagi boshqa shunga o’xshash daryolar bilan o’zaro solishtirilgan. Zarafshon daryosi o‘rta oqimida joylashgan Qarovultepa, Qoratepa va Oqdaryo suv omborlarining gidrologik rejimi, ularning suv balansiga ta’sir etuvchi tabiiy va antropogen omillar tahlil qilinadi. Shuningdek, suv omborlarining irrigatsiya, energetika va ekologik tizimdagi ahamiyati yoritilgan.*

Kalit so‘zlar: *Daryo, Zarafshon daryosi, daryolar oqimi, suv ombori, gidrologik rejim, suv balansi, Oqdaryo, Qoratepa, Qarovultepa, irrigatsiya.*

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HYDROLOGICAL REGIME OF THE MIDDLE COURSE OF THE ZARAFSHAN RIVER (IN THE EXAMPLE OF THE KAROVULTEPA, KORATEPA AND AQDARYO RESERVOIRS)

Abstract: *This article assesses and analyzes the changes in climatic factors in the Zarafshan River basin and compares them with other similar rivers in Uzbekistan. The hydrological regime of the Qarovultepa, Qoratepa and Akdarya reservoirs located in the middle reaches of the Zarafshan River, as well as natural and anthropogenic factors affecting their water balance, are analyzed. The importance of reservoirs in irrigation, energy and the ecological system is also highlighted.*

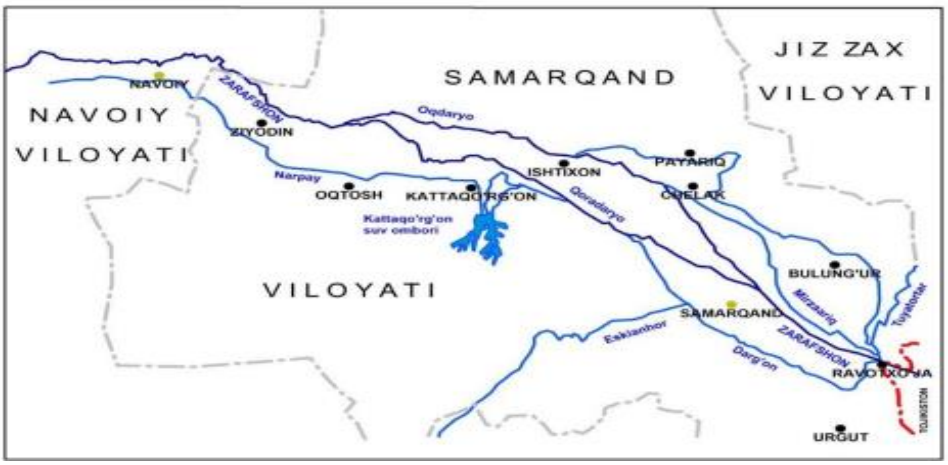
Keywords*: River, Zarafshan River, river flow, reservoir, hydrological regime, water balance, Akdarya, Qoratepa, Qarovultepa, irrigation.*

Kirish. Hozirgi kunda dunyo miqyosida daryolar suv resurslarining shakllanish sharoitlarini baholash, ular to‘yinish manbalarini tahlil qilish, daryolar oqimini turli suv iste’molchilari o‘rtasida oqilona taqsimlash usullarini yanada takomillashtirish kabi ustuvor yo‘nalishlarda ishlar olib borilmoqda. Shuningdek, daryolar oqimining suv omborlari yordamida keng miqyosida boshqarilishi,

daryolardan kanallarga suv olinishi kabi qator suv xo‘jaligi tadbirlari natijasida vujudga kelgan gidrologik o‘zgarishlalrni baholashga alohida e’tibor qaratilmoqda. Arid iqlimli O‘rta Osiyoning O‘zbekiston Respublikasida suv manbaidan oqilona foydalanish bugungi kuning dolzarb masalalaridan bir hisoblanadi. Suvning kimyoviy tarkibidagi metamorfizasiya yo‘nalishi to‘g‘ri yoki normal deb ataladi. O.A.Alyokin tadqiqotlariga ko‘ra dunyo bo‘yicha daryolarning aksariyati past va o‘rtacha mineralizasiyaga ega va kamdan-kam hollarda daryolarda yuqori minerallashgan suv mavjud. Zarafshon daryosining O‘zbekiston hududida daryoda mineralizasiya hamda ion miqdori ortishining asosiy sababi sanoat va qishloq xo‘jaligi tashlamalarining daryoga tashlanishi hisoblanadi.

Zarafshon daryosi O‘zbekistonning markaziy qismida Amudaryo va Sirdaryo o‘rtasida joylashgan bo‘lib, mamlakatdagi eng muhim suv manbalaridan biridir. Zarafshon daryosining suvlilik darajasi jihatidan ulardan ancha kichik, lekin, qo’shni Tojikiston Respublikasi va mamlakatimizning Zarafshon vohasida joylashgan Samarqand, Navoiy, Buxoro viloyatlari xalq xo’jaligi tarmoqlarining suvga bo’lgan talabi asosan shu daryo suvi hisobiga qondiriladi. Uning Respublikamiz xalq xo’jaligidagi ahamiyati beqiyosdir. Shuningdek, uzoq tarixiy davrlardan boshlab, Jizzax va Qashqadaryo yerlariga ham Zarafshondan suv olingan. Daryo Surxondaryo va Qashqadaryo daryolaridan farqli o‘laroq, tog‘li hududlardan boshlanib, quyi oqimda deyarli bug‘lanib ketadi. Shu sababli daryoning o‘rta oqimida suv resurslarini tartibga solish va taqsimlashda suv omborlarining roli nihoyatda katta. O‘rta oqimda joylashgan Qarovultepa, Qoratepa va Oqdaryo suv omborlari Zarafshon daryosi suvining mavsumiy o‘zgarishlarini tartibga soladi, sug‘orish tizimlarini suv bilan ta’minlaydi hamda ayrim hollarda energetik maqsadlarda foydalaniladi.

Asosiy qism. Zarafshon daryosi gidrologik jihatdan murakkab tizim bo‘lib, uning oqimi asosan tog‘ muzliklari va qor suvlaridan shakllanadi. O‘rta oqimda daryo suv sarfi yillik kesimda o‘zgaruvchan: bahorda suv sathi yuqori bo‘lsa, yoz oxiri va kuzda kamayadi. Zarafshon havzasining biz o’rganayotgan qismida yog’in kam yog’adi. Uning miqdori g’arbdan boshlanib, sharqqa tomon ortib boradi. Chunki, Zarafshon tabiiy geografik o’lkasining sharqiy qismlari havzaning tog’li qismlarga to’g’ri keladi.



1-rasm. Zarafshon daryosining joylashish xaritasi.

Masalan, Navoiyda (mutlaq balandligi 347 m) yog'in miqdori 177 mm, teng. Zarafshon daryosi havzasining o'ziga xos xususiyatlarga ega ekanligi iqlim sharoitiga, geologik tuzilishiga va gidrografik tarmoqlari oqimiga bevosita ta'sir etadi.

Zarafshon daryosi o'zining yuqori qismida Zarafshon muzligidan Maschoh nomi bilan boshlanadi. U Ayniy qishlog'i yonida chap irmog'i Fandaryo bilan qo'shilgach, Zarafshon nomini oladi. Zarafshon daryosini Panjikent shahridan o'tgandan keyin, hududda bironta ham doimiy oqadigan irmog'i yo'q. Okrug hududiga o'tgach, Zarafshon daryosining oqimi sekinlashadi. Samarqand shahri yaqinida ikkiga, Oqdaryo (shimoldagisi) va Qoradaryoga (janubdagisi) ajralib, Xatirchi qishlog'ida birlashadi. Ular orasida uzunligi 100 km, kengligi 15 km bo'lgan Miyonqol oroli vujudga kelgan.

Zarafshon daryosi Xazar yo'lagidan o'tgach Quyi Zarafshon okrugi boshlanadi. Zarafshon daryosiga okrug hududida doimiy quyiluvchi bironta irmoq yo'q. Lekin sug'orishga sarflanib, Zarafshon daryosiga quyilmaydigan 120 ta soy mavjud. Ularning eng muhimlari Urgutsoy, Omonqo'tonsoy, Oqsoy, To'sunsoy, Kattasoy, Tasmachisoy va boshqalar bo'lib, ular mavsumiy qor va yomg'ir suvlaridan to'yinib, suvi bahorda ko'payib, yozda juda kamayib qoladi.

Zarafshon daryosi tog'li qismida ko'pirib, toshlarga urilib, sekundiga 15-17 m tezlikda oqadi. Bu qismida Daryoga 200 ga yaqin irmoqlar qo'shiladi. Bu irmoqlar ichida eng muhimlari chapdan qo'shilovchi Fandaryo, Qishtutdaryo va Mag'iyon daryodir. Qolgan irmoqlari kichik. O'rta oqimdagi o'rtacha yillik suv sarfi 80-100 m^3/s atrofida bo'lib, bu miqdor yillar davomida iqlim o'zgarishlari va antropogen ta'sirlar (suv olish, bug'lanish, filtratsiya) sababli o'zgarib bormoqda.

Qarovultepa suv ombori - Jizzax viloyatida joylashgan.busuv ombor zarafshon daryosining Eski Tyuatortar kanali orqali kuz-qish mavsumida to'ldiriladi. Suv omborning hajmi 53,0 million m^3, balandligi 40 metr, maksimal suv o'tkazish imkoniyati 50 m^3/sekundni tashkil qiladi. Suv omborning vazifasi suvni to'plash va keyinchalik qishloq xo'jaligida sug'orish davrida foydalanish maqsadida qurilgan.



2-rasm. Qarovultepa suv omborining ko'rinishi.

Qoratepa suv ombori. 1960-yillarda Zarafshon vodiysida ham katta-katta yerlarning o‘zlashtirilishi boshlangan. Natijada qurg’oqchilik yillarida Zarafshon daryosining suvi sug’orishga yetmay qoldi. Shu sababli tog‘larda yirik soylarda suv ombori qurib, ularning suvidan foydalanish masalasi qo‘yildi. Qoratepa suv ombori 1970-yilning boshlarida boshlangan. Qoratepa suv omboriga bitta Omonqo’tonsoy quyiladi. Bu soy Qoratepa va Chaqilkalon tog’lari orasida joylashgan bo’lib, har ikkala tog’ni bir-biridan ajratib turadi. Omonqo’tonsoyning quyi qismida chap tomondan bir nechta katta soylar kelib qo’shiladi.

Omonqo’tonsoyning suv o’lchagich pastdan yuqori qismining suv yig‘gich maydoni 72,4 km kv. Agar Qoratepa suv omboridan boshlab hisoblasak, Omonqo‘tonsoyning suv yig‘gich maydoni 150 kv.km. dan oshadi. Qoratepa suv ombori hammasi bo‘lib, 1500 gektar yeni sug‘oradi.

Suv omborining maydoni 120 ming gektar bo‘lib, to‘g‘onning uzunligi 681 metr va balandligi 36 metr. Shu nuqtai nazardan tog‘lardagi soy suvlarini to‘plab, suv omborlar qurib, ulardan sug‘orishda foydalanish katta ahamiyatga ega. Shu jihatdan tog‘ soylari suv rejimini, suv sarfini, sel hodisalarini o‘rganish ahamiyatli hisoblanadi. tog’ soylarida suv omborlari qurilib, ulardan samarali foydalanilsa, tog‘ oldi tekisligidan yuz minglab gektar yerlar o‘zlashtirilishi mumkin. Bu esa ko‘plab kishilarning ish bilan band bo‘lishini ta’minlaydi, hamda sug‘orishda ilg‘or texnologiyalardan foydalanilsa, ya’ni tomchilatib sug’orishdan foydalanilsa, juyak bilan yoqi bostirib sug’orishga nisbatan suv 5-6 marta tejaladi, bu esa sug’oriladigan yer maydonlarini yanada kengaytirish imkoniyatini oshiradi. Hozirgi paytda tomchilatib sug‘orish bo‘yicha Samarqand viloyatining Qoratepa tog‘ oldi tekisligida Ohaklik qishlog‘i yaqinida 250 gektar yerga tomchilatib sug‘orish bilan bog’zorlar tashkil qilingan. Bunda yer osti suvidan va buloq suvidan foydalanilmoqda.

Xulosa

Zarafshon daryosi o‘rta oqimidagi Qarovultepa, Qoratepa va Oqdaryo suv omborlari mintaqaning suv xo‘jaligida strategik ahamiyatga ega. Ularning gidrologik rejimini chuqur o‘rganish suv resurslarini samarali boshqarish, suv tanqisligi muammosini yumshatish va ekologik barqarorlikni ta’minlash uchun zarurdir.

Kelgusida ushbu suv omborlarida raqamli monitoring tizimlari**,** masofadan zondlash ma’lumotlari va sun’iy intellekt asosidagi prognoz modellarini joriy etish suv balansini yanada aniq boshqarish imkonini beradi.

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LABORATORY DIAGNOSTIC APPROACHES FOR PSEUDOTUBERCULOSIS (YERSINIA PSEUDOTUBERCULOSIS)

Abstract: *Pseudotuberculosis, caused by Yersinia pseudotuberculosis, is an acute zoonotic infection that can affect humans and various animal species. The illness often presents with fever, intestinal disorders, and in some cases, systemic symptoms such as rash or lymph node enlargement. Reliable and timely laboratory diagnostics are essential for confirming the infection, initiating appropriate therapy, and avoiding complications. The main laboratory approaches include bacteriological culture, serological assays, and molecular methods (PCR). Each technique provides specific diagnostic insights that complement one another and ensure accurate pathogen identification.*

Keywords: *Yersinia pseudotuberculosis, culture, serology, PCR, diagnosis, zoonotic infection.*

Introduction. Yersinia pseudotuberculosis is a Gram-negative, zoonotic pathogen of major epidemiological and clinical significance. It is primarily transmitted through contaminated food, water, or direct contact with infected animals. According to multiple studies (Fukushima et al., 2011; Carniel, 2012; Aleksic & Bockemühl, 2020), Y. pseudotuberculosis belongs to the Enterobacteriaceae family and shares close phylogenetic similarity with Yersinia enterocolitica, though it differs in its clinical manifestations, reservoirs, and environmental survival characteristics.

Clinically, Y. pseudotuberculosis infection can resemble appendicitis, typhoid fever, enterocolitis, or mesenteric lymphadenitis (Bottone, 1999; Tauxe, 2004). This clinical polymorphism often leads to diagnostic confusion, emphasizing the necessity of laboratory confirmation through serological, bacteriological, or molecular diagnostic techniques (Fredriksson-Ahomaa & Korkeala, 2016). Misdiagnosis in clinical settings has been frequently reported in the literature, underscoring the need for improved laboratory-based diagnostic algorithms (Ostroff et al., 2010).

From an epidemiological perspective, Y. pseudotuberculosis is widely distributed in temperate regions and demonstrates the remarkable ability to multiply at refrigeration temperatures (0–4 °C). This psychrotrophic property allows it to persist in the food chain, particularly in refrigerated vegetables, fruits, and other raw

products, thereby serving as a source of foodborne outbreaks (Niskanen et al., 2009; Jalava et al., 2006). Several large-scale foodborne epidemics linked to contaminated produce—especially cabbage, carrots, and leafy greens—have been reported in Europe and Japan (Le Guern et al., 2016; Sato et al., 2021).

Recent molecular and genotypic investigations have revealed significant genetic diversity among Y. pseudotuberculosis strains. Studies highlight the presence of major virulence determinants, including invasin (inv), superantigen YPMa, and the pYV plasmid, which collectively contribute to epithelial invasion, immune evasion, and systemic dissemination of infection (Wren, 2003; Wang et al., 2019). These virulence factors explain the organism's adaptability and pathogenic potential in both human and animal hosts.

In summary, the literature demonstrates that Yersinia pseudotuberculosis is a cold-tolerant, foodborne zoonotic agent capable of mimicking other enteric diseases while maintaining distinctive epidemiological and molecular features. Its ability to survive under refrigeration conditions makes it a persistent hazard in modern food supply chains. Consequently, enhanced molecular surveillance, improved food storage standards, and the implementation of rapid diagnostic technologies are essential to mitigate its impact on public health.

Materials and methods.

1. Bacteriological Techniques. The bacteriological culture method remains the gold standard for identifying Yersinia pseudotuberculosis. Samples such as stool, blood, mesenteric lymph node aspirates, or tissue specimens are inoculated onto selective media like CIN (Cefsulodin–Irgasan–Novobiocin) or MacConkey agar, incubated at 25–28°C for 24–48 hours. Colonies typically appear small, smooth, and translucent, often resembling a "fried-egg" morphology. Final identification is achieved through biochemical profiling and agglutination tests using species-specific antisera.

2. Serological Techniques. Serological assays detect host antibodies directed against Y. pseudotuberculosis antigens. Widely used tests include agglutination reaction, ELISA, and complement fixation. The agglutination test employs a formalin-inactivated antigen, with diagnostic significance assigned to titers ≥1:160. ELISA provides higher sensitivity and specificity, allowing differentiation between recent (IgM) and past (IgG) infections.

3. Molecular Diagnostics (PCR). The Polymerase Chain Reaction (PCR) enables fast and highly specific detection of Yersinia pseudotuberculosis DNA in clinical or environmental samples. PCR assays commonly target virulence-associated genes such as inv, yadA, and virF, enabling the identification of even minimal bacterial loads. This approach is especially valuable when culture results are negative due to prior antibiotic treatment. PCR offers results within hours and assists in tracing infection sources during outbreaks.

Discussion and conclusion. Accurate laboratory confirmation of pseudotuberculosis necessitates a combined diagnostic strategy. While culture remains the definitive reference, it is time-intensive and may yield false negatives in antibiotic-treated cases. Serological and molecular tests enhance detection

sensitivity and shorten diagnostic turnaround time. The integrated use of these methods ensures reliable pathogen identification, timely therapy, and effective epidemiological control of this zoonotic infection.

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HISTORIOGRAPHY OF THE EMERGENCE AND DEVELOPINING PROCESSES OF ETHNOECOLOGICAL RESEARCH IN UZBEKISTAN

Abstract: *In this article the formation and developing processes of ethnoecological research in Uzbekistan are analyzed. It focuses on the first ethnological studies in the country, their development and evolution. In the article the ethnocological research is analyzed in a new context, that is, on the basis of chronologicial and interdisciplinary approaches. Furthermore, historians, philosophers, sociologists, ecologists and geographers have also put forward the idea that the nature and characteristics of ethnoses are determined by the natural and geographical environment in which they live.*

Key words: *Uzbek people, soviet period, years of independence, ethnoecology, ethnoecologicial research, historiography, nature, elements of nature, ecologicial system, ecological problems, natural resources.*

In recent years, the rapid development of science and technology and the economy, as a result of the increased influence of anthropogenic factors on nature, the destruction of biosphere ecosystems, desertification, and the increase in temperature on our planet are causing global environmental problems. Environmental problems such as atmospheric pollution, increasing air temperature, rapid reduction of forests, soil degradation, shortage of clean drinking water, depletion of the ozone layer are becoming especially important.

The world's leading scientific institutions are carrying out serious research on the study of regional ecological cultures along with the ecological danger that seriously damages the environment as a result of human development and the acceleration of the urbanization process. It is known from history that the genesis of the Uzbek people's conscious attitude to earth, water, air, fire and nature, their ancient traditions and ceremonies related to their veneration goes back to the distant past. As the President of the Republic of Uzbekistan, Shavkat Mirziyoyev, said: «At present, the most important issue is to raise the ecological culture of the population. Of course, such problems cannot be solved only by administrative means, it can be achieved by cultivating love for mother nature in the hearts of the young generation and a sense of belonging to it [1].

The Ferghana Valley is the jewel of Central Asia, it is distinguished by its unique ecosystem and eco-culture of its inhabitants. The fact that the valley is an orographically closed basin has created its unique changing climatic conditions. Therefore, the surrounding mountains have resulted in the formation of a unique

ecosystem and ecoculture as a result of the cold Arctic climate and the Atlantic climate coming from the west blocking the entry of air masses or moist eastern air masses. It is for this reason that historical and ethnological research of the traditional ecological culture of the Uzbeks of the Fergana Valley is of great scientific and practical importance.

The level of study of the problem. Although the researched problem is not studied as a special object of research, many works and articles cover one or another aspect of the issue to some extent. In the study, the literature on the subject, reflecting various aspects of the scientific problem, was conditionally divided into four groups: 1) literature of the end of the 19th century - the beginning of the 20th century; 2) studies of the Soviet period; 3) publications published in the years of independence; 4) foreign literature.

The information of the researchers of the Russian Empire period about the lifestyle and traditions of the people of the Fergana Valley is of a more empirical nature, and only more general conclusions can be drawn from it. Later they began to pay serious attention to the people of the valley, its lifestyle, types of economy and other aspects. In general, the initial data reflected views on the Turkestan region, particularly the Ferghana Valley **[2]**, *as the raw material base of the metropolis, while the later data expressed opinions based on deep scientific research. For example, geographer and zoologist I.A. Severtsev, geologist I.V. Mushketov and I.G. Researchers like Aleksandrov collected valuable scientific information about the nature, climate, and flora of the Turkestan region, particularly the Fergana Valley, the mountain ranges surrounding it* **[3]**.

Russian scientist, academician who carried out large-scale scientific research in the Fergana Valley. F. Middendorf's service deserves a special mention. The researcher was specially invited by the Governor-General of Turkestan, von Kaufman, to study the country. In his research entitled «Ocherki Ferhganskoy doliny» he incorporated valuable scientific information on the geographical location of the valley, nature, climate, rivers and mountains, ethnic composition and lifestyle of its inhabitants, as well as various fields of agriculture [4].

In the same period, another researcher In the work created by V.I. Kushelevski, the views of the inhabitants of the valley on medical and sanitary issues are analyzed. Although this work mainly contains statistical data on the state of folk medicine and the social life of the population in Turkestan, it also contains some noteworthy opinions on irrigation and melioration of the valley [5].

From the first quarter of the 20th century, more precisely, from the time of the former union, as a result of several scientific studies on the social and cultural life of the Uzbeks of the Fergana Valley[6], scientific articles and works were published within the framework of various topics of the ethnography of the Uzbek people. It should be noted here that although these works were created under the pressure of the ideology of that time, most of them contain a lot of valuable information about the ethno-ecological culture of the Fergana Valley and its inhabitants.

At the beginning of the 20th century, special studies were carried out on the ethnography of the peoples of the region, and in this regard, E.A. Pesherova's information about the «tulip festival» held in the village of Isfara in the Kokan district is important in the process of studying the spring rituals of Fergana Valley Uzbeks. In particular, the author recorded very interesting information about the procedure of conducting this festival, the participation of men and women in it, religious views related to the festival, and the traditional ecological culture of the peoples of the region during the study of the folklore spoken during the festival.

When discussing ethno-ecological culture in the studies of the former Soviet period, one of the Russian ethnologists S. Arutyunov, R. Its, I. Krupnik, V.L. Voronina, N.N. Cheboksarev and I.A. Cheboksareva, A.K. Bayburin O.A. Sukhareva, anthropologist V.P. Alekseev, Yu.V. Bromley, R.G. It is permissible to highlight the researches of authors such as Podolny.

The weight of the research on the problems of ecological culture, created in the years of independence, is also increasing. Therefore, scientific publications of this period form a separate category. The literature in this series is of special importance because it is free from communist ideology and created from a new point of view. The literature belonging to this group includes U. Abdullayev, M. Jo'rayev, A. Musaqulov, Sh. Otaboyev and Z. Hidoyatova's works can be included. Some aspects of the researched problem are highlighted in these works. In addition, Sh. Otaboyev, Z. Hidoyatova, S. Mirvaliyev and E. Tursunov's studies highlight the scientific basis of solving global environmental problems of mankind, that is, the importance of social and environmental factors in human development, as well as mutual relations between society and nature. Opinions were expressed on measures to protect human health, eliminate environmental problems, and improve environmental education [7].

Scientist In the studies of Abdullayev, inter-ethnic relations in the Fergana Valley are perfectly covered in the framework of the end of the 19th century and the 20th century. At the same time, the author provided information on the problem being studied in the coverage of the lifestyle of one or another ethnic group, while M. Jorayev and A. Narziqulov's works [8]. were also used in some places of the research to illuminate one or another aspect of the problem. Although the works of other authors are important for the problem under study, there is very little information about the traditional ecological culture of the valley Uzbeks.

During the years of independence, a number of monographic and complex studies on the topic were carried out by local ethnographers in the Republic. During such scientific research, A.A. Ashirov, A.A. Sarimsokov and B.R. Khalmuratov dissertations, monographs, articles and theses of can be included [9].

Field ethnographic materials also play an important role in the study of the ecological aspects of the traditional material culture of the Valley Uzbeks. The ecological views of the Valley Uzbeks were formed over long historical periods mainly under the influence of natural and geographical conditions, in connection with the people's traditional lifestyle, economic activity, customs and traditions, religious imagination, and socio-economic life. In the second half of the 20th

century, fundamental «revolutionary changes» took place in the cultural sphere along with the political and socio-economic aspects. As a result, the traditional ecological views of the Uzbeks of the Fergana Valley have changed to a certain extent.

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SUN’IY INTELLEKT TEXNOLOGIYALARINING KIBERXAVFSIZLIKNI TA’MINLASHDAGI AHAMIYATI

Annotatsiya. *Raqamli texnologiyalar jadal rivojlanib borayotgan hozirgi davrda kiberxavfsizlik masalasi davlatlar, tashkilotlar va foydalanuvchilar uchun eng muhim yo‘nalishlardan biriga aylandi. Internet tarmog‘ida ma’lumotlar almashinuvi kengaygani sari, firibgarlik, ma’lumot o‘g‘irlash va zararli dasturlar orqali amalga oshiriladigan hujumlar soni ham ortmoqda. Ushbu holatda sun’iy intellekt texnologiyalari kiberxavfsizlik tizimlarini takomillashtirishning eng samarali vositalaridan biri sifatida qaralmoqda. Sun’iy intellekt asosidagi tizimlar katta hajmdagi ma’lumotlarni qisqa vaqt ichida tahlil qilib, anomaliyalarni erta aniqlash va tahdidlarning oldini olish imkonini beradi. Mashinaviy o‘rganish, chuqur o‘rganish va tabiiy tilni qayta ishlash texnologiyalari yordamida xavfli faoliyatni avtomatik tarzda aniqlash, real vaqt monitoringi va foydalanuvchi xatti-harakatlarini tahlil qilish imkoniyatlari kengaymoqda. Maqolada sun’iy intellektning kiberxavfsizlikdagi o‘rni, amaliy qo‘llanilish yo‘nalishlari, shuningdek, ushbu texnologiyaning afzalliklari va ehtimoliy xavf jihatlari tahlil qilinadi. Tadqiqot natijalari AI texnologiyalarini kiberxavfsizlik sohasiga keng joriy etish zarurligini, bu esa ma’lumotlarni himoya qilish samaradorligini oshirishda muhim ahamiyat kasb etishini ko‘rsatadi.*

Kalit so‘zlar: *sun’iy intellekt, kiberxavfsizlik, machine learning, deep learning, ma’lumotlarni himoya qilish, tahdidlarni aniqlash, intellektual tizimlar, raqamli xavfsizlik, tarmoq xavflari, avtomatlashtirilgan monitoring.*

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THE IMPORTANCE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN ENSURING CYBERSECURITY

Abstract. *In the modern era of rapid digital development, cybersecurity has become one of the most crucial areas for governments, organizations, and individual users. As data exchange on the Internet expands, the number of frauds, data thefts, and malicious software attacks continues to increase. In this context, artificial intelligence (AI) technologies are regarded as one of the most effective tools for enhancing cybersecurity systems. AI-based systems can analyze large volumes of data in a short time, detect anomalies early, and prevent potential threats. Through machine learning, deep learning, and natural language processing technologies, it becomes possible to automatically identify harmful activities, conduct real-time monitoring, and analyze user behavior patterns.This article examines the role of artificial intelligence in cybersecurity, its practical applications, as well as its advantages and possible risks. The research highlights the necessity of integrating AI technologies into cybersecurity systems to enhance the effectiveness of data protection and threat detection.*

Keywords: *artificial intelligence, cybersecurity, machine learning, deep learning, data protection, threat detection, intelligent systems, digital security, network threats, automated monitoring.*

Kirish. Zamonaviy jamiyatda raqamli transformatsiya jarayoni tobora chuqurlashib borar ekan, axborot texnologiyalariga asoslangan tizimlar inson faoliyatining deyarli barcha sohalariga kirib bormoqda. Biroq raqamli infratuzilmaning kengayishi bilan birga, kiberxavfsizlik tahdidlari ham ortib bormoqda. Xakerlik hujumlari, ma’lumotlar bazalariga noqonuniy kirish, zararli dasturlar orqali amalga oshiriladigan tahdidlar jahon miqyosida dolzarb muammo sifatida e’tirof etilmoqda. O‘zbekistonda axborot-kommunikatsiya texnologiyalari tez sur’atlar bilan rivojlanib bormoqda, shuningdek davlat va biznes sohalarida raqamlashtirish jarayoni kengaymoqda. Biroq, shu bilan birga, kiberxavfsizlik sohasida bir qator muammolar mavjud. Birinchi navbatda, davlat va korxonalarda axborot tizimlarini himoya qilish bo‘yicha yetarlicha malakali mutaxassislar yetishmaydi. Ikkinchidan, ko‘plab tashkilotlar zamonaviy kiberxavfsizlik texnologiyalarini joriy etishda moliyaviy va texnik imkoniyatlarning cheklanganligi bilan duch keladi. Shuningdek, so‘nggi yillarda kiberhujumlar soni oshgani, shaxsiy va moliyaviy ma’lumotlar xavfsizligining zaifligi, internet firibgarligi va elektron xizmatlar orqali sodir bo‘layotgan hujumlar aholining axborot xavfsizligiga bo‘lgan ishonchini susaytirmoqda. Shu sababli sun’iy intellekt texnologiyalarini qo‘llash kiberxavfsizlikni oshirish, hujumlarni tez aniqlash va oldini olish hamda axborot tizimlarining barqarorligini ta’minlashda muhim ahamiyat kasb etadi. Mazkur muammolarni bartaraf etish maqsadida O‘zbekiston Respublikasi Prezidentining 2024-yil 14-oktyabrdagi PQ-358-sonli “ Sun’iy intelekt texnologiyalarini 2030-yilga qadar rivojlantirish” strategiyasini tasdiqlash tog’risidagi farmoni [3] qabul qilinganligini e’tirof etish mumkin. AI tizimlari real vaqt rejimida katta hajmdagi

ma’lumotlarni tahlil qilib, anomaliyalarni avtomatik tarzda aniqlash, xatti-harakatlardagi g‘ayrioddiylikni kuzatish va potentsial xavflarning oldini olishga yordam beradi. Sun’iy intellektning mashinaviy o‘rganish, chuqur o‘rganish va bashoratli tahlil kabi texnologiyalari orqali kiberxavfsizlik tizimlari yanada intellektual tus olmoqda. IBM Security hisobotlariga ko‘ra, AI asosidagi himoya tizimlari an’anaviy usullarga nisbatan tahdidlarni aniqlash tezligini va samaradorligini sezilarli darajada oshirgan [1]. Shu bilan birga, NIST tomonidan ishlab chiqilgan “AI Cybersecurity Framework” konsepsiyasi bu yo‘nalishda yagona metodologiyani shakllantirishga xizmat qilmoqda [2].

Adabiyotlar tahlili. So‘nggi yillarda kiberxavfsizlik tizimlarini mustahkamlashda sun’iy intellekt (AI) texnologiyalarining qo‘llanilishi keng miqyosda o‘rganilmoqda. Jahon miqyosidagi tadqiqotlar shuni ko‘rsatadiki, sun’iy intellekt xavfsizlik tizimlarida an’anaviy himoya usullarini to‘ldiruvchi emas, balki ularni yangi bosqichga olib chiqadigan asosiy omilga aylanmoqda. IBM Security (2023) tomonidan chop etilgan *“Cost of a Data Breach Report”* ma’lumotlariga ko‘ra, kiberhujumlar natijasida tashkilotlarga yetayotgan zarar hajmi yil sayin ortib bormoqda. Hisobotda ta’kidlanishicha, sun’iy intellekt asosidagi aniqlash va javob berish tizimlari kiberxavfga qarshi kurashish vaqtini sezilarli darajada qisqartiradi, bu esa iqtisodiy yo‘qotishlarni kamaytirishga xizmat qiladi [1]. NIST (2023) tomonidan ishlab chiqilgan *Artificial Intelligence Risk Management Framework* esa sun’iy intellekt tizimlarini kiberxavfsizlik jarayonlariga integratsiya qilishda xavf va mas’uliyatlarni boshqarish bo‘yicha muhim metodologiyani taqdim etadi. Ushbu hujjatda AI tizimlarining ishonchliligi, shaffofligi va barqarorligini ta’minlash asosiy tamoyil sifatida belgilangan [2].O‘zbekiston Respublikasi Prezidentining PQ–358-sonli qarori (2024) esa mamlakat miqyosida sun’iy intellektni 2030-yilgacha rivojlantirish strategiyasini belgilab berdi. Ushbu hujjat sun’iy intellektni kiberxavfsizlikni mustahkamlash, davlat boshqaruvi va iqtisodiyotning raqamli transformatsiyasiga joriy etish zarurligini alohida ta’kidlaydi [3]. Springer (2019) nashr etgan *“Artificial Intelligence: Foundations, Theory, and Algorithms”* asarida sun’iy intellektning nazariy asoslari, mashinaviy o‘rganish, neyron tarmoqlar va ularning kiberxavfsizlikdagi qo‘llanilishi batafsil yoritilgan. Bu manba kiberxavfsizlikdagi AI modellarining texnik jihatlarini tushunishda asosiy nazariy poydevor bo‘lib xizmat qiladi [4].Shuningdek, *“Advancing Cybersecurity: A Comprehensive Review of AI-Driven Approaches”* (Journal of Big Data, 2024) maqolasida sun’iy intellekt yordamida tahdidlarni oldindan aniqlash, xatti-harakatlarni tahlil qilish va avtomatik himoya mexanizmlarini yaratish imkoniyatlari keng tahlil qilingan. Mualliflar AI asosidagi yechimlar inson omilidan kelib chiqadigan xatoliklarni kamaytirishda samarali ekanini ta’kidlashgan [5].Oxirgi manba sifatida **GeeksforGeeks** platformasida joylashtirilgan *AI in Cybersecurity* maqolasi amaliy jihatdan dolzarb bo‘lib, unda sun’iy intellekt yordamida kiberxavf monitoringi, spam va fishingni aniqlash algoritmlari misollar orqali tushuntirilgan. Ushbu maqola mavzuning texnik amaliy tomonlarini o‘rganishda foydali bo‘ladi [6].Umuman olganda, tahlil qilingan adabiyotlar shuni ko‘rsatadiki, sun’iy intellekt texnologiyalari kiberxavfsizlik tizimlarida tahdidlarni

aniqlash, javob berish tezligini oshirish va inson omilini kamaytirish orqali samaradorlikni oshiradi. Shu sababli, bu yo‘nalishda ilmiy izlanishlar nafaqat texnik, balki strategik ahamiyat kasb etmoqda.

Tadqiqot metodologiyasi. Ushbu maqolada tahlil, sintez, nazariy umumlashtirish, induksiya, deduksiya va boshqa usullardan foydalanilgan. Asosiy manba sifatida sun’iy intelekt va kiberxavfsizlik bo‘yicha mavjud ilmiy adabiyotlar o‘rganildi. Shuningdek, raqamli texnologiyalar joriy etilishidan oldin va keyingi davrdagi ko‘rsatgichlar solishtirildi.

Tahlil va natijalar muhokamasi. Sun’iy intellekt (SI) — bu kompyuter tizimlariga inson aqlini taqlid qilish imkonini beruvchi texnologiyalarning majmuasidir. SI texnologiyalarining nazariy asoslari quyidagi asosiy yo‘nalishlarni o‘z ichiga oladi: Machine Learning — bu kompyuterlarga ma’lumotlar asosida o‘rganish va qarorlar qabul qilish imkonini beruvchi algoritmlar va modellarning rivojlanishini o‘rganadigan soha. Bu soha, ma’lumotlar asosida o‘rganish va qarorlar qabul qilish imkonini beruvchi algoritmlar va modellarning rivojlanishini o‘rganadi. Deep Learning — bu ko‘p qatlamli neyron tarmoqlarini qo‘llab-quvvatlaydigan va murakkab ma’lumotlarni tahlil qilish imkonini beruvchi metodlarni o‘z ichiga oladi. Bu metodlar, katta hajmdagi ma’lumotlar asosida murakkab neyron tarmoqlarini yaratish va o‘rgatish imkonini beradi. Natural Language Processing — bu inson tilini tushunish va ishlab chiqish uchun zarur bo‘lgan metodlar va texnologiyalarni o‘rganadi. Bu soha, kompyuterlarga inson tilini tushunish va ishlab chiqish imkonini beruvchi metodlar va texnologiyalarni rivojlantirishga qaratilgan. Algoritmlar va modellar - SI tizimlarining ishlashini ta’minlovchi asosiy komponentlar bo‘lib, ular ma’lumotlarni qayta ishlash va qarorlar qabul qilish jarayonlarini amalga oshiradi. Algoritmlar va modellar, SI tizimlarining samarali ishlashini ta’minlash uchun zarur bo‘lgan asosiy komponentlardir. Statistik nazariya va matematik asoslar - SI tizimlarining samarali ishlashini ta’minlash uchun zarur bo‘lgan statistik va matematik metodlarni o‘z ichiga oladi. Bu metodlar, SI tizimlarining samarali ishlashini ta’minlash uchun zarur bo‘lgan asosiy komponentlardir[4].

Kompyuter tarmoqlarining rivojlanishi jamiyatlarning faoliyatini tubdan o‘zgartirdi va natijada kiberhujumlar chastotasi va murakkabligi oshdi. Kiberhujumlar — bu kompyuter tizimlari, tarmoqlar yoki ma’lumotlarga qaratilgan buzuvchi faoliyatlar bo‘lib, odatda ular rejalashtirilgan va uyushgan bo‘lib, maqsadlariga erishish uchun bir qator sinxronlashtirilgan qadamlarni o‘z ichiga oladi. Ushbu hujumlar zarar yetkazish, ruxsatsiz kirish yoki xizmatlarning to‘xtatilishiga olib keladigan faoliyatlarni maqsad qilgan bo‘lib, natijada jiddiy ma’lumot yo‘qotilishi yoki moliyaviy zarar yuzaga keladi va ko‘pincha uzoq muddatli oqibatlarga olib keladi. Shuningdek, ichki tahdidlar — bu kiberhujumlarning sezilarli va ortib borayotgan segmentini tashkil etuvchi holatlar bo‘lib, odatda norozilik bildirgan yoki qonuniy vakolatini suiiste’mol qilgan xodimlar tomonidan amalga oshiriladi; ular ma’lumotlarni o‘g‘irlash yoki zarar yetkazish maqsadida mavjud ruxsatlardan foydalanadi. Bu tahdidlar shuningdek foydalanuvchilar tasodifan qurilmalariga o‘rnatgan, ruxsatsiz kirish huquqiga ega

ilovalardan ham paydo bo‘lishi mumkin, bu ilovalar esa sezgir ma’lumotlarga kirish va ularni noto‘g‘ri foydalanish imkonini beradi. Ushbu tahdidlarni bartaraf etish maqsadida ilg‘or xulq-atvor anomaliyasini aniqlash va avtomatik chidamlilik mexanizmlari ishlab chiqilmoqda, ular xodimlar va ilovalar darajasida zararli harakatlarni oldindan aniqlash va yumshatishga qaratilgan. Kiberhujumlarning keng spektri mavjud bo‘lib, ular raqamli dunyodagi turli tahdidlarni ifodalaydi. Adabiyotlarda ta’kidlangan va 1-jadvalda umumlashtirilgan ushbu hujumlarning bir nechta muhim turlari haqida ma’lumotlar berilgan. Ushbu ma’lumotlar kiber tahdidlarning murakkabligi va keng doirasini ko‘rsatib, bugungi kunda tashkilotlar va shaxslar duch kelishi mumkin bo‘lgan ko‘plab hujumlarni yoritadi. Botnetlar — yana bir muhim kiber tahdid bo‘lib, bu tarmoqqa ulanishgan kompyuterlarning hujumchi tomonidan boshqariladigan va DDoS hujumlari, ma’lumot o‘g‘irligi va spam kabi uyushgan zararli faoliyatlarni amalga oshirish uchun ishlatiladigan tarmoqlardir. Bu tarmoqlar juda keng bo‘lishi mumkin, minglab yoki hatto millionlab zaiflashtirilgan qurilmalarni o‘z ichiga oladi, bu esa ularni yo‘q qilishni nihoyatda qiyinlashtiradi. Botnet operatorlari qurilmalarni infektsiya qilish va nazoratni saqlash uchun ilg‘or usullarni qo‘llaydi va doimiy ravishda aniqlanishdan qochish maqsadida texnikalarini rivojlantirib boradi[5].

Kiber – hujum turlari

1- jadval[5].

Kiberhujum turlari	Tavsifi
Phishing	- ushbu hujum turida shaxslar aldab, ulardan login ma’lumotlari yoki moliyaviy ma’lumotlarni olishga harakat qilinadi. Huquqbuzarlar ishonchli elektron xabar sifatida o‘zlarini ko‘rsatib, shaxsiy yoki korporativ ma’lumotlarga ruxsatsiz kirish olishadi.
Malware	- bu viruslar, virmlar (worm), trojanlar va ransomware kabi zararli dasturlarni o‘z ichiga oladi. U kompyuter tizimlariga va ma’lumotlarga zarar yetkazish yoki ruxsatsiz kirish uchun mo‘ljallangan. Malware turli xil kiberhujumlarda qo‘llaniladi.
DDoS	- Denial of Service (DoS) yoki Distributed Denial of Service (DDoS) hujumlari tizim resurslarini to‘ldirib, uni haqiqiy so‘rovlarni qabul qilmasligiga olib keladi. DDoS hujumlari ko‘plab buzilgan kompyuter tizimlaridan bir vaqtning o‘zida hujum jo‘natish orqali amalga oshiriladi.
MitM	- Man-in-the-Middle hujumida ikki tomon o‘rtasidagi aloqa bilmasdan ushlanadi. Huquqbuzarlar xabarlarni o‘g‘irlashi, o‘zgartirishi yoki soxta xabarlar yaratishi mumkin, bu esa ma’lumotlar buzilishi yoki yashirin kuzatishga olib keladi.
SQL inyeksiya hujumi	- bu hujum texnikasi ma’lumotlar bazasi bilan ishlovchi veb-saytlardagi zaifliklardan foydalanadi, zararli SQL buyruqlarini so‘rovga kiritadi. Ama’lumotlarni shifrlab, ular qayta ishlatilmay qolishini ta’minlaydi. Huquqbuzar ma’lumotni ochish uchun pul talab qiladi. Bu shaxslar va tashkilotlar uchun moliyaviy xavfni

	yuzaga keltiradi. gar hujum muvaffaqiyatli bo‘lsa, huquqbuzar ma’lumotlarni o‘qishi, o‘zgartirishi yoki o‘chirishi mumkin.
Zero-Day Exploit	- Bu hujum, dasturiy ta’minot ishlab chiqaruvchisi zaiflikni aniqlashidan oldin yoki birinchi kunida amalga oshiriladi. Zero-Day hujumlar tezda aniqlanmagan zaifliklardan foydalanganligi sababli, ularni himoya qilish juda qiyin.
Ransomware	- Ransomware ma’lumotlarni shifrlab, ular qayta ishlatilmay qolishini ta’minlaydi. Huquqbuzar ma’lumotni ochish uchun pul talab qiladi. Bu shaxslar va tashkilotlar uchun moliyaviy xavfni yuzaga keltiradi.
XSS	- hujumlari uchinchi tomon veb-resurslarini ishlatib, qurbonning brauzerida yoki skript ishlay oladigan dasturda zararli skriptlarni bajaradi.hujumida shaxs yoki guruh tarmoqka ruxsatsiz kirib, uzoq vaqt davomida sezilmay qoladi.
APT	- Bu orqali ular muhim ma’lumotlarni o‘g‘irlashi mumkin, va tashkilot xavfsizlik xodimlari bu holatni tezda aniqlay olmaydi.
BEC	- hujumlarida moliyaviy vakolatga ega xodimlar maqsad qilinadi. Huquqbuzarlar puxta tadqiqot olib, xodimni pulni o‘z hisob raqamlariga yuborishga aldashadi.
Crypto-jacking	- hujumida qurbonning hisoblash resurslari yashirin tarzda kriptovalyuta qazib olish uchun ishlatiladi. Bu tashkilot tarmoqlarining resurslarini sezilmay kamaytiradi.
Password Attack	- parol hujumlari foydalanuvchi parollarini buzishga qaratilgan bo‘lib, Brute-Force, Dictionary, Rainbow Table, Credential Stuffing, Password Spraying, Keylogger va phishing kabi usullarni o‘z ichiga oladi..
Insider Threat	- ichki tahdidlar tashkilot xodimlaridan kelib chiqadi, ular ruxsatli kirish huquqlarini suiiste’mol qilib, tizim va ma’lumotlarga zarar yetkazadi.botnet hujumida buzilgan kompyuterlar tarmog‘i masofadan boshqariladi va muvofiqlashtirilgan zararli faoliyatlar amalga oshiriladi.
Botnet Attack	- botnet hujumida buzilgan kompyuterlar tarmog‘i masofadan boshqariladi va muvofiqlashtirilgan zararli faoliyatlar amalga oshiriladi.

Sun’iy intellekt (AI) texnologiyalari kiberxavfsizlik sohasida tahdidlarni aniqlash, hodisalarga tezkor javob berish hamda xavfsizlik jarayonlarini avtomatlashtirishda muhim ahamiyat kasb etadi. U katta hajmdagi ma’lumotlarni real vaqt rejimida tahlil qilish orqali kiberhujumlar, zararli dasturlar (malware), fishing va ransomware kabi tahdidlarni an’anaviy usullarga qaraganda tezroq aniqlash imkonini beradi. AI qo‘llanilgan kiberxavfsizlik tizimlarining asosiy ustunliklari — tahdidlar haqidagi ma’lumotlarni avtomatik tahlil qilish, foydalanuvchi xatti-harakatlarini kuzatish, xavf darajasini baholash, tizimga noqonuniy kirish holatlarini aniqlash va faol tahdidlarni qidirishdir. Ushbu yondashuvlar kiberhujumlarning zararini kamaytirish va ularning oldini olishda samarali natija beradi. Bugungi kunda AI texnologiyalari xavfsizlik devorlari (firewall), yakuniy nuqta himoyasi (endpoint security), xavfsizlik hodisalarini

boshqarish tizimlari (SIEM), kengaytirilgan aniqlash va javob tizimlari (XDR), shuningdek firibgarlikni aniqlash dasturlarida keng qo‘llanilmoqda. Bu tizimlar tarmoq, bulutli muhit va ma’lumotlar xavfsizligini yanada mustahkamlaydi.Kiberxavfsizlik tahdidlari shaklan va usul jihatidan murakkablashib borayotgan bir paytda, AI asosidagi himoya tizimlari real vaqtli monitoring, tezkor javob va hujumlarning oldini olish imkoniyatini yaratadi. Shu sababdan tashkilotlar o‘z kiberhimoya strategiyalarini yanada kuchaytirishlari zarur[6].

Sun’iy intellekt (AI) texnologiyalarining kiberxavfsizlikdagi o‘rni zamonaviy axborot tizimlarini himoya qilishda muhim ahamiyatga ega. U inson tomonidan boshqariladigan an’anaviy usullardan farqli o‘laroq, tahdidlarni aniqlash, tahlil qilish va ularga javob berish jarayonlarini o‘zlashtirib, ularni avtomatlashtirish imkonini beradi. AI tizimlari kiberhujumlarning murakkablashib borayotgan sharoitida xavfsizlikni ta’minlashning ishonchli mexanizmlaridan biri hisoblanadi. Quyida sun’iy intellektning bu boradagi asosiy jihatlari keltiriladi:

1.Tahdidlarni aniqlash (Detection).

Sun’iy intellekt tizimlari katta hajmdagi ma’lumotlarni real vaqt rejimida tahlil qilish orqali odatiy holatlardan chetga chiqadigan harakatlarni tezda aniqlaydi. Masalan, tizimga bir necha bor muvaffaqiyatsiz kirish urinishlari yoki shubhali fayl yuklash holatlari aniqlansa, AI ularni potentsial tahdid sifatida qayd etadi.

2.Bashorat qilish (Prediction).

AI ilgari sodir bo‘lgan hujumlar, ularning sabablari va oqibatlarini o‘rganib, kelajakdagi xavf-xatarlarni oldindan prognozlash imkoniyatiga ega. Shu tarzda u kiberhujumlar sodir bo‘lishidan avval ularni bashorat qiladi va tizimni tayyor holatga keltiradi.

3. Moslashuvchanlik(Adaptation). Sun’iy intellekt o‘z faoliyatida doimiy o‘rganish tamoyiliga asoslanadi. Har bir yangi tahdid yoki hujum holatidan keyin tizim ma’lum tajriba orttiradi va kelajakda shunga o‘xshash vaziyatlarda tezroq hamda samaraliroq choralar ko‘rishni o‘rganadi.

4.Avtomatlashtirish (Automation).

AI yordamida kiberxavfsizlik tizimlarida ko‘plab jarayonlar inson aralashuvisiz amalga oshiriladi. Masalan, zararli IP manzillarni bloklash, virus aniqlanganda uni karantin rejimiga o‘tkazish yoki ma’lum turdagi tahdidlar uchun standart javob choralarini ishga tushirish kabi amallar avtomatik bajariladi. Bu esa mutaxassislarning vaqtini tejab, ularni strategik muammolarga e’tibor qaratishga imkon beradi.

5.Javob berish (Response).

Sun’iy intellekt tahdid aniqlanganda darhol tizimni himoya holatiga o‘tkazadi yoki zarur ogohlantirishlarni yuboradi. Bu tezkor javob mexanizmi kiberhujumlarning ta’sir doirasini kamaytiradi va zarar yetkazish ehtimolini minimal darajaga tushiradi[6].



1-rasm. Kiberxavfsizlikda sun’iy intellektning 7 ta asosiy qo‘llanilishi [6]

Xulosa. Zamonaviy raqamli davrda kiberxavfsizlikni ta’minlash masalasi milliy xavfsizlikning ajralmas tarkibiy qismiga aylanmoqda. Axborot oqimining keskin ortishi, kiberhujumlarning murakkablashuvi va ularning iqtisodiy hamda ijtimoiy oqibatlari sun’iy intellekt texnologiyalaridan samarali foydalanishni zaruratga aylantirdi.Tadqiqot natijalari shuni ko‘rsatadiki, sun’iy intellekt asosidagi tizimlar kiberxavfsizlikda an’anaviy usullarga nisbatan tezroq aniqlash, bashorat qilish va avtomatik qaror qabul qilish imkonini beradi. Masalan, mashinaviy o‘rganish algoritmlari tarmoqdagi noodatiy faoliyatni real vaqt rejimida aniqlab, xavf manbaini bartaraf etishda muhim rol o‘ynaydi. Shuningdek, davlat siyosatida ham bu yo‘nalish ustuvor ahamiyat kasb etmoqda. Jumladan, O‘zbekiston Respublikasi Prezidentining 2024-yil 14-oktabrdagi PQ–358-son qarorida “Sun’iy intellekt texnologiyalarini 2030-yilgacha rivojlantirish strategiyasi” tasdiqlanib, ushbu texnologiyalarni kiberxavfsizlik tizimlariga keng joriy etish zarurligi qayd etilgan. Xulosa o‘rnida aytish mumkinki, kiberxavfsizlikni mustahkamlashda sun’iy intellekt texnologiyalarini joriy etish — nafaqat himoya darajasini oshiradi, balki milliy raqamli infratuzilmaning barqaror rivojlanishiga ham xizmat qiladi. Shu bois, kelgusida bu yo‘nalishda ilmiy tadqiqotlar va amaliy loyihalar o‘rtasida uzviy integratsiyani kuchaytirish zarur.

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DEVELOPMENT OF TRANSPORT AND LOGISTICS INFRASTRUCTURE IN CENTRAL ASIA

Abstract. *The article analyzes the transport and logistics infrastructure of Central Asian countries. Annual indicators of freight and passenger transportation by transport types in the regional countries are presented. Proposals and recommendations have been developed regarding the development of the region's transport and logistics infrastructure.*

Keywords: *integration, macroeconomy, modernization, transit, diversification, multimodal*

Introduction. Transport holds a special place in international and regional economic relations, as the opportunities, efficiency, and timing of any country's integration into the global economy depend on its state. Transport is one of the main sectors of the macroeconomy, the lifeblood of the economy, and a driving force. It connects production with consumption, ensuring the continuity of the social production process [5; 272-p].

In this sense, transport not only ensures the continuity of the production–consumption chain but also determines the degree of connection of regions to the global economy. This functional role is directly related to spatial location, serving as a natural transit hub for the Central Asia–Europe–Asia–Middle East corridors at the geostrategic intersection. Accordingly, modernizing the transport infrastructure in the region becomes a key condition for enhancing the efficiency of international and regional economic relations as well as the logistics system.

Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan, and Tajikistan make up Central Asia, a strategically important geographic region. It borders Russia to the north, China to the east, and Iran and Afghanistan to the south, serving as a vital bridge connecting Europe, Asia, and the Middle East [7; 224-p]. The development of the transport system in Central Asia plays a key role in the international and regional economic relations of these countries as well as in the formation of the logistics sector.

The development of the transport system is greatly influenced by factors such as the natural conditions of the region, its political and geographical location, the distribution of the economy and population, and the size of the territory. In Central Asian countries, including Kazakhstan and Turkmenistan, there are no obstacles to the development of the transport system due to favorable natural conditions.

However, the situation is fundamentally different in Kyrgyzstan and Tajikistan within the region. In these countries, the relief conditions hinder the development of the transport system, as 90 percent of the land area consists of high mountain ranges [1; 106, 112-p]. For example, the Tashkent-Andijan-Osh-Ergashtom-Kashgar highway passes through the Kyrgyz territory over the Chayirchiq Pass (2406 m), Toldiq Pass (3645 m), and Taunmurun Pass (3536 m). On the road connecting Dushanbe, the capital of Tajikistan, and the city of Khujand, there is the Istiklol Tunnel with a length of 5040 meters, located at an altitude of 2720 meters above sea level.

The location of the economy and population also determines the type and composition of transport. In oases and valleys where industry and agriculture are well developed and the population is densely settled—around cities and recreational areas - the transport system is accordingly formed in a well-developed manner [5; 281-p]. This, in turn, activates economic activity, strengthens interregional integration, and leads to an intensification of transport flows. For example, the Fergana Valley is considered one of the most densely populated areas not only in Central Asia but also in the world. Therefore, the transport system in the Fergana Valley is very dense and well-developed.

The political-geographical factor also plays an important role in the location of transport. For example, as a result of the collapse of the former Soviet Union and the emergence of new independent states, internal borders became international state borders, creating the need to develop transport systems that connect the internal parts of the countries [5; 282-p]. Furthermore, the political-geographical factor changes the priorities of transport routes. New independent states, considering their economic interests, strive to diversify external trade routes, that is, to develop transport connections along several directions. This requires the reconstruction of existing transport infrastructure based on modern demands and strengthening transit partnerships with neighboring countries. As a result, the transport system serves not only as a means of internal integration but also as a tool for regional cooperation and geopolitical stability. Political unrest in Afghanistan negatively affects the development of transport in the region because Afghanistan serves as a bridge between Central Asia and South Asia. Consequently, regional transport-transit projects are being delayed or halted.

Materials and Methods. The article utilizes scientific-theoretical analysis, processing of statistical data, and comparative analysis approaches. Statistical indicators related to the countries of the region were systematically analyzed based on data from their official statistical agencies and used as the main information source in the article.

Discussion. The transport system is not only a collection of means for transporting people and goods from one place to another but also a complex system closely linked with the country's economy, social development, and technology. In Central Asia, the transport system is a complex and vital sector that plays a decisive role in the region's economic, political, and geostrategic development.

Table 1

Transport Systems of Central Asian Countries[6]

№	Country	Transport types			
		Lenght of Roads, km	**Lenght of railway**, km	**Lenght of Pipelines**, km	**Inland waterways**, km
1.	Kazakhstan	95 000	16 000	12000	4302
2.	Uzbekistan	44 000	6200	14 000	-
3.	Kyrgyzstan	34 000 km	417	383	-
4.	Tajikistan	15000	620	587	-
5.	Turkmenistan	22 000	6500	1343	-

Source: Table compiled by the authors based on [10, 11, 12, 13, 14, 15].

Kazakhstan′s transport potential in the Central Asian region is more developed compared to other countries (Table 1). It ranks first in the region in terms of the length of both roads and railways. The country plans to build 4,700 km of new roads by 2030, of which 3,700 km will be first-degree highways [8]. In 2024, 1,078.8 million tons of cargo were transported via the country's transport system, which is a 10% increase compared to the same period in 2023. The railway density in the country is approximately 5,9 kilometers per 1,000 km², which is significantly lower than in developed countries. For example, it is 1,5 to 3 times lower than in countries like India and Vietnam, and several times lower compared to developed European countries [3; p. 831].

In 2024, compared to 2023, Kazakhstan saw a 9.4% increase in passenger transport by road, a 19.5% increase in freight transport, a 24.6% rise in passenger turnover, and a 19.7% increase in freight turnover. In the railway sector, the number of passengers transported in 2024 reached 20.8 million people, reflecting a 5.1% increase compared to the previous year. Passenger turnover grew by 0.5%, reaching 16.2 billion passenger-kilometers. A total of 437.1 million tons of cargo were transported by rail, showing a 5% increase from the previous year. Freight turnover amounted to 327.9 billion ton-kilometers, increasing by 0.3% [9]. These figures indicate a high growth rate in road transport and stability in the railway sector.

Kazakhstan ranks second in the region after Uzbekistan in terms of the length of pipeline networks. From January to December 2024, 295.4 million tons of cargo were transported through pipelines, which is 7.4% more than in 2023. Freight turnover amounted to 149.1 billion ton-kilometers, showing 3.7% increase compared to 2023.

[6] The table shows the length of the main transport routes.

The total length of inland waterways in Kazakhstan is 4,302 kilometers, making it the leader in the region in this regard (Table 1). These inland waterways are primarily concentrated in the Ural–Caspian, Ili–Balkhash, and Irtysh river basins. However, the majority of cargo transportation is carried out via the Irtysh River. On this river, vessels navigate through three lock-equipped dams located in Bukhtarma, Ust-Kamenogorsk, and Shulbinsk. Experts have identified the integration of inland waterways into the multimodal logistics system as a strategic priority. This is particularly relevant in the context of heavy congestion on rail and road networks, the redirection of import-export cargo to the transport system, and active discussions on developing the Russia–Kazakhstan–China transit corridor. If implemented, the project would enable cargo to be transported via the Irtysh River to Lake Zaysan, then loaded onto trains and shipped to China through the Maikapshagai–Jeminay border crossing. This initiative would create an alternative transport route to rail and road and could increase trade volume between Kazakhstan, China, and Russia by up to 3.6 million tons per year [6]. The integration of inland waterways into the multimodal logistics system could serve not only as infrastructure development for Kazakhstan but also as a means of gaining an advantage in geoeconomic competition. In 2024, 349.7 thousand tons of cargo were transported via inland waterways (54.1% decrease compared to 2023), while 231.1 thousand passengers were transported (90.9% increase) [12].

In Central Asia, Uzbekistan ranks second after Kazakhstan in terms of the length of road networks, third in the length of railway lines after Kazakhstan and Turkmenistan, and holds the first place in pipeline length (Table 1). According to data from the State Committee of the Republic of Uzbekistan on Statistics, the volume of cargo transported in 2020 amounted to 1,366.7 million tons, and by 2024, this figure had reached 1,521.2 million tons - an increase of 11%. This is the highest figure recorded over the past five years. Among the modes of transport, road transport leads in terms of cargo volume, accounting for 1.4 billion tons, which makes up 92% of the total cargo. Rail transport handled 73.9 million tons (4.9% of the total), while pipeline transport accounted for 61.8 million tons (4.1%) [18]. The key factors behind this growth include the gradual modernization of transport infrastructure, the expansion of trade turnover, and the recovery of economic activity following the pandemic-related restrictions.

In the early 20th century, a significant amount of passenger and cargo transportation took place along the waterways of the Amu Darya and the Aral Sea. In 1924, the total length of navigable waterways for boats and ships was 887 km. By 1980, this figure had increased to 2,800 km. Steamships operated on the Amu Darya from the Panj port to Muynak. However, due to the decline in the river's water levels and the shrinking of the Aral Sea, the length of navigable waterways sharply decreased [4; 86-p]. Today, ferries still operate in some sections of the Amu Darya and Syr Darya rivers. Currently, inland water transport holds little significance in Uzbekistan's economy and logistics. The limited use of water transport can be attributed to a lack of infrastructure and poor navigation conditions.

Kyrgyzstan ranks third in the region in terms of the length of road networks, following Kazakhstan and Uzbekistan (Table 1). In 2024, a total of 48.638 million tons of cargo were transported across the country, which is 5.9% more than in 2023. Over 82% of total cargo - namely 40.001 million tons - was transported by road, representing a 7.8% increase compared to 2023. In contrast, Kyrgyzstan ranks last in the region in terms of the length of railways and pipelines. As a result, cargo volumes transported by these modes are very low. For instance, in 2024, 8.227 million tons of cargo were transported by rail, which reflects a 3.1% decrease (0.261 million tons) compared to 2023. Meanwhile, 368 million tons of cargo were transported via pipelines in 2024, marking a 25.6% increase from the previous year. Kyrgyzstan is a landlocked country with no inland waterways, and its economy mainly relies on road, rail, and air transport. Consequently, water transport holds very little significance in the national economy.

In Central Asia, Tajikistan ranks last in terms of road network length and fourth in the length of railway and pipeline networks, following Kazakhstan, Uzbekistan, and Turkmenistan (Table 1). In 2024, a total of 134.4 million tons of cargo were transported by all modes of transport in the country, which represents an 11.5% increase compared to 2023. Among the modes of transport, road transport dominates cargo movement, accounting for 127.7 million tons, or 95% of the total volume. The shares of rail and pipeline transport in total freight movement are relatively small, indicating a high reliance on road transport in Tajikistan's freight system.

The regional structure of freight transport in 2024 shows that 37.1% of the total cargo was transported in the Khatlon region, 29.8% in Sughd region, 16.5% in the capital Dushanbe, 15.7% in districts directly subordinate to the republic, and only 0.9% in the Gorno-Badakhshan Autonomous Region.

In 2024, over 1 billion passengers were transported by various types of passenger transport, which is 13.4% more than in the previous year. Road transport plays a critical role in passenger mobility in the country, accounting for 99.9% of the total passenger traffic. During this period, 996.1 million passengers were transported by road transport (including services by ministries, agencies, enterprises of various ownership forms, and private entrepreneurs), which is a 13.6% increase compared to the previous year [10].

Turkmenistan ranks fourth in the region in terms of the length of road networks, following Kazakhstan, Uzbekistan, and Kyrgyzstan, and second after Kazakhstan in the length of railway lines. As a major gas exporter, the country has developed a network of main gas pipelines. However, the total length of trunk pipelines within the country is 1,343 km, placing Turkmenistan among the top three in the region in this category (Table 1). In January-April 2025, the volume of transit cargo transported through Turkmenistan exceeded 2 million tons, which is a 20% increase compared to the same period in 2024 [7]. Through pipeline transport, the country exports large volumes of oil and natural gas to other states. For instance, in January-July 2025, oil delivered from Turkmenistan and Kazakhstan to the Baku-Tbilisi-Ceyhan (BTC) pipeline accounted for 16.2% of the pipeline's total flow.

These figures highlight Turkmenistan's significant role in regional transit and resource logistics.

Conclusion and Recommendations. As the key infrastructure for economic development, the transport system plays a decisive role in forming interstate economic relations and integrating the Central Asian region into global markets. Kazakhstan and Uzbekistan are considered regional leaders due to the development of their transport infrastructure and favorable geographic location. Turkmenistan's transport system outperforms those of Kyrgyzstan and Tajikistan, as certain factors hinder the development of transport systems in these countries.

To develop the transport and logistics infrastructure in Central Asia, the following recommendations can be made:

1. Attract national and foreign investments to modernize modern highways, railways, logistics centers, warehouse systems, and border crossing points in Central Asian countries.

2. Diversify transport routes to avoid reliance on a single direction (for example, reduce dependence on China or Russia). Developing Trans-Afghan projects passing through Afghanistan will expand new routes and provide regional countries access to markets in the Middle East, Africa, and India through the seaports of Karachi, Qasim, and Gwadar.

3. Digitize customs procedures and implement a "single window" system across the region to speed up cargo flow and reduce excessive paperwork.

4. Harmonize logistics strategies among Central Asian countries and adopt unified standards and regulations in the transport sector.

5. Ensure ecological sustainability of the region by transitioning to environmentally friendly transport vehicles, reducing waste, and applying energy-efficient technologies.

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SYNTHESIS OF A FUZZY-LOGIC CONTROL SYSTEM FOR THE PROCESS OF NATURAL GAS DRYING BY ADSORPTION METHOD

Abstract: *This paper presents the development and synthesis of a fuzzy-logic-based control system for the industrial process of natural gas drying using adsorption methods. The study focuses on integrating fuzzy inference mechanisms with sensor-based feedback to ensure optimal control of gas moisture content under varying process conditions. The proposed system addresses nonlinearities and uncertainties inherent in adsorption dynamics, providing improved stability and performance compared to conventional PID control. Mathematical modeling of the adsorption kinetics is combined with a fuzzy control algorithm designed to adaptively adjust process parameters such as temperature, pressure, and flow rate. Simulation results obtained in MATLAB/Simulink demonstrate enhanced efficiency of the gas dehydration process, reduced energy consumption, and improved product quality, confirming the effectiveness of the fuzzy logic approach in industrial automation environments.*

Keywords: *fuzzy logic control, adsorption drying, natural gas, industrial automation, MATLAB simulation, process optimization, moisture content, energy efficiency.*

Introduction. In modern automatic factories and gas processing plants, the control of gas dehydration processes is a critical component of technological safety and energy efficiency. Natural gas typically contains significant moisture that must be removed before transportation or liquefaction to prevent pipeline corrosion, hydrate formation, and reduced calorific value. The adsorption method, which uses desiccants such as silica gel, activated alumina, or molecular sieves, is widely applied for gas drying. However, the process is highly nonlinear and sensitive to variations in flow rate, inlet humidity, and temperature. Traditional control systems such as PID or on-off regulators are often inadequate for maintaining precise moisture control under these fluctuating conditions. Fuzzy logic control (FLC), originally introduced by Zadeh in 1965[1], has emerged as a powerful technique for managing complex, uncertain, and nonlinear processes without requiring an exact mathematical model of the system. In the context of natural gas adsorption drying, fuzzy logic offers an opportunity to synthesize a control system capable of mimicking human reasoning in process supervision, providing adaptive and robust responses to disturbances and parameter drifts. Therefore, the synthesis of a fuzzy-

logic-based control system for the adsorption drying process is a promising research direction to improve the performance of industrial gas dehydration units operating under uncertainty.

Methods.The adsorption drying process can be represented by a dynamic model based on mass transfer and heat balance equations. The moisture content of the gas, denoted $w_g(t)$, changes according to the rate of adsorption $r_a(t)$ and desorption $r_d(t)$ processes. The mass balance equation for the moisture in the adsorber can be expressed as follows:

$$\frac{dw_g(t)}{dt} = -k_a\left(w_g(t) - w_{eq}(T,P)\right) + D(t) \qquad (1)$$

where k_a is the adsorption rate constant, $w_{eq}(T,P)$ is the equilibrium moisture content determined by temperature T and pressure P, and $D(t)$ represents external disturbances such as fluctuations in gas feed composition[2,3]. The control objective is to maintain the outlet moisture content $w_{out}(t)$ close to its desired reference w_{ref} by manipulating control variables: gas temperature T_c, regeneration airflow rate Q_r, and adsorber switching time τ_s. Due to nonlinear interactions among these parameters, direct analytical control synthesis is challenging; thus, a fuzzy inference mechanism is introduced.

The fuzzy logic controller consists of three principal components: fuzzification, inference, and defuzzification. The inputs to the fuzzy controller are the moisture error $e(t) = w_{ref} - w_{out}(t)$ and its derivative $\dot{e}(t)$. These linguistic variables are mapped into fuzzy sets such as Negative Big (NB), Negative Small (NS), Zero (Z), Positive Small (PS), and Positive Big (PB). The rule base is constructed from expert knowledge of process operators. For instance, if $e(t)$ is Positive Big and $\dot{e}(t)$ is Positive Small, then the control action should strongly increase regeneration temperature T_c to accelerate moisture removal. The fuzzy rules are expressed in the Mamdani form, and the membership functions are defined using Gaussian or triangular shapes with overlapping intervals to ensure smooth control transitions[7,9]. The fuzzy inference is performed using the min-max method, while the defuzzification is carried out by the centroid technique to produce the final control signal $u(t)$ corresponding to the adjustment in heater power or airflow rate.

$$(t) = \frac{\int_\Omega \mu_U(z) z, dz}{\int_\Omega \mu_U(z), dz} \qquad (2)$$

where $\mu_U(z)$ denotes the aggregated membership function over the output domain Ω. This equation ensures that the fuzzy controller yields a continuous and smooth control signal. The fuzzy logic control block is integrated into the process control system implemented in MATLAB/Simulink, with real-time adaptation capability through parameter tuning of membership functions using gradient-based or genetic optimization algorithms.

Results. To validate the performance of the synthesized fuzzy control system, simulations were conducted using a mathematical model of a natural gas adsorption unit operating at an inlet pressure of 6 MPa and temperature of 300 K. The adsorbent

bed consisted of molecular sieve 5A with a particle diameter of 2 mm, and the total bed mass was 15 kg. The gas feed rate was varied between 0.5 and 1.0 kg/s to simulate industrial fluctuations. The reference outlet moisture content was set to $w_{ref} = 0.001$ kg/kg. The fuzzy logic controller used five linguistic terms for each input and produced one output control variable corresponding to the heating temperature T_c. The simulation time was 2000 s, and the sampling period was 0.1 s.

The results showed that the fuzzy logic control system achieved fast convergence to the desired outlet moisture level with a steady-state error below 0.0001 kg/kg. The system exhibited robust performance under external disturbances, such as a 10% fluctuation in gas flow rate or a 5 K change in inlet temperature, maintaining stability and minimal overshoot. Compared to a classical PID controller tuned using the Ziegler–Nichols method, the fuzzy system reduced the settling time by approximately 35% and the integral squared error (ISE) by 48%[5,6]. The control action generated by the fuzzy system was smoother, avoiding sharp transitions in valve position and heater power, thereby reducing mechanical wear and energy consumption. The energy efficiency improvement was estimated at 12% compared to the conventional control scheme. Figure 1 (MATLAB simulation) shows the temporal response of outlet moisture under fuzzy and PID control, highlighting faster stabilization with fuzzy control. Figure 2 illustrates the fuzzy rule surface describing the control action $u(t)$ as a function of $e(t)$ and $\dot{e}(t)$, revealing nonlinear but consistent control behavior.

Discussion. The obtained simulation results confirm the effectiveness of fuzzy logic control for the adsorption-based natural gas drying process. One of the key advantages of the fuzzy approach lies in its ability to handle model uncertainty and nonlinearities without requiring precise mathematical descriptions of adsorption kinetics. This property is particularly valuable in industrial environments where sensors, actuators, and process dynamics are subject to significant variability. The fuzzy system can adaptively compensate for such variations through its rule-based reasoning and overlapping membership functions. Moreover, the modular structure of the fuzzy controller facilitates integration into distributed control systems (DCS) and programmable logic controllers (PLC), commonly used in automatic factories.

From a theoretical standpoint, the fuzzy control system can be interpreted as a nonlinear mapping $u(t) = f\big(e(t), \dot{e}(t)\big)$, where the mapping function $f(\cdot)$ approximates the optimal control law derived from process experience rather than explicit differential equations. This allows the control system to exhibit robustness similar to adaptive or sliding-mode controllers, while maintaining smooth responses. The choice of membership functions significantly affects system behavior; for instance, Gaussian functions ensure better smoothness but require higher computational effort, whereas triangular functions simplify implementation. The number of rules also influences controller complexity; in the current study, a rule base of 25 rules provided a satisfactory balance between accuracy and computational load.

Another critical aspect of the fuzzy control synthesis is stability. Although fuzzy logic controllers are heuristic by nature, their stability can be analyzed using Lyapunov methods. A Lyapunov candidate function $V(e) = \frac{1}{2}e^2$ can be introduced to ensure that $\dot{V}(e) \leq 0$ for all admissible inputs. By constraining the control signal $u(t)$ to maintain $e(t)\dot{e}(t) < 0$, asymptotic convergence to the reference state can be guaranteed. In practical terms, this condition is enforced through the fuzzy rule design, where positive errors always lead to corrective control actions that decrease the error magnitude. Hence, the fuzzy controller not only maintains system stability but also ensures robustness under uncertainty.

Implementation in an industrial context requires interfacing the fuzzy logic module with real-time data acquisition systems. Sensors measuring gas humidity, temperature, and pressure provide input signals to the fuzzy inference system, while actuators controlling heaters, valves, and compressors execute the computed control commands. The control logic can be implemented in industrial controllers such as Siemens S7-1500 or Allen-Bradley CompactLogix using fuzzy function blocks, or embedded in microcontroller-based devices for local control loops. The communication with supervisory control systems (SCADA) is established through standard protocols like Modbus TCP or OPC UA, ensuring integration into factory automation networks. The fuzzy algorithm can operate in a hybrid mode, combining feedforward compensation with feedback correction to further enhance stability during transient regimes.

Conclusion. The synthesis of the fuzzy-logic control system for the adsorption-based natural gas drying process has demonstrated significant advantages in terms of robustness, accuracy, and energy efficiency compared to traditional control approaches. By incorporating fuzzy reasoning, the system effectively handles process nonlinearities, parameter uncertainties, and external disturbances. The fuzzy inference structure provides human-like decision-making capabilities, translating expert knowledge into adaptive control actions. Simulation studies confirmed that the fuzzy control system reduces steady-state errors, accelerates response, and improves overall energy utilization. These characteristics make the fuzzy logic control system a promising solution for industrial natural gas dehydration units, aligning with the goals of Industry 4.0 and smart factory automation.

Future research will focus on extending the fuzzy logic control framework by incorporating adaptive and hybrid elements, such as neuro-fuzzy and type-2 fuzzy systems, to further enhance robustness and self-learning capabilities. Integration with machine learning algorithms will enable real-time optimization of membership functions and rule weights based on process data. Experimental validation of the fuzzy control system on a pilot-scale gas dehydration unit will also be conducted to verify its industrial applicability. Moreover, the implementation of model predictive fuzzy control strategies could improve long-term performance and energy management, contributing to the sustainability of automated gas processing facilities.

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SHAHAR SHAROITIDA SANOAT ISHLAB CHIQARISH TIPIDAGI ERKIN IQTISODIY ZONALARNI FUNKSIONAL TASHKILLASHTIRISH METODOLOGIYASI

Annotatsiya. *Maqolaning maqsadi jahonda erkin iqtisodiy zonalarning shakllanish bosqichlari, shakllanish jarayonlari keltirilgan. Tadqiqot metodikasi mavzuga tegishli xalqaro va mahalliy tajribalarni o'rganish va ular asosida taklif va tavsiyalarni shakllantirish. Maxsus iqtisodiy zonalarning tashkiliy va funktsional tuzilishi juda xilma-xildir. Iqtisodiy zonalarning o'ttizdan ortiq toifalari mavjud bo'lib, ularning har biri bir necha turdagi maxsus iqtisodiy zonalarning xususiyatlariga ega bo'lib, ularni qat'iy tasniflash imkoniyatini qiyinlashtiradi. Shu munosabat bilan, mahalliy va xorijiy ilmiy muhitda maxsus iqtisodiy zonalarni funktsional asosda, iqtisodiyotga integratsiya darajasi, tarmoq yo'nalishi, mulkning tabiati (davlat, xususiy yoki aralash) va boshqalar bo'yicha guruhlash odat tusiga kiradi. Birinchi maxsus iqtisodiy zonalar faoliyatida O'zbekistonning jahon iqtisodiy tizimiga integratsiyalashuviga e'tibor qaratildi, shu bilan birga iqtisodiy zonalar faoliyatining o'ziga xos xususiyatlari va ularning ma'muriy-huquqiy maqomi aniq belgilanmagan. Maxsus iqtisodiy zonalarni rivojlantirish loyihalarida hududlarni rivojlantirishning strategik vazifalari, shu jumladan hududiy tartibga solish aks ettirilmagan. Mahalliy va xorijiy ilmiy adabiyotlarda sanoat-ishlab chiqarish tipidagi maxsus iqtisodiy zonalar sanoat ishlab chiqarishining ayrim tarmoqlarida faoliyat yuritishi va tovarlarning o'ziga xos turlarini ishlab chiqarish bilan tavsiflanishi qayd etilgan. Tadqiqot natijasi: Dunyoning mazkur siyosati bugungi kunda O'zbekistonda qo'llash bo'yicha tavsiyalar va takliflar ishlab chiqildi. Asosiy xulosa: maqolada jahonda tashkil etilgan yirik erkin iqtisodiy hududlarning har biri aniq maqsad va ixtisoslikka ega bo'lganligi, ular ushbu ixtisoslikda rivojlanishlari uchun xorijiy investitsiyalarni faol jalb etishganligi, ularga kiritilgan xorijiy investitsiyalarning to'g'ri yo'naltirilganligi, O'zbekistonning erkin iqtisodiy zonalari rivojiga hamda arxitekturaviy muhitni to'g'ri loyihalashga muhim dasturi amal bo'ladi.*

Kalit so'zlar. *Maxsus iqtisodiy zona, bojxona hududi, blokirovka qilingan binolar, yopilgan struktura, ichki makon, ko'ndalang yo'llar, yorug'lik moslamalari.*

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METHODOLOGY OF FUNCTIONAL ORGANIZATION OF FREE ECONOMIC ZONES OF INDUSTRIAL PRODUCTION TYPE IN URBAN CONDITIONS

Annotation. *The purpose of the article is the stages of formation of Free Economic Zones in the world, the processes of formation. The research methodology is the study of international and local experiences related to the topic and the formation of proposals and recommendations based on them. The organizational and functional structure of Special Economic Zones is very diverse. There are more than thirty categories of economic zones, each of which has the characteristics of several types of special economic zones, making it difficult to categorize them strictly. In this regard, in the domestic and foreign scientific environment, it is customary to Group Special Economic Zones on a functional basis, the level of integration into the economy, the direction of the network, the nature of the property (public, private or mixed), etc. In the activities of the first Special Economic Zones, attention was paid to the integration of Uzbekistan into the world economic system, while the specifics of the activities of economic zones and their administrative and legal status were not clearly defined. Projects for the development of Special Economic Zones do not reflect the strategic tasks of the development of territories, including territorial regulation. In domestic and foreign scientific literature, it is noted that Special Economic Zones of the industrial-production type operate in certain branches of industrial production and are characterized by the production of specific types of goods. The result of the study: recommendations and proposals have been developed for the application of this policy of the world in Uzbekistan today. Main conclusion: the article says that each of the major free economic regions established in the world has a specific purpose and specialization, they actively attract foreign investments for their development in this specialty, the correct orientation of foreign investments made in them, an important program will apply to the development of Free Economic Zones of Uzbekistan and the correct design of the architectural environment.*

Keywords. *Special Economic Zone, customs territory, blocked buildings, closed structure, interior space, transverse roads, lighting fixtures.*

Kirish. Transport va kommunikatsiyalarning joylashishini hisobga olgan holda shaharsozlik tarkibidagi maxsus iqtisodiy zonaning biznes markazining yashash joyini aniqlash. Ishbilarmonlik markazini qurish uchun joy tayyorlash jarayoni mavjud obodonlashtirish tizimlarini, madaniy va tarixiy ob'ektlarni,

maxsus iqtisodiy zonaga boradigan yo'lda transport yo'llarining asosiy chorrahalarini o'rganishni o'z ichiga oladi. Maxsus iqtisodiy zonaning alohida qismi sifatida mavjud tabiiy va infratuzilma muhitiga integratsiya qilish uchun qulay mehnat sharoitlarini shakllantiradigan avtomobil va temir yo'l o'tish punktlarining joylashuvi, shamol ko'tarildi, qo'shni turar-joy binolari va tabiiy tabiiy tuzilmalar parametrlari ko'rsatilgan. Agar kerak bo'lsa, shovqin va atrof-muhitga salbiy ta'sirlardan tegishli himoya choralari ta'minlanadi, axloqiy himoya zonalari yaratiladi. Transport vositalarini iqtisodiy zona hududiga o'tkazish punktlari va asosiy chegaralari bo'ylab 2-3 km qadam bilan joylashtirilishi kerak. Maxsus iqtisodiy zona hududiga yuklarni yetkazib berish uchun temir yo'l transportidan foydalanish xarajatlarni kamaytiradi.

Asosiy qism. Rezident korxonalarni joylashtirish uchun savdo maydonchalarini loyihalash. EIZning boshlang'ich rivojlanish nuqtasini tanlashda kelajakdagi biznes markazi o'rnida eng estetik va iqtisodiy jihatdan eng maqbul metall konstruktsiyalardan foydalangan holda "boshlang'ich" tuzilmani qurish taklif etiladi. Ushbu inshootni yaratish kelajakda iqtisodiy zonaning noishlab chiqarish infratuzilmasining asosiy ob'ektlarini qurish joyida muvofiqlashtirilgan ishlarni olib borishga yordam beradi. Ota-ona moduli joylashtirilgandan so'ng, er uchastkalarini ijaraga oluvchi potentsial investorlarning tavsiyalarini hisobga olgan holda maxsus iqtisodiy zonaning sanoat maydonchalarini loyihalash bo'yicha chora-tadbirlar amalga oshiriladi. Ularning konfiguratsiyasi va o'lchamlari keyinchalik ba'zi fraktal korxonalarni boshqalari bilan moslashuvchan almashtirishni amalga oshirish uchun EIZ hududidan oqilona foydalanishni ta'minlashi kerak.

Kompleks hududni uzluksiz fazoviy rivojlantirish uchun maxsus iqtisodiy zonani rivojlantirishning modulli tizimini loyihalash kerak. Erkin iqtisodiy zonalarni shakllantirishning boshlang'ich nuqtasi sifatida rivojlanishi bilan bir vaqtda sanoat rivojlanishi uch vaqt oralig'ida rivojlanadi: shakllanish, o'sish va yetuklik. Birlashtirilgan hajmli rejalashtirish hujayralaridan foydalanish biznes markazini qurishda yordam beradi, bu sizga alohida inshootlarning o'lchamlarini erkin o'zgartirishga imkon beradi, shu bilan birga maxsus iqtisodiy zonani rivojlantirishning umumiy kontseptsiyasi buzilmaydi. Ushbu shart juda muhimdir, chunki vaqt o'tishi bilan mavjud ishlab chiqarishlarni texnologik jihatdan yaxshiroq ishlab chiqarishlar bilan almashtirish kerak.

Ishbilarmonlik markazining tarkibiy bo'linmalari iqtisodiy zonaning shakllanish bosqichida yuk va yengil transport vositalarining EIZ hududiga kirish va chiqishda asosiy boshlang'ich nuqtalar bo'lib xizmat qiladi.[1]

EIZ tuzilmalarining keyingi o'sishi modellashtirishning bioanalogik printsipiga muvofiq volumetrik rejalashtirish hujayralari asosida o'xshashlikning fraktal xususiyatidan foydalangan holda amalga oshirilishi taklif etiladi [2]. Buning uchun maxsus iqtisodiy zonani rivojlantirish uchun hududni to'liq o'zlashtirish kerak. Sanoat inshootlarining amaldagi yagona o'lchamlari va oraliqlarini belgilaydigan 6 m dan oshadigan qadamlar bilan bir xil o'lchamdagi kvartallarga joy ajratadigan yo'llar tarmog'ini yotqizish kerak. Ushbu qadamni hisobga olgan holda, binolarning asosiy aloqa markazlari orasidagi masofani — 72 m, iqtisodiy

zonaning asosiy yo'llari orasidagi masofani — 660-720 m oralig'ida qabul qilishni tavsiya etamiz [3]. Iloji bo'lsa, maxsus iqtisodiy zonaning ichki transport tarmog'ining yo'llari shahar magistrallarining davomi bo'lishi yoki ularga parallel yo'nalishda ketishi kerak. Muhandislik aloqalariga to'siqsiz kirishni ta'minlash uchun ularning bir qismi erdan 4-6 m balandlikda maxsus estakadalarda yotqizilishi mumkin, bu maxsus iqtisodiy zonaning texnologik doirasini tashkil qiladi.

EIZlarni rivojlantirishning tavsiya etilgan bioanalogik va kompyuter modellarini va birlashtirilgan o'lchamlarga ega bo'lgan uch turdagi modulli hujayralarni hisobga olgan holda biznes markazining tarkibiy bo'linmalarining o'sishi uchun maqbul funktsional va texnologik sxemani yaratish. Bu EIZning asosiy funktsional bloklari — ma'muriy, bojxona, logistika va servis binolarining tarkibi va maydonlari bo'yicha tavsiyalar yordamida amalga oshiriladi.

EIZ tarkibida asosiy kompozitsion dominantlar aniqlanadi, me'moriy ansamblning stilistik yechimi ishlab chiqiladi. Landshaft-rekreatsion hududlarga va maxsus iqtisodiy zonaning asosiy maydoniga alohida e'tibor qaratilmoqda. Amalda, ushbu maqsadlar uchun biznes markazining qisqartirilgan modelidan foydalanish mumkin. Fraktak korxonasining makon-vaqt va quvvat xususiyatlarini hisobga olgan holda sanoat-ishlab chiqarish tipidagi maxsus iqtisodiy zonaning kompleks hajmli rejalashtirish echimini sintez qilish.

Shuni ta'kidlash kerakki, erkin iqtisodiy zonalarni loyihalashning bir qator umumiy tamoyillari:

1. EIZlarning konstruktiv va texnologik echimi kompleksning ichki xonalarini o'zgartirish va ko'p qirrali foydalanish imkoniyatini ta'minlashi kerak.
2. EIZlar tarkibida volumetrik-fazoviy dominantlarni yaratish ularning qo'shni avtomagistrallardan va iqtisodiy zonaning alohida korxonalari hududlaridan qabul qilinishini hisobga olgan holda amalga oshirilishi kerak.
3. EIZ binolari va inshootlarining me'moriy, badiiy va uslubiy echimi qurilish texnologiyalari sohasidagi zamonaviy tendentsiyalarga javob berishi kerak. Arxitektura loyihasining ushbu qismini ishlab chiqish atrofdagi sanoat rivojlanishining ko'rinishiga muvofiq amalga oshirilishi kerak.
4. Landshaft dizayni elementlari bo'lgan ochiq joylar EIZning arxitektura rejalashtirish tarkibiga uyg'un ravishda kiritilishi kerak.
5. EIZning bir qismi sifatida vaqtinchalik inshootlar va oldindan qurilgan inshootlardan yasalgan pavilonlar joylashtirilishi mumkin bo'lgan zaxira hududlarni ta'minlash kerak.

EIZ me'moriy va rejalashtirish qarori iqtisodiy zonaning funktsional va tarmoq ixtisoslashuvi bilan bog'liq. Bu mintaqaning tarixiy rivojlanish xususiyatlari va unda tegishli sanoat tarmoqlarining mavjudligi asosida belgilanadi. Iqtisodiy zonadagi korxonalar sanoat ishlab chiqarishining alohida tarmoqlari bo'yicha guruhlanadi.

Iqtisodiy zona hududi sanoat ishlab chiqarish tarmoqlari bo'yicha bir nechta zonalarga bo'lingandan so'ng, ularning chegarasida maxsus iqtisodiy zonaning asosiy taqsimlash uzellaridan — Markaziy maydondan boshlab tashrif buyuruvchilar va yuklarning asosiy yo'nalishlari loyihalashtiriladi. Ushbu iqtisodiy

zonaning makonini vizual ravishda boyitadigan me'moriy dominantlarni joylashtiradi.

Zonaning ishchi xodimlari va yuklarning harakati maxsus iqtisodiy zonaning asosiy maydonidan boshlab amalga oshiriladi va asosiy va ikkinchi darajali yo'llar bo'ylab tegishli inshootlarga (ma'muriy muassasalar, omborxonalar, o'tish punktlari va boshqalar) olib boradi. Shu bilan birga, turli xil funktsional maqsadlar uchun (yuk, xizmat, xususiy) avtomobil transporti yo'nalishlari bo'linadi. Bunday yo'l harakati tashkiloti bojxona nazorati sohasidagi qonun hujjatlarini buzishdan qochadi [4]. Iqtisodiy zonaning Markaziy maydonidagi biznes markazining ishchilari va xodimlarining transport vositalari uchun Markaziy vestibyullar va zallarni chetlab o'tib, binolarga xizmat ko'rsatish kirish joylari yonida maxsus to'xtash joylari mavjud. EIZ bilan aloqa qilish uchun havo aviakompaniyalaridan ham foydalanish mumkin.

Sanoat-ishlab chiqarish tipidagi maxsus iqtisodiy zonaning transport-piyodalar harakatini tashkil etishning asosiy vazifalariga quyidagilar kiradi:

1. Shahar hududi bilan chegarada nazorat-o'tkazish punktlari va bojxona terminallari tizimini yaratish.

2. Iqtisodiy zona hududiga kirish va chiqish paytida biznes markazining o'tish joylarida yetarli miqdordagi mashina joylarini ta'minlash.

3. Maxsus iqtisodiy zona hududidagi alohida funktsional zonalar va uchastkalar bilan bog'laydigan jamoat transporti liniyasi, ular bo'ylab 300-500 m to'xtash pavilonlari o'rnatiladi, piyodalar va velosiped yo'llari yotqiziladi.

4. Shahar markaziga tashrif buyuruvchilarning kam harakatlanadigan toifasini ko'chirish uchun qurilmalar (binolarga kirishda rampalar, liftlar va boshqalar).

5. Asosiy kirish yo'llari va o't o'chirish yo'llari bo'lgan binolar.

Xavfsizlik maqsadida transport va piyodalar oqimlari tartibga solinadigan va tartibga solinmagan o'tish joylarini tashkil etish bilan bir xil darajada minimal kesishish nuqtalariga ega bo'lishi kerak.

Maxsus iqtisodiy zonaning biznes markazi hududida harakatlanish uchun asosan avtomobil transporti ishlatiladi, uni tashkil etish tizimida aniq munosabatlarni ta'minlash kerak. Bojxona nazoratidan o'tmagan mashinalar uchun hibsga olingan transport vositalarining alohida to'xtash joyi mavjud. Kerakli tekshiruvlardan so'ng yuk mashinalari korxonalar maydonchalariga boradi.

Maxsus iqtisodiy zona hududida joylashgan yuk tarkiblari, shuningdek, og'irlik (kirish-chiqish) bilan nazorat punktlari orqali o'tadi, so'ngra bojxona terminaliga boradi, u erda yuklarni rentgen-nazorat qilish va vaqtincha ushlab turilgan konteynerlarni saqlash amalga oshiriladi. Ichki kran yordamida yuklar omborxonaga tushiriladi, shundan so'ng ular maxsus iqtisodiy zona hududida qabul qiluvchiga etkazib beriladi.

Shunday qilib, maxsus iqtisodiy zona doirasida yuk-yo'lovchi oqimlarining harakatlanish yo'nalishlari qat'iy tartibga solinadi va bojxona qonunchiligi normalari bilan cheklanadi [5]. Iqtisodiy zona hududida harakatlanish yo'nalishini tanlash biznes markazining ochiq "nazorat ostidagi" zonasida belgilanadi. Ushbu

hudud bo'ylab odamlar va transport vositalarining harakatlanishini tashkil etish funktsional mantiqqa bo'ysunadi. Fazoviy yo'nalishni marshrutning asosiy nuqtalarida joylashgan ma'lumot stendlari va indeks belgilari osonlashtirishi kerak.

Qabul qilingan jamoat binolari tipologiyasiga muvofiq, erkin iqtisodiy zonalarni funksional va texnologik rayonlashtirish bir necha turdagi bo'lishi mumkin:

-monoblok (barcha funktsiyalar turli darajalarda bir xil hajmda birlashtirilgan);

-blok-pavilyon (funktsional aloqalar yopiq o'tish joylari bilan bir nechta hajmlar o'rtasida gorizontal yo'nalishda o'rnatiladi);

-monoblok-pavilyon (funktsional aloqalar biznes markazining yagona me'moriy va fazoviy ansambli hajmlarining Markaziy guruhi ichida taqsimlanadi); Markaziy yopiq (funktsional aloqalar vertikal ravishda o'rnatiladi);

-yopiq hovli yoki atrium atrofida).

EIZni funktsional va texnologik rayonlashtirish sxemasini tanlash sanoat korxonalariga ishlab chiqarish va xizmat ko'rsatish vazifalarining xususiyatiga qarab amalga oshirilishi taklif etiladi: *logistika operatsiyalari, bojxona nazorati, hududni muhofaza qilish, maishiy xizmatlarni tashkil etish va boshqalar. Biznes markazining funktsional guruhlari o'rtasida transport va piyodalar oqimlarini taqsimlash EIZning asosiy maydoni va Markaziy kirish vvestibul orqali amalga oshiriladi.*

Maxsus iqtisodiy zonaning xodimlar va mehmonlarni o'z hududiga etkazib berish va yuklarning to'sqinliksiz harakatlanishini ta'minlash uchun federal avtomobil yo'llari va temir yo'l magistrallari bilan yaxshi rivojlangan aloqaga ega bo'lishi kerak, chunki iqtisodiy zona va shahar markazidagi barcha ob'ektlarning to'liq ishlashi bilan mavjud umumiy foydalanishdagi yo'llarga yuk sezilarli darajada oshadi. Shahar hududidan tashqarida maxsus iqtisodiy zonani qurishda mavjud yo'llar tarmog'ini kengaytirish, shuningdek, shovqin chiqaradigan to'siqlar, estakadalar, er usti o'tish joylari va boshqalarni qurish orqali yo'l bo'yidagi infratuzilma sifatini oshirish kerak.

Turli funktsional zonalarning kombinatsiyasi va o'zaro joylashishi uning uch o'lchovli tuzilishini belgilaydi.

Funktsional zonalarni joylashtirishning asosiy usullarini ajratib ko'rsatamiz:

- binoning bir darajasida;

-bir xil darajada, ikki yoki undan ortiq hajm ichida-binolar; bitta binoda bir necha darajalarda (qavatlarda);

-bir nechta hajmlarda-balandligi bir-biriga nisbatan siljigan binolar.

EIZning funktsional zonalarini pastki darajada joylashtirishda binolarning kirish guruhini va umumiy ovqatlanish va savdo korxonalari bilan dam olish zonasini, shuningdek xavfsizlik direktsiyasini va diniy va diniy makonni joylashtirish tavsiya etiladi. Belgilangan xonalar bilan bir xil darajada yoki undan pastroqda sog'liqni saqlash bo'limi, yordamchi va xizmat ko'rsatish xonalari joylashtirilishi kerak. EIZning markaziy qismida "bitta oyna" xizmati, axborot va

texnologik ta'minot markazi, ofislarni o'z ichiga olgan biznes zonasi joylashtirilishi kerak. Ma'muriy-hududiy maqsadlar guruhini biznes markazining yuqori darajasiga olib chiqish tavsiya etiladi.

Maxsus iqtisodiy zonaning me'moriy va stilistik echimini ishlab chiqishning asosiy vazifalaridan biri bu yuk va yo'lovchi transporti yo'nalishlarida kompleks tarkibini bir butunga birlashtirgan vizual dominantlarni yaratishdir. Arxitektura dominantlari sifatida zavod boshqarmalari binolari va EIZ hududidagi sanoat korxonalarining korporativ ramzlar ranglariga bo'yalgan ma'muriy-maishiy korpuslaridan foydalanish mumkin. Biznes markazi binolari va inshootlarining rang ohangining to'yinganligi bir ob'ektdan ikkinchisiga o'tishda o'zgarishi kerak va yulka plitalarining naqshlari to'g'ridan-to'g'ri kompleksning asosiy ob'ektlariga harakatning asosiy yo'nalishlarini ko'rsatishi kerak va shu bilan ularning ahamiyatini ta'kidlaydi.

Maxsus iqtisodiy zonaning landshaft-rekreatsiya hududlari obodonlashtirilgan Park zonalari shaklida loyihalashtirilgan. Ularning rejalashtirish tuzilmasiga yo'llar bilan o'rmon uchastkalari organik ravishda kiritilishi mumkinterrenkurlar, daryolar va jarliklar yon bag'irlari. Ulardan foydalanish bo'yicha tashkiliy tadbirlarni yil davomida o'tkazish tavsiya etiladi. Masalan, daryolar bo'ylab chang'i uchish uchun marshrutlar o'rnatilishi mumkin va kichik ko'l konkida uchish maydonchasiga aylantiriladi.

EIZ hududida dam olish uchun ishlatiladigan tabiiy tabiiy shakllanishlar bo'lmagan taqdirda, EIZ majmuasi tarkibiga sport va sog'lomlashtirish profilining ixtisoslashtirilgan inshootlarini kiritish tavsiya etiladi. Ular basseyn, dam olish maskanlari bilan jihozlangan dam olish maskani, qishki bog ' va gulli issiqxonalarni o'z ichiga olishi kerak.

Sanoat va ishlab chiqarish tipidagi erkin iqtisodiy zonalarning muhandislik infratuzilmasini shakllantirish jarayonida rivojlanayotgan biznes markazlarini qurish metodologiyasini qo'llash ushbu ob'ektlarni qurish xususiyatlari va ularning keyingi ishlashi bilan bog'liq bir qator masalalarni amalda hal qiladi. Shunday qilib, kelajakdagi loyihani yaratish bosqichida uni rivojlantirish algoritmi yotadi, undan arxitektura va qurilish amaliyotida foydalanish vaqt talablariga muvofiq maxsus iqtisodiy zonaning biznes markazining hajmli rejalashtirish echimining parametrlarini o'zgartirishga imkon beradi.

EIZ loyihasini ishlab chiqish vertikal va gorizontal yo'nalishda standart hajmli rejalashtirish hujayralaridan foydalangan holda blok-modulli printsip asosida amalga oshiriladi. Ushbu qaror sizga loyihani moliyalashtirish va uning funktsional tarkibining xususiyatlari bo'yicha mavjud vaziyatni to'liq hisobga olishga, umumiy tarkibga zarar bermasdan dizayn echimlarini o'zgartirishga imkon beradi.

Funktsional va rejalashtirish nuqtai nazaridan, erkin iqdisodiy zona inshootlari majmuasi ikkinchi qavat bo'ylab yopiq o'tish yo'li bilan bog'langan uchta asosiy blokdan iborat. Biznes markazining dastlabki ikkita bloki innovatsion sanoat mehmonxonasidir. Ularni eng yangi muhandislik va telekommunikatsiya infratuzilmasi bilan jihozlash taklif etiladi

mikroprotsesslar, laboratoriyalar uchun "toza xonalar", shuningdek innovatsion uskunalar bilan eksperimental komplekslar kiritilishi kerak.

EIZning asosiy funktsional bloki ko'p qavatli ofis qismi va asos — Kongress mehmonxonasidan iborat bo'lib, unga tashrif buyuruvchilar asosiy zal binosi orqali kirishadi. Ushbu funktsional blok muzokaralar, ishlab chiqarish ko'rgazmalari, konferentsiyalar, ilmiy seminarlar, korporativ tadbirlar va boshqalarni tashkil qilish uchun mo'ljallangan.yuqori qismida rezidentlarga ijaraga beriladigan xonalar mavjud.

Taklif etilayotgan metodologiyani qo'llash natijasida quyidagicha xulosalarga kelindi:

Ushbu tadqiqot arxitektura uchun muhim bo'lgan muammoni hal qildi. Sanoat ishlab chiqarish turidagi erkin iqtisodiy zonalarning quvvatini o'zgartirganda ularning o'sishi va rivojlanishini hisobga olgan holda zona markazlarini shakllantirish tamoyillari aniqlandi.

1. Erkin iqtisodiy zonalarning "rivojlanayotgan arxitekturasi" tamoyillari shakllantirilgan bo'lib, ular dizaynning dastlabki bosqichida sanoat markazining bino va inshootlari majmuasini yanada rivojlantirish va rivojlantirish imkoniyatlarini hisobga olish zaruriyatidan iborat. Sanoat inshootlarini loyihalashda modulli muvofiqlashtirish va birlashtirish asosida shaharsozlik cheklovlari doirasida erkin iqtisodiy zonalarning sanoat maydonchasi hududini rivojlantirishda ushbu tamoyillarni amalga oshirish mumkin.

2. Sanoat korxonalarining fraktalligini o'rganish asosida rivojlanayotgan tizimning asosiy prinsipi EIZ uchun zarur bo'lgan barcha funktsional jarayonlarni (ma'muriyat, logistika, bojxona operatsiyalari, xizmat ko'rsatish) ta'minlaydigan dastlabki axborot blokini ("ona moduli") shakllantirish deb hisoblash mumkinligi aniqlandi.

3. Sanoat ishlab chiqarish turidagi erkin iqtisodiy zonalarni loyihalash, qurish va ulardan foydalanish bo'yicha mahalliy va xorijiy tajriba tahlil qilindi. Mahalliy va xorijiy mutaxassislarning tadqiqotlari asosida sanoat va ishlab chiqarish turidagi erkin iqtisodiy zonalar fraktal korxonalarga mos kelishi aniqlandi. Arxitektura va rejalashtirish echimining tabiati bo'yicha biznes markazlari ishlab chiqarishning texnologik moslashuvchanligi va dinamik shakllanish talablariga javob berishi kerakligi aniqlandi, shuning uchun ularni o'rganish me'moriy bionika usullari yordamida amalga oshirilishi mumkin.

4. Sanoat-ishlab chiqarish tipidagi maxsus iqtisodiy zonaning biznes markazini sanoat maydonchasining maxsus ajratilgan hududida qurilgan yirik me'moriy majmua sifatida belgilash joriy etildi. Ushbu hududiy ishlab chiqarish komplekslarini shakllantirishning asosiy xususiyati butun hayot sikli davomida uzluksiz rivojlanishdan iborat. Ularning tasnifi ishlab chiqilgan: ish joylari soniga, EIZda o'tkaziladigan funktsional jarayonning xususiyatiga, sanoat korxonasi tarkibiga joylashtirish usuliga ko'ra. Sanoat va ishlab chiqarish tipidagi erkin iqtisodiy zonalarning zamonaviy biznes markazlari tarkibiga to'rtta asosiy funktsional va texnologik zonalar: ma'muriy-biznes, bojxona, logistika va xizmat ko'rsatish kiradi.

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ECOLOGICAL CONCEPTS RELATED TO ZOROASTRIANISM

Abstract: *In the article is analyzed first ideas in "Avesta", connected with protection of the environment and formation of relations between person and nature.*

Keywords: *Avesta, ecological-religious notion, first religious viewpoints.*

Spiritual growth is one of the highest peaks in the society of harmony, nature and human life, and while realizing it there is a balance. Night after coming down, the rivers flow, issue with the cold, bitter sweet and discern between good and evil plays an important role in the development of the human. This is a history of our ancestors who lived in ancient times, their religion, arts, and medicine, everything was spirituality full confirmed. It is not chance that teachings of Zoroastrianism people to the water promote soil fertility and purityin our Father country. It was in Central Asia in the early period, the natural forces divining totemic, animism, fetishism such beliefs were less than perfection, monotheism doctrine. In Zoroastrianism affect bloodshed in vain offerings spots, those who live sedentary, physical labor, fertile are encouraged to engage in animal husbandry.

During the development of the consistent traditions of Zoroastrianism, the ancient began seven "living saints" and their mythological nature of seven things were symbolized - air, soil, water, plants, cows, and seven ceremonies and celebrations in honor of the fire ceremony were existed. Two of these celebrations happiness, kindness, heavenly order and a true representative of the exalted name of Asha, a centuries old customs of certain mutated forms of our beginning of the year associated with Navruz preserved in the system of traditional ceremonies.

The duration of human life, of course are closely related to the sun, water, land and air. Realize that common ranges of regulatory areas of these four elements of nature for submitting the request were appeared according to the worship life of the furnace cycle. In these regions two economic areas, namely agriculture and livestock from natural elements were divined. Our ancestors could not imagine their lives without them. In all areas of Uzbekistan there was great need for them. For this reason, the ancestors of the Uzbek people for the first time in all areas of both agricultural embassies affect the role played important role in the spiritual world. Therefore, affect the environment concerns all aspects of the study of ecological culture, history, history lessons, life is must be comfortable whenever for all people. Especially, people's home household cleanliness, environment, clean, conservation opinions, ideas are still actual in practice.

Ancestors known that a fire was burning fiery furnace pepper, bread, food scraps to remove ashes from the hearth rubbish, waste furnace burning in abundance

in the valley settled population lived in rural areas for the gray wire gathered in a corner of the courtyard or gray as the edification in the fall or in the spring of mineral crops. Together with the ashes of the fire garbage out, this house was going to join one of the wedding and mourning ceremonies, - they thought. During the three days of mourning ritual for the fire infected apartment fire cooking source. It is now common in all regions of the country. Neighbors that provide hot meals for three days of mourning neighbors [1].

Zoroaster's religion on the ecological system of the concept is not only stopped in environment and a bribe as well as the purity of his own sorrow. Thus, in the "Avesta" recommended that regular exercises every day to deal with a few hundred hand-washing, hands-suckle up and keep the other parts of the body, hair, and nails counsel. 17-of this part of "Vendidod" were collected and shun the devil and cut off the nail and hair was given instructions about what to do for people in "Avesta".

Water sources - rivers, lakes, wells or maintained in spite of all kinds of pollution. If you need to wash something impure ceremony, the water collected in a special place, but even then bad things directly into the water. The bad thing is erased before the cows are washed and dried in the sun or in the sand and then washed with water in order to purify the final. In addition, burning of the rain outside the home is prohibited, because such a move is due to the water and the earth "disliked" they thought they could handle it. Waste water and blacken the sin. "Avesta" invited to clarity "pure water, and the fire burning in front of the world social punishment in hell Who soil grief and suffering was so bad condition" [2] the wakeup call.

Seriously studied by scientists around the world of our ancestors, "Avesta" the pastures, not to destroy the bushes, crops, gardens rag, fruit trees, harm, environmental protection purity, springs, wells, pools, ditches groove enough attention should be paid to signs comments could be found at this complex time. For example, looking at a pond or a stream on the property, or any person who has tied his horse to the ground, broke a trunk of a neuron founded 25 lash and punished with beatings. If the environment, road, bushes, meadows land, in violation of the provisions of the protection of the water dirty and it has been sentenced 400 lashes pulse [3].

Still preserved traditions of our holy doctrines: "Water pollution", "Do not spit", "Animal scold," "night sleep with pressure, playing with fire" and "desolate cabin fever clean" as gentle and wisdom are remained us from the ancient legacy of "Avesta".

Thus, air, earth, water, fire, clean, environmental cleanliness and wildlife preservation ideas are still important for people. Thus, the "Avesta" forward views on all aspects related to the environment, the positive aspects of life development of the ecological, mind and culture.

Preserved in environmental cleanliness and diseases "Avesta" can be divided into the following groups:

1. Hide garbage, dirty soil, stone, sand disposal. Killed in the same way microbes or less.

2. Flame, heat and cold loss. "Avesta" fire away and the sprinkling of rare tool. Even may be cleaned clothes from microbes and disposal with it.

3. Chemicals: slave, vinegar, wine, a variety of herbs (There – in cense, onions, God, sandals) by way of incense. Herbs are also eliminates germs thrive. "Vendidod"s Chapter 6 looks for wind, animals, and birds fly through a variety of ways to let you highlight the spread of diseases prevention.

It was perceived as an enemy of the opposite of life and death that death was due to complications of the evil days for his reactions were different. Close to dead people who died of possible dead washers tried to go to a special place day alone the body. Body separate towers, ancient, long time ago, the count of hills, desert, rocky places, worms and amphibians, birds, wild animals could ate them as food. Which is abnormal for this time of such actions do not target the bodies dirty there, the water might contaminate the weeds. At that time, the body meat, bones buried together spool plate.

According to Zoroastrian cosmogony, the earth is in the form of a flange, moisture, water is the basis of everything, the earth is surrounded by the ocean, it is like a board in water. According to this belief, Zoroastrians revered water even more than fire. According to them, the first of the six substances (six gods) surrounding the earth is water (Apam-Napat), which contains the power of life, and the power of life in the water should be enriched with the juices of death [4].

In the system of ecological concepts related to Zoroastrianism, not only the environment, but also the purity of the person was concerned. For example, in "Avesta" it is advised to engage in regular physical education, to wash the face and hands several times a day, not to touch other parts of the body without washing hands, to keep the hair clean and clean the nails. The 17th chapter of "Vendidot" gives instructions on what to do with the nails and hair in which the devil’s excrement is collected and is cut [5].

Traces of Zoroastrian views about the magical properties of hair and nails have survived in the life of our people even in the present days. According to the researchers, nails should be thrown on the edge of the ground when they are taken. [6]. If it is not thrown to a distant place, it will pierce under the feet of that person in the doomsday. Therefore, when people cut their nails away, they wrap them in paper like a shroud and say: “I give it to you, the black earth.” They bury it in a distant place, saying, “The wind, you are a witness[7]” At the heart of this custom, a positive relationship between man and nature began to be formed on th basis of the preservation of hair and nails, which are considered remains of the human body.

Among Zoroastrians, keeping the surroundings clean and not interfering with the process of nature was a part of Zoroastrian virtue[11]. Members of the team, particularly, young people, were brought up in the spirit of preserving and beautifying nature. From a young age, they were taught to plant trees, take care of them, create greenery, build gardens, and not to pollute streams and ponds.

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THE ROLE OF CLOUD COMPUTING IN MODERN HEALTHCARE SYSTEMS

Abstract: *In recent years, cloud computing has emerged as a revolutionary technology in the field of healthcare, enabling the efficient storage, management, and sharing of medical information across institutions and geographical boundaries. This paper examines the critical role of cloud computing in transforming modern healthcare systems by improving accessibility, scalability, and cost-effectiveness. Cloud-based platforms allow healthcare professionals to access electronic health records (EHRs) in real time, support telemedicine services, and facilitate advanced data analytics for clinical decision-making. Moreover, the integration of cloud infrastructure with artificial intelligence (AI) and the Internet of Things (IoT) has paved the way for smart healthcare environments that enhance patient monitoring, diagnosis, and treatment personalization.*

Despite its significant advantages, the adoption of cloud computing in healthcare presents several challenges, including data privacy, cybersecurity risks, and regulatory compliance. This study explores both the opportunities and obstacles associated with implementing cloud-based healthcare systems. The findings emphasize that, when properly managed and secured, cloud technologies can dramatically enhance operational efficiency, foster innovation, and contribute to building more resilient, patient-centered healthcare ecosystems.

Keywords: *Cloud computing; healthcare systems; electronic health records (EHR); telemedicine; artificial intelligence; Internet of Things (IoT); health informatics; data security; digital transformation; patient-centered care.*

Introduction

The rapid advancement of information technologies has profoundly influenced the healthcare sector, prompting the adoption of innovative solutions to improve patient care, optimize operational processes, and enhance data management. Among these technologies, cloud computing has emerged as a transformative force, providing scalable, flexible, and cost-effective platforms for managing vast volumes of medical data. Unlike traditional on-premises systems, cloud-based infrastructures allow healthcare institutions to store, access, and share patient information securely across multiple locations, fostering collaboration among medical professionals and researchers.

One of the primary benefits of cloud computing in healthcare is its ability to enhance accessibility and interoperability. Electronic Health Records (EHRs),

laboratory results, diagnostic images, and other patient-related information can be accessed in real time by authorized personnel, enabling faster clinical decisions and more coordinated care. In addition, cloud platforms support telemedicine services, allowing healthcare providers to deliver consultations and remote monitoring to patients in underserved or geographically isolated areas. This capability has proven especially valuable during global health crises, such as the COVID-19 pandemic, which accelerated the need for remote healthcare solutions.

Moreover, cloud computing facilitates the integration of emerging technologies such as artificial intelligence (AI), machine learning, and the Internet of Things (IoT). These integrations enable advanced analytics, predictive modeling, and continuous patient monitoring, which in turn improve diagnostic accuracy, personalize treatment plans, and optimize resource allocation.

Despite its significant advantages, the adoption of cloud computing in healthcare is not without challenges. Concerns regarding data privacy, cybersecurity, regulatory compliance, and the initial cost of implementation remain significant barriers for many institutions. Ensuring that sensitive patient information is protected while maintaining seamless accessibility requires robust security measures, standardized protocols, and comprehensive staff training.

This paper aims to explore the pivotal role of cloud computing in modern healthcare systems by examining its benefits, challenges, and potential applications. The study emphasizes how cloud technologies contribute to operational efficiency, patient-centered care, and the development of resilient healthcare infrastructures capable of meeting the demands of an increasingly digital and interconnected world.

Discussion

Cloud computing has fundamentally reshaped the operational and clinical landscape of modern healthcare systems, offering numerous advantages in terms of efficiency, scalability, and innovation. One of the primary benefits is enhanced data accessibility and interoperability. Cloud-based platforms allow healthcare professionals to access electronic health records (EHRs), imaging data, and laboratory results in real time, regardless of their geographic location. This seamless flow of information facilitates better coordination among multidisciplinary teams, reduces medical errors, and accelerates clinical decision-making processes.

Telemedicine, supported by cloud infrastructures, represents another significant advancement. Remote consultations, virtual check-ups, and continuous patient monitoring have become more feasible and reliable due to cloud-enabled platforms. These services not only increase access to healthcare for patients in rural or underserved areas but also reduce the burden on physical healthcare facilities, improving resource utilization and overall system efficiency. The COVID-19 pandemic demonstrated the crucial role of cloud-supported telemedicine in maintaining continuity of care while minimizing infection risks.

Integration of emerging technologies such as artificial intelligence (AI) and the Internet of Things (IoT) with cloud computing further enhances healthcare delivery. AI algorithms can process large datasets stored in the cloud to identify patterns, predict patient outcomes, and assist in early diagnosis, especially in

complex areas such as oncology, cardiology, and radiology. Similarly, IoT-enabled medical devices continuously collect real-time health data, which is stored and analyzed in the cloud to provide actionable insights for clinicians. This convergence of technologies enables personalized medicine, allowing tailored treatment plans and improved patient outcomes.

Despite its transformative potential, cloud computing in healthcare faces several challenges and limitations. Data privacy and cybersecurity remain critical concerns, as sensitive patient information is increasingly vulnerable to breaches. Compliance with regulatory frameworks such as HIPAA, GDPR, or national health data protection laws requires robust encryption, secure access controls, and constant monitoring. Furthermore, the initial investment required for cloud adoption, along with the need for staff training and system integration, can pose barriers, particularly for small or resource-limited healthcare institutions.

An additional consideration is system reliability and dependency. Cloud platforms must maintain high availability and minimize downtime, as disruptions can directly affect patient care. Therefore, healthcare organizations must select reputable cloud service providers and implement comprehensive disaster recovery and backup plans. Interoperability between legacy systems and new cloud-based solutions is also crucial to ensure continuity and accuracy of medical records.

Overall, the discussion highlights that cloud computing is not merely a technological upgrade but a strategic enabler of modern, efficient, and patient-centered healthcare systems. Its proper implementation enhances operational workflows, supports evidence-based decision-making, and promotes collaboration across healthcare networks. By addressing security, regulatory, and integration challenges, healthcare institutions can fully leverage cloud technologies to achieve sustainable improvements in service quality, cost-effectiveness, and accessibility.

Conclusion

Cloud computing has emerged as a transformative technology in modern healthcare systems, significantly enhancing the efficiency, accessibility, and quality of medical services. By providing scalable, flexible, and secure platforms for managing medical data, cloud technologies enable real-time access to electronic health records, support telemedicine services, and facilitate the integration of emerging innovations such as artificial intelligence (AI) and the Internet of Things (IoT). These advancements contribute to improved clinical decision-making, personalized patient care, and optimized operational workflows.

The adoption of cloud computing also allows healthcare institutions to reduce costs, improve resource utilization, and expand access to healthcare services, particularly in remote or underserved regions. Nevertheless, the successful implementation of cloud-based systems requires careful attention to data privacy, cybersecurity, regulatory compliance, and staff training. Interoperability and system reliability are also critical factors to ensure continuity of care and effective integration with existing healthcare infrastructure.

In conclusion, cloud computing is not merely an IT solution but a strategic enabler that reshapes healthcare delivery, promotes innovation, and supports

patient-centered care. When properly implemented and secured, cloud technologies have the potential to create resilient, efficient, and sustainable healthcare systems capable of meeting the demands of an increasingly digital and interconnected world.

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PLATELET DYSFUNCTION AS A PREDICTOR OF ISCHEMIC STROKES IN PATIENTS WITH CHRONIC BLOOD DISORDERS. LITERATURE REVIEW

Abstract: *Introduction: Ischemic stroke remains a leading cause of global morbidity and mortality. Patients with chronic blood disorders exhibit a significantly elevated risk of ischemic stroke, attributable to complex hemostatic system impairments, with platelet dysfunction being a central component. Traditional cardiovascular risk factors do not fully account for the high incidence of cerebrovascular events in this population, underscoring the need to identify specific predictors linked to hematopoietic pathology.*

Objective: The aim of this literature review is to systematize and analyze contemporary scientific data on the role of platelet dysfunction as a key predictor of ischemic strokes in patients with myeloproliferative neoplasms (MPNs), sickle cell anemia (SCA), and paroxysmal nocturnal hemoglobinuria (PNH).

Materials and Methods: A review of publications in peer-reviewed Russian and international journals available in the PubMed, Google Scholar, CyberLeninka, eLibrary, and other databases from 2000 to 2024 was conducted. Search keywords included: "platelets," "platelet dysfunction," "ischemic stroke," "myeloproliferative neoplasms," "sickle cell anemia," "paroxysmal nocturnal hemoglobinuria," "JAK2 V617F," "hypercoagulability."

Results: It was established that platelet dysfunction in chronic blood disorders is multifaceted. In MPNs, quantitative and qualitative anomalies are pivotal: thrombocytosis, heightened sensitivity to agonists, diminished response to antiplatelet therapy, and the presence of the somatic JAK2 V617F mutation, which is associated with a hypercoagulable phenotype. In SCA, the primary mechanisms involve chronic inflammation and platelet adhesion to activated endothelium and circulating erythrocytes. In PNH, a deficiency of complement regulatory proteins on the platelet membrane leads to their paradoxical hypersensitivity to complement activation. A comprehensive analysis of the data enabled the identification of key laboratory and molecular-genetic markers with prognostic value for stroke risk.

Conclusion: Platelet dysfunction is an integral component of the pathogenesis of ischemic strokes in patients with chronic blood disorders. Its assessment, which should extend beyond platelet count to include functional activity (aggregation, activation marker expression, molecular-genetic profile), must be integrated into risk stratification algorithms. This approach paves the way for

developing personalized strategies for the primary and secondary prevention of cerebrovascular events in this high-risk cohort.

Key words:*Platelet dysfunction, ischemic stroke, chronic blood disorders, myeloproliferative neoplasms, polycythemia vera, essential thrombocythemia, sickle cell anemia, paroxysmal nocturnal hemoglobinuria, hypercoagulability, JAK2 V617F, thrombocytosis, platelet aggregation, predictor, cerebrovascular events.*

Introduction

Ischemic stroke persists as a global medical and social challenge, ranking as the second leading cause of mortality worldwide and a primary cause of permanent disability in the adult population [Feigin et al., 2022, p. 12]. Despite significant progress in understanding its pathogenesis and developing therapeutic strategies, stroke incidence continues to rise, necessitating a deeper investigation into its etiology, particularly in specific high-risk groups.

This category includes patients with chronic blood disorders, among which myeloproliferative neoplasms (MPNs), sickle cell anemia (SCA), and paroxysmal nocturnal hemoglobinuria (PNH) hold a prominent place. The risk of ischemic stroke in these patients is dozens of times higher than in the general population [Marchioli et al., 2005, p. 85]. The pathogenesis of thrombotic complications in these conditions is complex and multifactorial, involving all components of the hemostatic system—the vascular wall, blood cells, and plasma coagulation factors. However, accumulating evidence indicates that the central element integrating these diverse pathological processes is the platelet.

Platelets, or thrombocytes, are traditionally viewed as the primary effectors of primary hemostasis. Yet, their role extends beyond the formation of a platelet plug. They are active participants in inflammation, immune response, angiogenesis, and vascular remodeling [Koupenova et al., 2018, p. 178]. In chronic blood disorders, platelets undergo profound alterations—both quantitative (thrombocytosis in MPNs, thrombocytopenia in PNH) and, more importantly, qualitative. Qualitative dysfunction, characterized by altered reactivity, metabolism, receptor apparatus, and secretory activity, transforms platelets from protective elements into agents of systemic prothrombotic readiness.

The relevance of this review is driven by the need to consolidate disparate data on the specifics of platelet abnormalities in various hematological pathologies and their contribution to cerebrovascular risk. Understanding these mechanisms is key to identifying patients at the highest risk of stroke and developing targeted preventive interventions. The aim of this work is to provide a comprehensive analysis of current knowledge on platelet dysfunction as a predictor of ischemic strokes in patients with MPNs, SCA, and PNH.

Literature review

1. Platelet Physiology and Fundamentals of Dysfunction

Under normal conditions, platelets circulate in the bloodstream in a quiescent state. Their activation is a cascade process triggered by interaction with

subendothelial structures (e.g., collagen) via GPIa/IIa and GPVI receptors, soluble agonists (ADP, thrombin, thromboxane A2), or shear stress [Varga-Szabo et al., 2008, p. 455]. A pivotal event is the conformational change in the GPIIb/IIIa receptor (integrin αIIbβ3), enabling it to bind fibrinogen and mediate platelet aggregation. Concurrently, the secretion of granule contents occurs (δ-granules with ADP, serotonin; α-granules with von Willebrand factor, P-selectin), amplifying and propagating the activation response.

Platelet dysfunction can manifest as hypofunction (increased bleeding) or hyperfunction (propensity for thrombosis). In the context of ischemic stroke, the focus is on the hyperfunctional state, which includes:

- Increased sensitivity to agonists: A lowered activation threshold in response to ADP, collagen, and epinephrine.
- Spontaneous activation: In vivo platelet activation without an apparent stimulus, reflected by elevated levels of circulating activation markers (P-selectin, activated GPIIb/IIIa).
- Impaired arachidonic acid metabolism: Enhanced synthesis of the proaggregatory and vasoconstrictive thromboxane A2.
- Procoagulant activity: Accelerated thrombin generation on the surface of activated platelets due to phosphatidylserine exposure ("flip-flop").

2. Platelet Dysfunction in Myeloproliferative Neoplasms (MPNs)

MPNs, particularly polycythemia vera (PV), essential thrombocythemia (ET), and primary myelofibrosis (PMF), are classic examples of diseases where thrombotic complications, including stroke, determine patient prognosis.

2.1. The Role of Thrombocytosis. For a long time, the primary cause of thrombosis in ET and PV was believed to be an elevated platelet count. However, large-scale studies, such as ECLAP (European Collaboration on Low-dose Aspirin in Polycythemia Vera), demonstrated a weak correlation between the degree of thrombocytosis and thrombosis risk [Marchioli et al., 2005, p. 87]. Moreover, some patients with extremely high platelet counts (>1,500,000/μL) may develop a hemorrhagic syndrome due to acquired von Willebrand syndrome, associated with the adsorption and clearance of von Willebrand factor multimers on the platelet surface. Thus, thrombocytosis is a necessary but insufficient condition for thrombosis, bringing qualitative anomalies to the forefront.

2.2. Qualitative Platelet Abnormalities in MPNs. Platelets in MPNs exhibit a spectrum of functional defects:

- Abnormal aggregation: Cases of both spontaneous in vitro aggregation and increased sensitivity to low doses of agonists (ADP, epinephrine), and paradoxically, a reduced response to some stimuli (ristocetin) have been described [Landolfi et al., 2008, p. 112].
- Granule and secretion defects: Reduced content of serotonin and ADP in δ-granules, as well as impaired secretion upon activation, are observed.

•Membrane receptor anomalies: Increased expression of the activated form of GPIIb/IIIa and decreased expression of the prostacyclin receptor (IP), a potent vasodilator and aggregation inhibitor [Arellano-Rodrigo et al., 2006, p. 623].

•Leukocyte activation and conjugate formation: Activated platelets form stable conjugates with leukocytes (primarily monocytes and neutrophils) via P-selectin. These conjugates possess heightened procoagulant and proinflammatory potential, contributing to endothelial injury [Falanga et al., 2007, p. 312].

2.3. The Pivotal Role of the JAK2 V617F Mutation. The discovery of the somatic mutation in the JAK2 tyrosine kinase gene (V617F) was a breakthrough in understanding MPN biology. This mutation is found in over 95% of PV patients and 50-60% of those with ET and PMF. Numerous studies have demonstrated that the presence of the JAK2 V617F mutation, particularly a high allele burden, is a powerful independent predictor of thrombotic complications, including stroke [Campbell et al., 2005, p. 2679]. Mechanisms linking the mutation to hypercoagulability include:

•Direct platelet activation: Constitutive activation of the JAK-STAT signaling pathway renders platelets hyperreactive.

•Leukocyte activation: Mutant leukocytes are in a state of constant activation, express tissue factor, and form conjugates with platelets.

•Endothelial dysfunction: The mutation can be found in endothelial cells, promoting a prothrombotic phenotype.

3. Platelet Dysfunction in Sickle Cell Anemia (SCA)

SCA is an inherited disorder characterized by the presence of pathological hemoglobin S (HbS), which polymerizes upon deoxygenation, leading to red blood cell deformation (sickling). Ischemic stroke is one of the most severe complications of SCA, affecting up to 11% of children and 24% of adults by age 45 [Ohene-Frempong et al., 1998, p. 134].

The pathogenesis of stroke in SCA is complex, and platelets play a critical role against a background of chronic hemolysis, endothelial dysfunction, and inflammation.

•Chronic in vivo platelet activation. Patients with SCA, even during steady state, exhibit elevated levels of platelet activation markers (P-selectin, soluble CD40 ligand) in plasma [Wun et al., 2001, p. 162]. This results from constant exposure to activating stimuli:

•Activated endothelium: Circulating sickle cells, hemolysis products (free heme, arginase), and proinflammatory cytokines cause damage and activation of the cerebral endothelium, increasing platelet adhesion.

•Activated leukocytes and erythrocytes: Platelets form aggregates with sickle erythrocytes and neutrophils, exacerbating microvascular occlusion.

•Impaired nitric oxide (NO) metabolism. Chronic hemolysis leads to NO depletion, a potent vasodilator and inhibitor of platelet activation. This promotes vasoconstriction and further platelet activation [Rother et al., 2005, p. 1653].

•Altered aggregability. Platelets from SCA patients demonstrate enhanced aggregation in response to ADP and collagen, correlating with the frequency of vaso-occlusive crises.

4. Platelet Dysfunction in Paroxysmal Nocturnal Hemoglobinuria (PNH)

PNH is a rare, acquired clonal disorder caused by a somatic mutation in the PIG-A gene, leading to a defect in glycosylphosphatidylinositol (GPI) anchor synthesis. Consequently, blood cells, including platelets, lack GPI-anchored proteins such as CD55 (DAF) and CD59 (MIRL), which protect cells from complement-mediated lysis.

The risk of thrombosis, including cerebral venous thrombosis and arterial strokes, is extremely high in PNH patients and is a leading cause of death. Platelet dysfunction in PNH has a unique mechanism:

•Paradoxical complement sensitivity. The deficiency of CD55 and CD59 makes platelets vulnerable to attack by the complement system. However, unlike erythrocytes, this does not always lead to their lysis. Sublytical exposure to the membrane attack complex (MAC) serves as a powerful activating stimulus for platelets [Wiedmer et al., 1993, p. 739]. The activated platelet exposes a procoagulant phosphatidylserine surface and secretes procoagulant microvesicles.

•Chronic in vivo activation. Patients with PNH experience constant complement activation, maintaining platelets in a state of readiness. Hemolytic episodes (e.g., during infections) further intensify this activation.

•Synergy with hemolysis. Free heme released during hemolysis is itself a proinflammatory and procoagulant agent, exacerbating endothelial dysfunction and creating a favorable background for platelet-mediated thrombosis.

DISCUSSION

The conducted analysis of the literature affirms that platelet dysfunction is a common pathogenic denominator linking various chronic blood disorders of different etiologies in the context of a high risk of ischemic stroke. However, the specific mechanisms of this dysfunction differ significantly, which has crucial implications for diagnosis and prevention.

In MPNs, the dominant factor is clonal proliferation driven by mutations in JAK2, CALR, or MPL genes. This results in the production of inherently "defective" platelets with an altered receptor apparatus and metabolism. The JAK2 V617F mutation acts not merely as a diagnostic marker but as a direct driver of hypercoagulability, affecting all myeloid lineage cells. This explains why thrombosis risk stratification in MPNs is now unthinkable without determining the molecular-genetic status.

In SCA, the primary event is erythrocyte pathology, and platelet dysfunction is secondary and reactive. It arises in response to chronic inflammation, endothelial dysfunction, and the constant "noise" of activating stimuli from damaged sickle cells. Here, the platelet acts as an amplifier and integrator of pathological signals circulating within the system. This underscores the importance of controlling not

only the platelet component but also the underlying disease (e.g., with hydroxyurea or transfusion programs).

In PNH, the mechanism is unique and linked to a defect in the innate complement defense system. Platelets in PNH are hostages of their own vulnerability: the complement system, a part of immune defense, becomes their constant activator. This fundamentally distinguishes PNH from MPNs and SCA and explains the high efficacy of complement inhibitor therapy (eculizumab), which, by blocking complement activation, not only halts hemolysis but also drastically reduces the frequency of thromboses.

An important aspect of the discussion is the challenge of antiplatelet therapy. The standard for primary thrombosis prevention in MPNs is low-dose aspirin, whose efficacy was proven in the ECLAP study [Landolfi et al., 2004, p. 114]. However, some patients exhibit "aspirin resistance," which may be related to ongoing platelet activation via JAK-STAT pathways independent of cyclooxygenase-1. In SCA, aspirin is also used, but its efficacy is less clear, and key roles in stroke prevention are held by transfusion programs or hydroxyurea. In PNH, antiplatelet agents are ineffective as they do not target the root cause—complement activation.

Thus, despite the common endpoint—ischemic stroke—the pathogenic pathways are distinct. This dictates the need for a personalized approach to risk assessment and the selection of preventive strategies, based on an understanding of the specifics of platelet dysfunction in each particular nosology.

RESULTS

Based on the systematization of literature data, key laboratory and molecular markers of platelet dysfunction associated with an increased risk of ischemic stroke in chronic blood disorders can be identified.

Table 1. Markers of Platelet Dysfunction and Their Prognostic Value in Various Chronic Blood Disorders.

Disease	Key Markers of Platelet Dysfunction	Association with Stroke Risk	Assessment Methods
Myeloproliferative Neoplasms	-Presence of **JAK2 V617F** mutation (especially high allele burden) -Increased spontaneous or agonist-induced aggregation - Increased **P-selectin (CD62P)** expression -Formation of platelet-leukocyte aggregates	Strong direct correlation. JAK2 V617F is an independent risk factor.	PCR, allele burden; aggregometry (optical, impedance); flow cytometry; functional aspirin resistance tests.

Disease	Key Markers of Platelet Dysfunction	Association with Stroke Risk	Assessment Methods
	- Reduced response to aspirin		
Sickle Cell Anemia	-Elevated plasma levels of **soluble P-selectin** and **sCD40L** -Enhanced aggregation with ADP/collagen -Formation of aggregates with neutrophils and sickle erythrocytes -Decreased nitric oxide (NO) levels	Correlates with the frequency of vaso-occlusive crises and cerebrovascular events.	ELISA; aggregometry; flow cytometry; assessment of vasodilation.
Paroxysmal Nocturnal Hemoglobinuria	-Deficiency of **CD55** and **CD59** on the platelet membrane -Enhanced complement-induced activation (phosphatidylserine exposure) - Increased generation of procoagulant microvesicles	Extremely high risk, especially with a large clone size and during hemolysis.	Flow cytometry (FLAER); coagulometric assays; flow cytometry for microvesicles.

For a visual representation of the pathogenic mechanisms, the following scheme can be used:

Table 2. Comparative Characteristics of Approaches to Correcting Platelet Dysfunction and Preventing Stroke.

Disease	Primary Pathogenetic Mechanism	Main Stroke Prevention Methods Targeting Platelets	Efficacy
MPN	Clonal Hyperreactivity	-Low-dose Aspirin - Cytoreductive Therapy (hydroxyurea, interferon) for cell count control - JAK Inhibitors (ruxolitinib)	High for aspirin and cytoreduction. JAK inhibitors have demonstrated reduced thrombotic events.
SCA	Secondary Activation due to Inflammation & Hemolysis	-Hydroxyurea (lowers HbS, reduces inflammation) -Chronic Transfusion Programs -Aspirin (role less defined)	High for hydroxyurea and transfusions. Aspirin has an auxiliary role.

Disease	Primary Pathogenetic Mechanism	Main Stroke Prevention Methods Targeting Platelets	Efficacy
PNH	Complement-Mediated Activation	-Terminal Complement Inhibitors (eculizumab, ravulizumab) - Anticoagulants (if history of thrombosis) - Antiplatelets are ineffective	Very high for complement inhibitors (drastic reduction in thromboses).

Conclusion

1. Platelet dysfunction represents a universal and significant pathogenic factor contributing substantially to the development of ischemic strokes in patients with a wide spectrum of chronic blood disorders, including myeloproliferative neoplasms, sickle cell anemia, and paroxysmal nocturnal hemoglobinuria.
2. Despite the common endpoint, the molecular and cellular mechanisms underlying platelet hyperfunction are fundamentally distinct: clonal determinism in MPNs, secondary reactive activation in SCA, and complement-mediated activation in PNH.
3. Stroke risk assessment in this patient category should not be limited to platelet count. A comprehensive approach must be integrated into clinical practice, including the evaluation of platelet functional activity (aggregometry, flow cytometry for activation markers) and mandatory molecular-genetic testing (JAK2 V617F for MPNs, FLAER test for PNH).
4. The strategy for preventing cerebrovascular events must be etiotropic and personalized, targeting the correction of the primary dysfunction mechanism: cytoreduction and aspirin in MPNs; control of hemolysis and inflammation in SCA; complement inhibition in PNH.
5. Promising directions for future research include: investigating the role of novel mutations (CALR, MPL) in MPNs in modulating platelet function; searching for more effective antiplatelet agents that overcome "resistance"; and developing methods to correct endothelial dysfunction as a background for platelet hyperreactivity.

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COGNITIVE IMPAIRMENT IN ANEMIAS OF VARIOUS GENESIS: METABOLIC AND VASCULAR MECHANISMS. LITERATURE REVIEW

Abstract: *Anemia, one of the most common hematological syndromes globally, is traditionally associated with clinical manifestations such as weakness, fatigue, and shortness of breath. However, compelling data accumulated in recent decades indicate a significant impact of anemias of various origins on cognitive functions. The aim of this literature review is to systematically analyze and synthesize current knowledge on the metabolic and vascular mechanisms underlying cognitive deficits in Iron Deficiency Anemia (IDA), B12 Deficiency Anemia, and Anemia of Chronic Disease (ACD). An analysis of over 50 scientific sources demonstrates that hypoxia, resulting from reduced blood oxygen-carrying capacity, is a universal but not the sole pathogenetic factor. Metabolic mechanisms include impaired synthesis of neurotransmitters (dopamine, norepinephrine), myelination of nerve fibers (in B12 and iron deficiency), mitochondrial dysfunction, and oxidative stress. Vascular mechanisms are related to compensatory cerebral vasodilation, impaired autoregulation of cerebral blood flow, endothelial dysfunction, and accelerated cerebral small vessel disease. The results section presents integrated pathogenetic pathways and a comparative analysis of the features of cognitive deficits depending on the anemia's genesis. It is established that cognitive impairments in anemia are often reversible in the early stages, underscoring the importance of timely diagnosis and pathogenetic therapy. It is concluded that a comprehensive consideration of metabolic and vascular components is necessary for developing effective neuroprotection strategies for patients with anemia.*

Keywords: *Anemia, Cognitive Functions, Iron Deficiency Anemia, B12 Deficiency Anemia, Anemia of Chronic Disease, Hypoxia, Cerebral Blood Flow, Neurotransmitters, Myelin, Oxidative Stress, Endothelial Dysfunction, Hippocampus, Prefrontal Cortex.*

Introduction. Anemia represents a global health problem, affecting approximately a quarter of the world's population, with the highest prevalence among children, pregnant women, and the elderly [WHO, 2021]. Historically, the focus of clinical and research efforts has been on the systemic manifestations of anemia, such as reduced exercise tolerance, cardiovascular complications, and diminished quality of life. However, a growing body of epidemiological and clinical

research indicates a consistent association between anemia and impairments in the cognitive domain, including deficits in attention, memory, executive functions, and information processing speed [Lukowski et al., 2010; Andro et al., 2013].

The classic and most obvious explanation is cerebral hypoxia resulting from reduced blood oxygen capacity. However, hypoxia alone cannot fully explain the entire spectrum of cognitive disorders and their specificity in different types of anemia. For instance, in Iron Deficiency Anemia, the key role is played by iron's involvement in catecholamine metabolism and myelogenesis [Beard, 2001], whereas in B12 Deficiency Anemia, demyelination and accumulation of neurotoxic metabolites dominate [Green et al., 2017]. In Anemia of Chronic Disease, pro-inflammatory cytokines independently disrupt neuroplasticity and the function of the blood-brain barrier [Simmons, 2022].

The purpose of this literature review is to conduct a comprehensive analysis and synthesis of current data on the metabolic and vascular mechanisms of cognitive impairment in anemias of various genesis. The objectives of this work are:

1. To analyze the role of the universal factor of hypoxia.
2. To identify specific metabolic disturbances for IDA, B12 Deficiency Anemia, and ACD.
3. To assess the contribution of vascular mechanisms, including changes in cerebral hemodynamics and endothelial dysfunction.
4. To conduct a comparative characterization of the cognitive profile in various anemias.
5. To visualize complex pathogenetic pathways and discuss promising therapeutic directions.

Literature review. *1. Universal Mechanism: Cerebral Hypoxia and Energy Metabolism.* A decrease in hemoglobin concentration directly leads to reduced oxygen delivery to tissues, including the brain, which is one of the most metabolically active and oxygen-dependent organs. Compensatory increases in cerebral blood flow (CBF) are confirmed by functional MRI and transcranial Doppler ultrasonography data [Ivanov et al., 2019]. However, the capacity for this compensation is limited. In severe anemia, the mechanisms of cerebral blood flow autoregulation can be impaired, leading to relative ischemia in the most vulnerable areas, such as the hippocampus and frontal lobes [Osipova, 2020].

Hypoxia induces the expression of HIF-1α (Hypoxia-Inducible Factor 1-alpha), which regulates a wide range of adaptive genes. Although short-term HIF-1α activation may have a protective effect, chronic hypoxia leads to disruption of energy metabolism: the efficiency of oxidative phosphorylation in neuronal mitochondria decreases, ATP levels fall, and dependence on less efficient anaerobic glycolysis increases [Vasnetsov, 2018]. This directly affects processes requiring significant energy expenditure – maintaining the resting potential, synaptic transmission, and long-term potentiation, which is the cellular basis of memory.

2. Specific Metabolic Mechanisms in Various Anemias.

Iron is a cofactor for numerous key enzymes in the brain. Neurotransmitter Synthesis. Iron is a component of tyrosine hydroxylase, a key enzyme in the

synthesis of dopamine and norepinephrine. Iron deficiency leads to decreased levels of these catecholamines in the striatum and prefrontal cortex, clinically manifesting as impairments in attention, executive functions, and motivation [Beard, 2001, p. 372]. "Dopaminergic pathways, particularly the mesocorticolimbic pathway, are critically dependent on adequate iron availability," emphasizes J. Beard in her review.

Myelinogenesis. Oligodendrocytes, responsible for myelin formation, require high iron content for the activity of lipid synthesis enzymes and energy production. IDA, especially during critical periods of development (infancy, early childhood), leads to hypomyelination and impaired nerve impulse conduction velocity [Lozoff, 2011, p. 55]. This may explain the persistent cognitive deficits that remain even after anemia correction.

Oxidative Stress. Paradoxically, iron deficiency can enhance oxidative stress in the brain. Iron is a component of catalase and other antioxidant enzymes. Its deficiency reduces antioxidant defense, making neurons more vulnerable to damage by reactive oxygen species [Sokolova, 2017].

Cobalamin (Vitamin B12) deficiency has a direct neurotoxic effect. Demyelination. Vitamin B12 is a cofactor in the synthesis of methionine from homocysteine. In its deficiency, homocysteine accumulates and the level of S-adenosylmethionine (SAM) decreases, which is a universal methyl group donor. This disrupts the methylation of myelin basic proteins and lipids, leading to myelin instability and demyelination, primarily in the spinal cord and brain [Green et al., 2017, p. 215].

Accumulation of Toxic Metabolites. Besides homocysteine, methylmalonic acid (MMA) accumulates in B12 deficiency. Both metabolites are neurotoxic, inducing neuronal apoptosis, disrupting mitochondrial function, and potentiating excitotoxicity through NMDA receptor activation [Mikhailov, 2020].

Impaired Neurotransmitter Synthesis. SAM is also necessary for the synthesis of catecholamines and serotonin. Thus, B12 deficiency indirectly affects neurotransmitter balance.

ACD develops against a background of chronic inflammation (oncological, rheumatic, infectious diseases). The pathogenesis of its cognitive impairments is unique.

Inflammatory Hypothesis. Pro-inflammatory cytokines (IL-1β, IL-6, TNF-α), which are elevated in ACD, cross the blood-brain barrier and exert a direct damaging effect on neurons and glial cells. They suppress neurogenesis in the hippocampus, impair synaptic plasticity, and induce apoptosis [Simmons, 2022, p. 104].

Iron Metabolism Dysfunction. In ACD, functional iron deficiency develops: macrophages sequester iron, making it unavailable for erythropoiesis. This process can also limit iron availability for neurons, secondarily triggering mechanisms similar to those in IDA, albeit in a less pronounced form.

Reduced Erythropoietin (EPO) Production. Inflammation suppresses renal EPO production. Beyond its hematopoietic function, EPO is a potent

neuroprotective cytokine in the CNS. It has anti-inflammatory, anti-apoptotic properties and stimulates neurogenesis. Decreased EPO levels in ACD deprive the brain of an important protective factor [Smith, 2014].

3. Vascular Mechanisms of Cognitive Impairment.

Impaired Autoregulation of Cerebral Blood Flow. Prolonged compensatory vasodilation in anemia can deplete the vasomotor reserve of cerebral vessels. This makes cerebral blood flow more dependent on systemic blood pressure, increasing the risk of both ischemia during hypotension and hyperperfusion injury during hypertension [Ivanov et al., 2019, p. 45].

Endothelial Dysfunction. Chronic hypoxia and concomitant inflammation (especially in ACD) damage the endothelium of cerebral vessels. The production of the vasodilator NO decreases, while the level of vasoconstrictors (endothelin-1) increases. This impairs microcirculation and contributes to the development of cerebral microangiopathy [Osipova, 2020].

Link to Cerebrovascular Pathology. Anemia has been identified as an independent risk factor for stroke and vascular cognitive impairment. Patients with anemia more frequently exhibit silent lacunar infarcts and leukoaraiosis on MRI, which directly correlates with the severity of cognitive deficit [Verdelho et al., 2010].

This section presents the results of systematizing literature data in the form of integrated pathogenetic pathways and comparative tables.

Table 1.

Comparative Characteristics of Cognitive Impairments and Key Mechanisms in Anemias of Various Genesis.

Parameter	Iron Deficiency Anemia (IDA)	B12-Deficiency Anemia	Anemia of Chronic Disease (ACD)
Predominant Cognitive Domains	Executive functions, attention, processing speed.	Memory, processing speed, visuospatial functions, possible psychotic disorders.	Global cognitive decline, psychomotor slowing, memory deficit.
Key Metabolic Mechanisms	Dopamine/norepinephrine deficiency, hypomyelination, oxidative stress.	Demyelination, accumulation of homocysteine and MMA, neurotoxicity.	Inflammatory cytokine-induced dysfunction, functional iron deficiency, reduced EPO.
Key Vascular Mechanisms	Impaired autoregulation, endothelial dysfunction.	Endothelial dysfunction (homocysteine-mediated), increased thrombosis risk.	Pronounced endothelial dysfunction, accelerated atherosclerosis and microangiopathy.
Reversibility with Treatment	High in early stages; may be incomplete with long-term childhood deficiency.	Depends on deficiency duration; neurological changes may be irreversible.	Partial; depends on successful therapy of the underlying inflammatory disease.

Neuroimaging Data Visualization. Numerous studies using voxel-based morphometry (VBM) and diffusion-tensor imaging (DTI) demonstrate that patients with chronic anemia have reduced grey matter volume in the prefrontal cortex and

hippocampus, as well as decreased fractional anisotropy (FA) in white matter, indicating impaired integrity of conductive pathways [Zhou et al., 2021]. These structural changes are the morphological substrate of the identified cognitive deficit.

One of the key discussion points is the issue of the reversibility of cognitive deficits. Evidence suggests that the earlier pathogenetic therapy is initiated (iron supplementation, vitamin B12, inflammation control), the higher the likelihood of complete cognitive recovery [Lukowski et al., 2010; Green et al., 2017]. However, the concept of a "critical period" exists, particularly relevant for IDA in early childhood. Iron deficiency during the period of active brain development can lead to persistent, not fully reversible changes in neural network architecture, manifesting in later life periods [Lozoff, 2011, p. 58]. This underscores the importance of preventive screening programs.

Conclusion. This literature review demonstrates that cognitive impairment is an integral and clinically significant component of anemias of various genesis. The pathogenesis of these impairments is multicomponent and includes:

1. A universal hypoxic component, leading to energy deficit and impaired neuronal function.

2. Specific metabolic disturbances determined by the type of anemia: dysfunction of catecholaminergic systems and myelogenesis in IDA; demyelination and neurotoxicity in B12 deficiency; inflammatory damage and reduced neuroprotection in ACD.

3. Vascular mechanisms, manifesting as impaired autoregulation of cerebral blood flow, endothelial dysfunction, and accelerated cerebrovascular pathology.

The interaction of these mechanisms leads to structural and functional changes in key cognitive brain areas – the hippocampus, prefrontal cortex, and white matter. Cognitive impairments in anemia are often potentially reversible, making their early diagnosis and adequate pathogenetic therapy an important reserve for preserving cognitive health and quality of life in patients. Further research should focus on identifying biomarkers of early cognitive risk and developing comprehensive neuroprotective strategies for this category of patients.

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COMPARISON OF IRON-DEFICIENCY, MEGALOBLASTIC, AND HEMOLYTIC ANEMIA IN TERMS OF THEIR EFFECTS ON CEREBRAL PERFUSION AND COGNITIVE FUNCTION. LITERATURE REVIEW

Abstract: *Anemias of various origins exert significant effects on cerebral blood flow and cognitive function. Iron-deficiency anemia (IDA), megaloblastic anemia (MA), and hemolytic anemia (HA) differ in their pathophysiological mechanisms but converge at a common endpoint — impaired neuronal oxygenation and reduced cerebral perfusion. In IDA, the key pathogenic factor is iron deficiency, which impairs hemoglobin synthesis and cytochrome function, resulting in neuronal hypoxia and energy failure. MA is primarily associated with vitamin B_{12} and folate deficiency, leading to DNA methylation failure and demyelination. HA, on the other hand, is characterized by chronic hemolysis, anemic hypoxia, and elevated free bilirubin, which induce oxidative stress and endothelial injury. All three types of anemia are linked to decreased cerebral blood flow, hippocampal and cortical dysfunction, and cognitive deficits involving attention, memory, and executive function. This review summarizes and compares current data on how these types of anemia affect cerebral perfusion and cognition, including evidence from neuroimaging and neuropsychological studies.*

Key words: *iron-deficiency anemia, megaloblastic anemia, hemolytic anemia, cerebral perfusion, cognitive function, hypoxia, neuro-metabolism, vitamin B_{12} deficiency, oxidative stress.*

Introduction

Anemia is a pathological condition defined by a reduction in hemoglobin concentration and/or red blood cell count, leading to decreased oxygen delivery to tissues. According to the world health organization, more than 24% of the global population is affected by anemia, and among women of reproductive age and the elderly, the prevalence reaches 40% [who, 2023, p. 12].

The most clinically significant forms of anemia—iron-deficiency (ida), megaloblastic (ma), and hemolytic (ha)—differ in etiology but share similar consequences for the central nervous system (cns). The major outcome is cerebral hypoxia, resulting in metabolic and functional disturbances within neurons, particularly in oxygen-sensitive regions such as the hippocampus, frontal lobes, and cerebellum [gavrilova, 2021, p. 78].

Recent neuroimaging research demonstrates that all types of anemia cause a decrease in cerebral perfusion, as observed by functional mri, and alter neuronal network connectivity in brain regions responsible for attention and memory [singh, 2019, p. 133]. Cognitive deficits include decreased concentration, slowed processing speed, and impaired memory [poliakova, 2020, p. 45].

The purpose of this review is to conduct a comparative analysis of these three types of anemia, focusing on their pathophysiological effects on cerebral perfusion and cognitive performance, to identify shared and specific mechanisms, and to synthesize the findings of contemporary literature in a structured format.

Literature review

1. Iron-deficiency anemia and cerebral blood flow

Iron-deficiency anemia is the most prevalent type of anemia and results from insufficient iron required for hemoglobin and cytochrome synthesis [lozoff, 2018, p. 210]. Iron deficiency leads to impaired tissue oxygenation and altered cerebral energy metabolism. Experimental studies demonstrate that iron deficiency decreases cytochrome oxidase activity and atp levels in neurons [beard, 2019, p. 48].

Neuroimaging studies have shown reduced regional cerebral blood flow in the frontal cortex and hippocampus in ida patients [huang, 2020, p. 116]. These changes are associated with impaired myelination and reduced gray matter volume [xu, 2019, p. 303]. Clinically, ida manifests as cognitive sluggishness, diminished attention span, and reduced information processing speed [poliakova, 2020, p. 49].

Iron also plays a critical role in the synthesis of neurotransmitters such as dopamine, serotonin, and gaba. Therefore, iron deficiency often results in apathy, decreased motivation, and depression [beard, 2019, p. 53].

2. Megaloblastic anemia and cognitive dysfunction

Megaloblastic anemia arises due to deficiencies of vitamin b_{12} and/or folic acid, which are essential for dna synthesis and methylation processes critical to myelin production [o'leary, 2020, p. 21]. Vitamin b_{12} deficiency leads to homocysteine accumulation, causing oxidative stress and neurotoxicity [miller, 2021, p. 34]. It also disrupts the methylation of myelin phospholipids, leading to demyelination, particularly in the spinal cord and brain [green, 2017, p. 140].

Cognitive impairments in ma include memory deficits, disorientation, and attention decline, sometimes progressing to "pseudo-dementia" associated with vitamin b_{12} deficiency [clarke, 2019, p. 66]. Neuroimaging studies reveal hippocampal atrophy and decreased white matter volume [sachdev, 2020, p. 90].

Folate deficiency additionally exacerbates dna hypomethylation and downregulates genes related to synaptic plasticity [yajnik, 2020, p. 77].

3. Hemolytic anemia and cerebral hypoxia

Hemolytic anemia is characterized by shortened red blood cell lifespan and accelerated erythrocyte destruction, resulting in hypoxia and elevated unconjugated bilirubin levels [barcellini, 2021, p. 25]. Chronic hemolysis induces endothelial dysfunction, free radical generation, and microvascular ischemia [hill, 2022, p. 32].

The cerebral consequences are most pronounced in sickle cell disease—a major subtype of hemolytic anemia—where patients exhibit markedly reduced cerebral blood flow and multiple white matter microinfarcts [debaun, 2020, p. 58]. Disrupted perfusion contributes to cognitive deficits involving reduced processing speed, executive dysfunction, and impaired visuospatial memory [prussien, 2019, p. 101].

4. Summary of literature findings

Evidence indicates that all forms of anemia cause cerebral hypoxia but differ in their mechanisms: in ida — impaired oxygen transport; in ma — metabolic and myelination dysfunction; and in ha — oxidative vascular damage and hemolysis.

Discussion

A shared pathogenic mechanism among all forms of anemia is cerebral hypoxia, initiating a cascade of metabolic disruptions: decreased mitochondrial activity, lactate accumulation, glial activation, and neuronal injury.

In ida, hypoxia directly reduces perfusion and metabolic activity, as shown in fmri studies. In ma, hypoxia is secondary to methylation defects, rendering vitamin b_{12} deficiency particularly detrimental to cognition [green, 2017, p. 140]. In ha, endothelial injury and oxidative stress lead to microvascular ischemia and chronic inflammation.

Collectively, these pathophysiological processes lead to cognitive impairments involving memory, attention, and executive functions. Recognition of these mechanisms is crucial for early diagnostic and therapeutic interventions.

Results

Table 1. Comparative characteristics of the effects of anemia types on cerebral perfusion and cognitive function

Parameter	Iron-Deficiency Anemia (IDA)	Megaloblastic Anemia (MA)	Hemolytic Anemia (HA)
Principal deficiency	Iron (Fe)	Vitamin B_{12}, Folate	Hemoglobin (due to RBC destruction)
Mechanism of hypoxia	Reduced Hb and O_2 transport	Metabolic failure, demyelination	Hemolysis, oxidative stress
Cerebral perfusion	Decreased, especially in frontal regions	Reduced, mainly in hippocampus	Impaired, focal microischemia
Neuroimaging findings	Reduced gray matter volume	White matter atrophy	Multiple microinfarcts
Cognitive effects	Attention deficits, fatigue	Memory and orientation impairments	Executive dysfunction
Reversibility	Partially reversible	Partially reversible with B_{12} therapy	Partially reversible

Scheme 1. General Pathogenic Pathway of Cognitive Dysfunction in Anemia

Iron/Vitamin B_{12} Deficiency or Hemolysis → Cerebral Hypoxia → Oxidative Stress → Neuronal Metabolic Impairment → Decreased Perfusion → Cognitive Dysfunction

Conclusion

Anemias of different origins exert multifactorial effects on the brain, disrupting cerebral perfusion and cognitive performance. Despite distinct primary mechanisms, all converge on neuronal hypoxia and oxidative damage. The most profound cognitive deficits are observed in megaloblastic anemia, where demyelination compounds hypoxic injury, while iron-deficiency anemia primarily results in energetic failure, and hemolytic anemia causes vascular microdamage.

Early diagnosis and correction of anemia—through iron supplementation, vitamin B_{12} and folate therapy, and antioxidant treatment—can partially restore cerebral perfusion and cognitive capacity, particularly when initiated promptly. These insights underscore the necessity of integrating neurocognitive assessment into anemia management strategies.

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PREVALENCE OF IMMUNODEFICIENCY SYMPTOMS IN GROUPS OF THE POPULATION WITH HYMENOLEPIASIS

Abstract: *The article analyzes the clinical features and immunological parameters of patients with hymenolepiasis. The study included patients of different age groups, their complaints, general condition, laboratory parameters and parameters of immune system function were studied. Based on the data obtained, immunological changes in hymenolepiasis were analyzed in comparison with those in healthy individuals. Significant differences in humoral and cellular immunity were revealed. In particular, changes in the level of immunoglobulins, a decrease in the number of lymphocytes, and a decrease in the activity of T cells were noted. It was also established that the clinical symptoms experienced by patients – diarrhea, loss of appetite, feeling of heaviness and general weakness – are directly related to changes in the immune system. The results of the study indicate the importance of taking into account immunological indicators in the effective diagnosis and treatment of hymenolepiasis.*

Keywords: *hymenolepiasis, immunological parameters, immune system, immunoglobulin, lymphocyte, parasitic diseases*

Introduction. Today, parasitic diseases, including hymenolepiasis (Hymenolepidosis), are one of the problems that pose a serious threat to public health. The widespread prevalence, especially among children and individuals with weakened immune systems, and the latent or chronic course of the disease make it difficult to diagnose and effectively treat it in a timely manner. In patients with hymenolepiasis, not only general clinical signs, but also significant changes in the state of the immune system are observed. From this point of view, along with the clinical condition of patients, an in-depth analysis of immunological indicators is important for a better understanding of the pathogenesis of the disease, early diagnosis, and the development of effective therapeutic approaches. This article presents data aimed at determining the mechanisms of disease development through a comparative analysis of various aspects of clinical signs and changes in the immune system in patients with hymenolepiasis. This is relevant from a practical and theoretical point of view for practicing doctors and researchers. Worldwide, scientific research is being conducted on the immunological basis of individual differences in the development of hymenolepiasis, which belongs to the group of helminthiases in children, and its results, the role of cytokines in the pathogenesis

of this disease, and the formation of a protective reaction. [1,3]. The specific effect of the infection on immunocompetent cells, in particular B-lymphocytes, its ability to trigger immunosuppression and persist in the human body for a long time after infection with hymenolepiasis, determines the expediency of studying the functional properties of cells. [2,4,7]. In this regard, it should be noted that leukocytes, especially lymphocytes, are a sensitive criterion for cytokimytic indicators, the activity, severity, and outcome of the infectious process. Determination of T- and B-lymphocyte activity, assessment of cytokine status in the blood, expression of cellular receptors (CD4+-, CD8+-, CD16+-, CD38+-, CD95+-, CD25+-) in hymenolepiasis in young children was not carried out. [5,6.8].

Helminthiases lead to changes that negatively affect all organs and systems of a person. The dwarf worm has many mechanisms of immunosuppression, as immunological disorders intensify, which leads to the formation of a chronic process [9]. As a result of the influence of the dwarf worm on the quantitative indicators and activity of the human immune system, it affects the mechanisms of action of anti-inflammatory cytokines, blocks the mechanisms of apoptosis.

The purpose of the study was to determine the clinical and immunological features of hymenolepiasis in children and, on this basis, to develop rational treatment regimens.

Materials and Methods. The study analyzed the results of diagnostics and treatment of 114 children aged 3 to 18 years with hymenolepiasis during 2019-2022, and 40 practically healthy children were examined in the control group. All observed children underwent a comprehensive continuous examination, including clinical and laboratory, biochemical, and immunological studies. In this regard, attention is paid to their complaints, past and concomitant diseases, premorbid manifestations, causes of the disease, duration, and the effectiveness of early treatment measures.

The scientific significance of the research results lies in the fact that the clinical manifestations of the disease in children diagnosed with hymenolepiasis, such as weight loss, growth retardation, skin itching, involuntary nervous movements, have a direct proportional relationship with the main indicators of immune and cytokine status, based on the assessment of immune and cytokine status, CD3+-, CD4+-, CD8+-, CD16+ lymphocytes in the blood, IRI, serum IL-4, IFN-γ parameters are indicated as alternative criteria for immunodiagnosis, the inclusion of the drug immunal in the traditional treatment complex leads to a decrease in the course of the disease, its clinical manifestations, elimination of secondary immunodeficiency in the immune and cytokine status of the body, and normalization of these indicators.

The practical significance of the research results lies in the fact that the inclusion of the drug Immunal in the complex treatment of children with hymenolepiasis significantly increases the effectiveness of treatment, which is an important recommendation for use in practical healthcare, it has been proven that there is an inextricable link between the main clinical manifestations of the disease in sick children and the main indicators of the immune and cytokine status of their

body, the development of an algorithm for early diagnosis and complex treatment of the disease in cases of secondary immunodeficiency is important for practical healthcare.

Clinical symptoms in children with hymenolepiasis showed a tendency to occur in accordance with the severity of the disease (Table 1).

Table 1

Distribution of clinical symptoms by severity of the disease in children diagnosed with hymenolepiasis

Clinical symptoms	Light degree, n=14		Moderately severe, n=61		Severe degree, n=39		χ2		P	
	абс.	%	абс.	%	абс.	%				
Abdominal pain	4	28,5	28	45,9	38	97,4	$\chi_1 2$	1,40	P_1	0,237
							$\chi_2 2$	29,70	P_2	0,0001
							$\chi_3 2$	28,16	P_3	0,0001
Irritability	3	21,4	19	31,1	28	71,7	$\chi_1 2$	0,52	P_1	0,471
							$\chi_2 2$	10,76	P_2	0,001
							$\chi_3 2$	15,78	P_3	0,001
Nervous involuntary movements (NIA)	4	28,5	18	29,5	26	66,6	$\chi_1 2$	0,00	P_1	0,945
							$\chi_2 2$	6,09	P_2	0,014
							$\chi_3 2$	13,33	P_3	0,0001
Evening enuresis	5	35,7	12	19,6	16	41	$\chi_1 2$	1,67	P_1	0,196
							$\chi_2 2$	0,12	P_2	0,727
							$\chi_3 2$	5,38	P_3	0,020
Tooth twists	6	42,8	9	14,7	15	38,4	$\chi_1 2$	5,62	P_1	0,018
							$\chi_2 2$	0,08	P_2	0,773
							$\chi_3 2$	7,33	P_3	0,007
Weight loss	8	57,1	25	40,9	36	92,3	$\chi_1 2$	1,21	P_1	0,272
							$\chi_2 2$	9,04	P_2	0,003
							$\chi_3 2$	26,34	P_3	0,0001
Growth lag	8	57,1	21	34,4	28	71,7	$\chi_1 2$	2,48	P_1	0,115
							$\chi_2 2$	1,02	P_2	0,314
							$\chi_3 2$	13,29	P_3	0,0001
Skin itching	7	50	23	37,7	29	74,3	$\chi_1 2$	0,72	P_1	0,397
							$\chi_2 2$	2,81	P_2	0,094
							$\chi_3 2$	12,81	P_3	0,0001
Hepatomegaly	-	-	8	13,1	20	51,2	$\chi_1 2$	2,06	P_1	0,152
							$\chi_2 2$	11,53	P_2	0,001
							$\chi_3 2$	17,19	P_3	0,0001
Splenomegaly	-	-	5	8,1	8	20,5	$\chi_1 2$	1,23	P_1	0,268
							$\chi_2 2$	3,38	P_2	0,066
							$\chi_3 2$	3,19	P_3	0,074

Note: P1, P2, P3 - significance of differences in the indicators of mild, moderate, and severe patients, respectively.

According to the results of the average analysis in patients with a mild course (n=14), no pathological changes were detected in the studied parameters. In cases

with a moderate degree of severity of this nosological unit, the biochemical indicators exceeded the normal range.

In the severe course of the disease, all biochemical blood parameters were significantly elevated, including the level of ALT significantly increased by 1.8 times ($p<0.001$). This situation indicates that the infectious process has a toxic effect on all internal organs.

Thus, the development of T-immunodeficiency is associated with a deficiency in the quantitative and relative indicators of CD4+ cells.

The content of CD16+-cells in children of the main group was 18.86±0.78%, which is 1.2 times higher than the values of the control group (15.20±1.60%), the absolute value of this indicator was also significantly higher in the main group compared to the values of the control group ($P<0.05$). Such an increase in CD16+ cell expression is explained by the presence of an infectious agent, in response to which a sharp increase in immature forms of CD16+ lymphocytes is observed.

Conclusion. Based on the results of the study, it was established that the clinical manifestations in patients with hymenolepiasis are diverse and varied. Among the main clinical symptoms, signs of intoxication, dyspeptic conditions, and allergic reactions prevailed. At the same time, immunological analyses showed significant changes in the humoral and cellular immune response in patients. In particular, a decrease in the number of T-lymphocytes and an increase in the level of immunoglobulins (IgE, IgG) were observed.

Comparative analysis with the healthy control group confirmed that hymenolepiasis infection leads to consistent changes in the immune system in the body. These changes depend on the duration and severity of the disease and also affect the clinical course. These results are important for the early detection of hymenolepiasis and the development of targeted treatment methods, as well as for assessing the condition of patients based on immunological indicators.

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THE NECESSITY AND IMPORTANCE OF DECARBONIZING THE ECONOMY

Abstract. *Global climate change consequences eliminate in the process of the economy decarbonization important importance has. In the article stable development goals done in increasing the economy decarbonization of importance, essence and his/her to oneself typical features, as well as the main tools quoted.*

Key words: *stable development, global climate change, greenhouse gases emission, Paris agreement, ecology, carbon capacity, human activity.*

Entrance

Decarbonization stable and solid on our journey to the future inseparable This is the goal. imperative strategy to reduce aimed at carbonate dioxide (CO2) and other greenhouse gases emissions , they are causing global warming and climate change behind main are the culprits . Decarbonization aspiration through whole world along societies climate change harmful the impact softening, energy safety provides and current and future generations for our planet health save stay with together economic growth to encourage goal did.

Global climate change of the 21st century main from problems one is, this regarding own on time measures done if not increased in the atmosphere greenhouse gases emission increase as a result of global environmental to threats take arrival possible.

Global climate change – of humanity to nature relatively bossless in a relationship to be as a result in the environment of balance to the violation reason Globalization is happening. in the processes coal, oil, natural gas such as hydrocarbon fossil fuels burning greenhouse gas calculated carbonate anhydride and nitrogen oxide gases atmosphere to the air to be released reason will be.

Climate change population marriage to the level negative impact shows, drink water to the shortage and food products to cultivate makes it difficult.

Coming output natural or anthropogenic was carbonate anhydride, nitrogen oxide, sulfur fluoride, ozone, methane, water vapors and one row synthetic emission gases sun energy land in the atmosphere holding remains and as a result The greenhouse effect occurs This is own In turn, the Earth global climate in the world to changes reason will be.[1].

Global climate change consequences prevent in receiving important from directions one the economy decarbonization is considered.

Analysis and results

Global threats prevent to take for the purpose climate changes according to Paris transaction acceptance Made in Paris of the transaction main from the goals

one world in countries waste amount reduce obligation to take by designating placed.

The economy decarbonization is human activity as a result carbon (CO_2) and other greenhouse gases waste reduce This process coal , oil and gas such as digging removable energy from sources solar , wind , hydro and nuclear energy such as clean and stable energy to the sources to pass own inside takes .

Decarbonization main to their goals the following includes:

1. Climate risks Reduce: Greenhouse gases emission reduce, extreme weather events, sea level rise and ecosystems change, global warming and his/her the impact to slow down help gives.

2. Innovations and technologies: decarbonization process energy, transport and working release in the fields new technologies and innovative solutions working exit encourages.

3. Economic opportunities: few carbonaceous to the economy transition again renewable energy and other in the field's stable development and business expansion and new work places create opportunities brought releases.

World in countries energy, transport, industry, construction, agriculture in the economy, finance in the sertor the economy decarbonization wide is being used.

The world in 2021 CO_2 on scale emissions by 36.4 billion tons enough, this waste about 75% mined removable oil, coal, gas fuels burning as a result harvest will be.

Back in 2020 renewable energy sources total world electricity energy working of release about 29 percent organization did, this past for years relatively noticeable is growth.

International energy agency (IEA) data According to, by 2050 carbon neutrality achieve for again renewable resources on a global scale energy working release in the content share from 70 percent increase need.

So, the economy decarbonization - this climate to change against fight for carbon waste and other greenhouse gases emission reduce process is considered.

The economy to decarbonize to achieve help giving main tools:

The economy decarbonization main tools		
1.	**Again renewable energy to the sources transition**	Energy on the balance solar , wind , hydro and geothermal energy share increase
2.	**Energy efficiency**	Industry , transport and in residential sectors equipment update and energy saver technologies and from materials use through energy efficiency increase
3.	**Transport electrification**	Electricity and to hybrid vehicles transition , infrastructure develop through less emissive public transport current to be

4.	**Stable village farm**	Village on the farm to the ground processing in giving organic from fertilizers use minimize
5,	**Carbon technologies**	To the atmosphere being released carbons catch and storage (CCS) technologies working release and current to work , as well as to release in the processes from carbon use .
6.	**Innovations encouragement**	Pure technologies working to release based research and developments support
7.	**Economic measures**	Carbon emissions reduce for economic incentives creative carbon tax or emission trade system current to be
8.	**Education and awareness**	The economy decarbonization importance about public awareness increase
9.	**International cooperation**	Climate to change against struggle according to international contracts and in initiatives participation to grow
10.	**State by support**	**Decarbonization policy and initiatives done increase for state help necessary**

The economy decarbonization advantages gives:

1. **To the climate endurance.** Greenhouse gases emission restriction through decarbonization climate change intensifying going including the impact extreme weather events, sea level rise and ecosystem violations to soften help gives.

2. **Health and prosperity.** Decarbonization as a result air pollution Decreased respiratory diseases and relevant health storage expenses reduce through population to your health positive impact shows.

3. **Economic growth.** Again renewable energy and stable to technologies investments work their places creates, innovates encourages and developing on the networks economic to develop help gives.

4. **Energy security.** Mining removable from fuel give up delay energy independence increases and resources price variability and geopolitical to tensions relatively weakness reduces.

5. **Global cooperation.** Towards decarbonization aspiration international cooperation develops, because countries are facing a global problem solution to do for general, they accept responsibility.

World 2/3 of countries, including G20 countries, by 2045-2060 carbon neutrality to achieve own in front of them goal as by designating [2] The world 2000 most popular countries large from companies about 30 percentage that is, from 700 more than large companies this to the goal added [3].

The economy decarbonization as a result gross internal in the product carbon capacity to reduce By 2050, the world's electricity of energy at least half the rest (probably up to 70%) renewable energy sources using working release forecast is being done. The 21st century to the end come, " clean " to "energy" transition completion probability available. Leader of countries in industry from oil, gas, coal use abbreviation new energy of the policy to the essence, green the economy development far to the long-term global trend is spinning [4].

However, if the global economy is to become carbon neutral by 2050, neutrality if not achieved, gross internal of the product one how many years from 4% to 18% during to decrease take arrival possible [5].

CONCLUSION

The economy decarbonization world countries stable development to their goals to achieve and climate to change against struggle on the way main step It is carbon. waste reduce and sun, wind and hydroelectric power such as less carbonaceous energy to the sources to pass own inside takes.

Decarbonization process climate change as a result to the surface upcoming global problems solution as effective energy policy administration, industry, transportation and village on the farm technological and innovative changes own inside received complex approach demand does.

Low - carbon to the economy transition innovations encouragement, work places create and clean energy to the types transition and economy in the field’s stable development through economic growth for new opportunities opens.

The economy decarbonization not only ecological necessity, maybe further stable, fair and prosperous society create the economy is an opportunity. in decarbonization structural and technological changes to encourage done increase as a result high technological in the fields employment to improve the environment pollution decrease and green in global product markets participation of arrival as a result economic and ecological benefit brings.

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INTENSITY OF SOIL WASH-OFF FROM THE SURFACE OF MOUNTAIN RIVER BASINS AND THEIR MAPPING

Abstract: *The article addresses the issues of changing the intensity of washout from the surface of the river basins of Uzbekistan in altitude zones and their mapping. The river catchments with a natural hydrological regime were chosen as the object of the study. Estimated values of flush modulus for different altitude zones. Mapping of soil washout according to O.P.Shcheglova method on the example of the Chirchik river basin was conducted.*

Keywords: *river; river basin; water discharge; suspended sediment discharge; flush module; flush intensity; mapping.*

Introduction. Determining long-term values of hydrological parameters characterizing the intensity of soil loss from the surface of mountain river basins, such as the discharge and volume of suspended sediment runoff, the erosion modulus, and the erosion depth, and mapping these parameters are important tasks in mountain hydrology.

Many scientists have studied the issues of quantitative assessment and mapping of the intensity of soil and ground loss from the surface of the mountain river basins of Uzbekistan and adjacent territories. In particular, the issues of soil and ground loss and the formation of suspended sediment runoff (SSR) are considered in the works of B.V. Polyakov, G.I. Shamov, G.V. Lopatin, N.I. Makkaveev, A.V. Karaushev, G.N. Khmaladze, M.N. Zaslavsky, K.S. Kabanova, R.S. Chalov, G.I. Shwebs, A.P. Dedkov, R.E. Horton, H. H. Bennett, A. Barat, N. L. Coleman, J. M. Jansen, V.A. Vanoni, W.D. Ellison, J.N. Holeman, W.H. Wisehmeier and others. These works proposed methods for quantitative assessment of runoff from the surface of river basins and scientific approaches aimed at their mapping [3, 5].

In Uzbekistan, the first fundamental studies on this issue were carried out by V.L. Shultz, O.P. Sheglova and others. Their scientific ideas were subsequently developed in the works of A.A. Khanazarov, H.M. Makhsudov, Yu.N. Ivanov, A.R.

Rasulov, S.R. Saidova, Z.S. Sirlibayeva, F.H. Khikmatov and others [5].

The main objective of this study is to evaluate intensity of soil erosion from the surface of mountain river basins and their mapping.

The objectives of the study are as follows:

- improvement of existing methods for quantitative assessment of the intensity of soil erosion from river basins, taking into account the influence of meteorological factors;

- identification of the features of the distribution of the intensity of soil erosion from river basins by altitude zones;

- mapping the intensity of soil erosion from river basins, taking into account the characteristics of their changes according to altitude zones.

Methods and Results of the Study. In this study, erosive activity indicators for both surface and channel runoff were estimated for selected river basins in Uzbekistan using observed suspended sediment runoff data. Specific calculation formulas used in standard hydrological calculations were used.

An analysis of the obtained results revealed changes in the intensity of soil and ground loss from the surface of the studied river basins. It was revealed that the Surkhandarya (Shurchi) River basin is characterized by the most intense soil and ground loss processes. For this river, if the observed average long-term loss moduli are M_R = 504 t/km^{2}per year, then the average loss depth will be h_c = 0,336 mm. At the same time, the annual loss from the surface of this river basin was 4,38·10^6. The erosion meter calculated based these data was h_e = 2976 years. This figure indicates that the surface of the Surkhandarya River basin, on average, will decrease by one meter over 2976 years. The Akchasai River basin (Akcha village), located within the Akhangaran River basin, on the other hand, exhibits minimal surface soil loss. The surface loss modulus for this basin was 4,93 t/km^2·. Compared to the Surkhandarya River basin (Shurchi), the difference is more than 100-fold (Table 1).

Based on this primary objective, this paper further examines changes in the rate of runoff from the surface of river basins across altitudinal zones. The rate of runoff from the surface of river basins, for the purposes of mapping, was assessed based on multifactorial relationships between suspended sediment discharge in rivers and hydrometeorological factors (rainfall, snowmelt, and glacier melt).

Table 1

Indicators of soil loss intensity in river basins

#	River basin	N	Value	Sediment runoff		M_R t/km^2 per year	h_s, mm	h_e, per year
				W_{RG}, 10^3 t	W_{RV}, 10^3 м^3			
1	Chirchik	13	Max	23.02	15.3	406	0, 271	3690
			Min	0.568	0.379	24.4	0.016	62500
2	Akhangaran	12	Max	200	133	159	0.106	9434
			Min	0.631	0.421	4.93	0.003	333333
3	Sanzar + Zaaminsu	7	Max	5.39	3.59	121	0.08 1	12346
			Min	1.51	1.01	10.2	0.007	142857
4	Zeravshan	8	Max	3.34	2.23	133	0.089	11236
			Min	1.48	0.987	5.99	0.004	250,000
5	Kashkadarya	15	Max	248	165	294	0.195	5128
			Min	24.6	16.4	15.7	0.010	100,000
6	Surkhandarya	14	Max	4384	2922	504	0.33 6	2976
			Min	144	96.0	54.1	0.036	27778

Note: N – number of hydrological posts; W_{RG} – sediment runoff, in weight units; W_{RV} - sediment runoff, in volumetric units; M_R - erosion modulus; h_c - erosion layer; h_e - erosion meter.

Normalized regression equations characterizing these multifactorial relationships were obtained. To facilitate calculations of suspended sediment runoff, the values of which enable the calculation of runoff values, special nomograms were compiled based on normalized regression equations (Fig.1).

The accuracy of the calculated nomogram was assessed. For this purpose, the observed suspended sediment discharges ($R_в^ф$) were compared with the values ($R_в^р$), i.e., those calculated using the nomogram. The paired correlation coefficient characterizing the relationship between the observed and calculated suspended sediment discharge values was 0.886 ± 0.046 (Fig.2).

The calculation of washout modules from different altitude zones was carried out using the method of O.P. Shcheglova [6]. Based on the calculated values of washout modules, using modern GIS technologies (Map Info, Arc GIS), a map of soil erosion from the surface of the Chirchik River basin was compiled (Fig. 3).

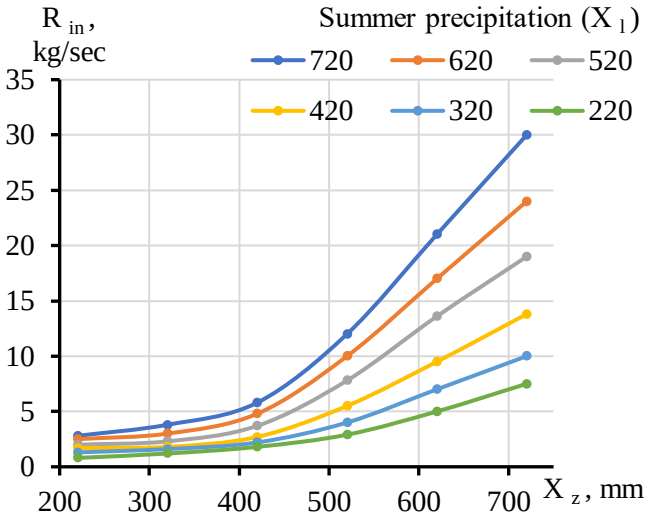


Fig. 1. Nomogram for assessing the suspended sediment discharge of the Akhangaran River (Iertash village) according to winter ($X_з$) and summer ($X_л$ precipitation

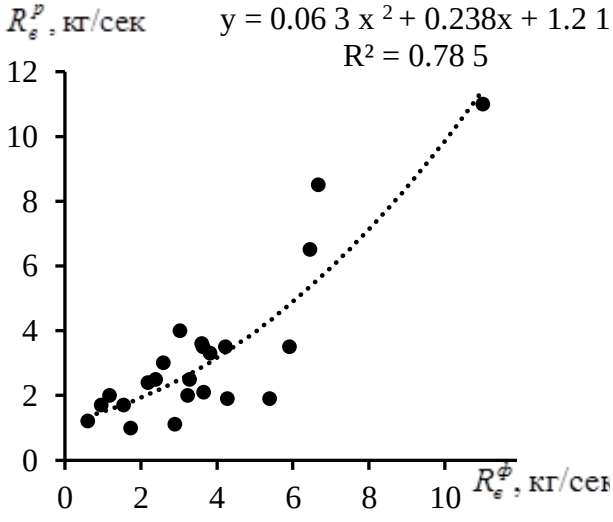


Fig. 2. Graph of the relationship between calculated ($R_в^р$) and actually observed ($R_в^ф$) values suspended sediment runoff

The soil loss map constructed using the above-mentioned sequence made it possible to identify water erosion hotspots, i.e., areas with the most intense loss processes. This, in turn, will serve as the basis for developing targeted action plans to prevent erosion processes on the surface of river catchments.

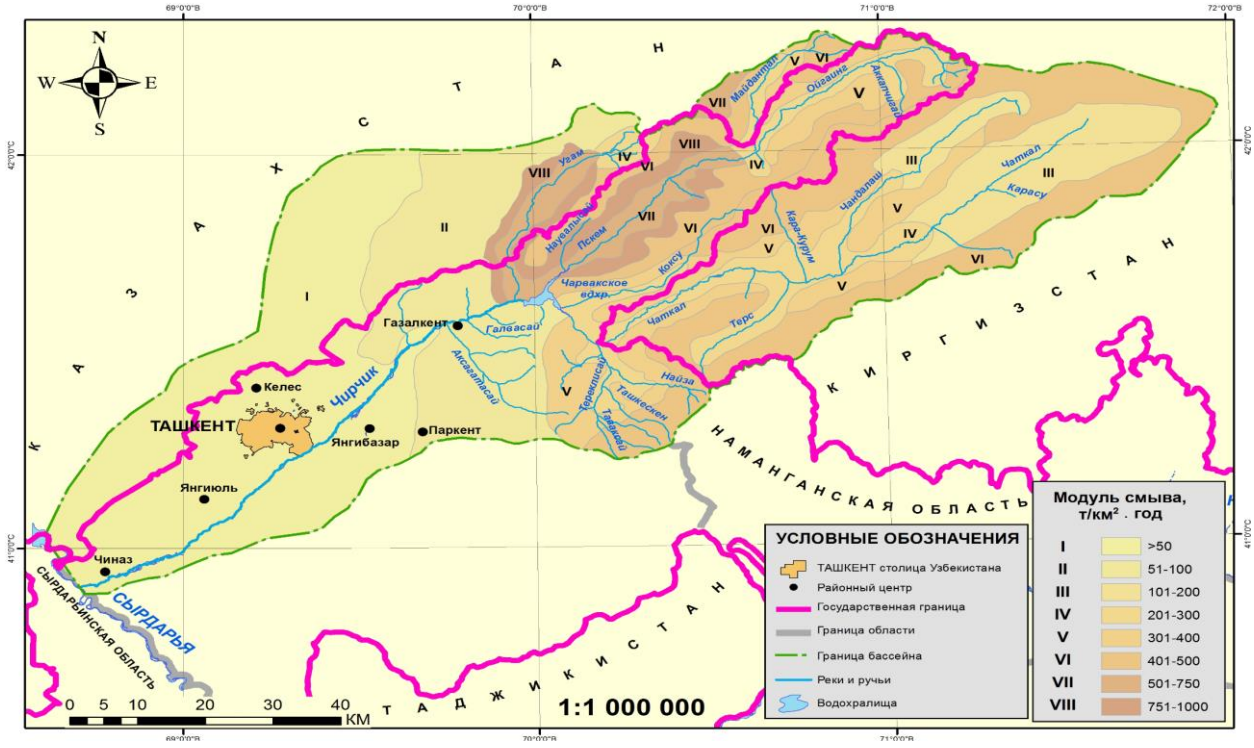


Fig. 3. Map of soil erosion from the surface of the Chirchik River basin

Conclusions. In conclusion, quantitative characteristics of soil loss from the surface of river basins by elevation zones were calculated using O.P. Shcheglova's method. To map soil loss from the surface of river basins, hydrometeorological factors that shape water erosion processes were also taken into account in the calculations. The soil loss moduli calculated for different elevation zones made it possible to compile soil loss maps from the surface of river basins. The soil loss map was compiled using modern GIS technologies (MapInfo, ArcGIS) using the Chirchik River basin as an example.

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ACCOUNTING POLICY FOR MANAGEMENT ACCOUNTING PURPOSES

Abstract: *This article is devoted to the role and importance of accounting policies in the internal management system of a joint-stock enterprise, with both theoretical and practical analytical analysis of their application in management accounting. Accounting policies play a decisive role in providing accurate, reliable, and timely information necessary for managerial decision-making. The article examines the specific features of accounting policies in management accounting directions such as cost calculation, budgeting, transfer pricing, and segment reporting. It also discusses the guidance and methods used to organize production activities. Properly developed, directly applied, and adapted accounting policies provide a solid foundation for achieving strategic objectives, optimizing resource utilization, and enhancing profitability.*

Keywords: *management accounting, accounting policy, cost calculation, budgeting, cost management, transfer pricing, segment reporting.*

Introduction

In today's rapidly developing market economy, ensuring stability, supporting growth, and improving managerial efficiency requires effective internal management mechanisms. The core of these mechanisms is the management accounting system, which provides enterprise management and relevant departments with analytical, timely, and strategic information necessary for decision-making.

The reliability and usefulness of management accounting directly depend on the organization's **accounting policy**. While financial accounting policies focus on external reporting to investors, creditors, and regulatory authorities, management accounting policies are designed to support internal planning, monitoring, and control processes. The primary goal of this study is to examine the theoretical foundations of accounting policies adapted for management accounting purposes, demonstrate their practical relevance, and analyze their impact on managerial decision-making.

Literature Review and Methodology

LiteratureReview:

The issues of management accounting and accounting policy have been extensively studied by leading scholars in economics and accounting, including S.S. G'ulomov,

A.M. Abdukarimov, Y.V. Sokolov, A.D. Zaripov, and others. Sokolov emphasizes that accounting policies play a central role not only for financial reporting but also for internal management processes. Researchers highlight how accounting methods, budgeting techniques, costing methods (e.g., absorption costing), and segment reporting approaches are reflected in management accounting policies. Budgeting methodologies, continuous and variable cost control, and transfer pricing mechanisms remain essential components of an effective accounting policy. Literature analysis shows that well-developed accounting policies provide management with fast analytical insights into profits and revenues by activity segment, which is critical for strategic decision-making. The study uses scientific methods such as systematic analysis, comparative analysis, synthesis, and logical generalization. Management accounting policy is considered as an element of the broader management system, and its interconnections within the overall organizational framework are examined. Comparative methods allow the analysis of differences in accounting approaches, particularly in cost calculation methods. In practical research, the impact of using Activity-Based Costing (ABC) compared to traditional costing methods on managerial decision quality was evaluated. Based on the findings, practical recommendations were developed for aligning accounting policy sections into a coherent system. Developing an accounting policy for management accounting requires focus on the enterprise's characteristics, operational specifics, and strategic objectives. Practice shows that choosing the right costing method significantly affects operational efficiency and pricing policy. For instance, in enterprises producing diverse and complex products, ABC costing provides a much more accurate product or service cost compared to traditional methods.

Comparative Analysis of Costing Methods in Management Accounting Policy

Table 1.

Features	Traditional Full Costing	Direct Costing	ABC Costing (Activity-Based)
Treatment of Fixed Costs	Included in full cost	Charged to financial accounts	Allocated by activity type
Basis for Decision-Making	Long-term pricing	Short-term decisions (e.g., special orders)	Activity analysis
Usefulness of Information	Suitable for financial reporting	Sensitive to profitability changes	High for evaluating cost drivers

Source: Compiled by the author based on various literature.

Direct costing is optimal for quick management decisions and evaluating contribution margins since it considers only variable costs. Meanwhile, ABC costing improves accuracy by reflecting actual resource consumption in the management accounting system.

Impact of Transfer Pricing Methods on Internal Management

Table 2.

Transfer Pricing Method	Application Description	Advantages	Disadvantages
Market-based	Used when market price exists	Supports divisional autonomy	Cannot be applied if no market price
Cost-based	Actual or standard cost plus markup	Simple, minimal disputes	May hide inefficiencies
Negotiated	Set mutually between divisions	Motivates managers	Requires extensive negotiation time

Source: Author's summary.

Discussion indicates that the choice of transfer pricing method must consider divisional independence and incentives for decision-making. For example, in conditions where an internal market exists, market-based pricing is preferable. If there is no internal market, cost-based pricing is more practical. Accounting policies must clearly define methods and conditions, while budgeting should specify control distribution and assessment criteria.

Conclusion

Accounting policy for management accounting purposes is a key strategic and operational tool for internal enterprise management. Its primary function is to provide reliable, timely, and analytical information for strategic, tactical, and operational decision-making. Unlike strict financial accounting regulations, management accounting policies can be adapted based on the complexity of production processes and the type of information required by managers.

A well-developed accounting policy ensures:

- Continuous monitoring and control of operations;
- Accurate tracking of costs and profitability;
- Effective budgeting and performance evaluation;
- Clear inter-division relationships through proper transfer pricing.

Changes in production processes, market conditions, or technology require ongoing review and adjustment of accounting policies, ensuring sustainable economic development. Properly implemented, management accounting policies serve as a fundamental tool for achieving strategic advantages and operational excellence.

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DECISION-MAKING AND RELEVANT INFORMATION IN MANAGEMENT ACCOUNTING

Abstract: *This article explores the critical role of relevant information in managerial decision-making within enterprises. Effective management decisions require timely, accurate, and decision-oriented information, which reflects the real economic environment of the organization. Relevant information allows managers to evaluate alternative courses of action, forecast potential outcomes, minimize risks, and align decisions with strategic objectives. The study highlights both quantitative and qualitative aspects of relevant information, the mechanisms of its collection and analysis through management accounting systems, and its practical application in operational, tactical, and strategic decisions. Examples and analytical reasoning demonstrate how proper utilization of relevant information enhances efficiency, profitability, and competitive advantage.*

Keywords: *management accounting, relevant information, decision-making, strategic management, performance evaluation, cost analysis, business efficiency, internal reporting, risk assessment, managerial control.*

Introduction

In today's competitive and rapidly changing business environment, the ability to make informed and timely decisions is one of the key determinants of an enterprise's success. Every managerial decision—whether operational, tactical, or strategic—requires access to high-quality information. Management accounting serves as a systematic tool to provide this information, enabling managers to monitor internal processes, evaluate performance, control costs, and plan for future activities.

Not all information available to managers is equally useful. Only **relevant information**—data that has the potential to influence a particular decision and differs across alternatives—is essential for effective decision-making. Relevant information is future-oriented and directly connected to the decision at hand. For example, when considering whether to invest in new equipment, relevant data would include projected production capacity, expected cost savings, potential revenue, and associated risks. Historical costs or sunk investments, which cannot be changed by current decisions, are irrelevant.

The Nature and Importance of Relevant Information

Relevant information serves as the foundation for rational decision-making. Its main characteristics include:

1. **Decision-oriented** – The information must relate directly to the decision to be made.

2. **Future-focused** – Only information that impacts future outcomes is relevant.

3. **Differentiated among alternatives** – Data must vary depending on the choice of course of action.

Relevant information can be quantitative, such as costs, revenues, production volumes, resource usage, and profitability metrics. It can also be qualitative, such as brand reputation, employee morale, customer satisfaction, or environmental impact. Both types of information are critical in assessing the consequences of managerial decisions. For instance, when a company decides to discontinue one product line and focus on another, the manager must consider:

- Avoidable costs for each product line;
- Expected revenues and profit contribution;
- Market demand forecasts;
- Resource allocation constraints;
- Strategic fit with long-term organizational goals.

Quantitative data allows precise calculation of costs and profits, while qualitative data supports long-term sustainability and stakeholder satisfaction. The combination of both ensures balanced and informed decision-making.

Types of Decisions and Relevant Information Application

Management decisions can be categorized into three main types:

1. **Strategic decisions** – Long-term decisions affecting the overall direction of the organization (e.g., entering new markets, launching investment projects, mergers, or acquisitions). Relevant information includes market research, financial forecasts, risk assessment, and strategic alignment.

2. **Tactical decisions** – Medium-term operational adjustments that improve efficiency and optimize resources (e.g., production planning, pricing strategies, marketing campaigns). Relevant information here involves cost analysis, sales projections, and capacity utilization.

3. **Operational decisions** – Short-term, day-to-day management of business activities (e.g., allocating materials, scheduling labor, managing inventory). Relevant information must be timely, precise, and actionable to allow immediate response to operational challenges.

Role of Management Accounting in Relevant Information Provision

Management accounting systems are designed to generate, process, and present relevant information to support managerial decisions. Their key functions include:

1. **Data Collection** – Gathering financial and operational data, including costs, revenues, and resource utilization.

2. **Data Processing** – Converting raw data into meaningful information through calculation, categorization, and analysis.

3. **Comparative Analysis** – Evaluating alternative scenarios and projecting outcomes based on relevant variables.

4. **Decision Support** – Presenting data in forms (reports, dashboards, KPIs) that facilitate informed choice by managers.

5. **Monitoring and Feedback** – Assessing the results of decisions to improve future processes and information accuracy.

By distinguishing between relevant and irrelevant information, management accounting ensures that managerial focus remains on data that materially affects business outcomes.

Practical Example

Consider a company producing two products, A and B, with the following characteristics:

Table 1

Product	**Production Cost (UZS)**	**Profit per Unit (UZS)**	**Market Demand**
A	40,000	10,000	High
B	55,000	15,000	Medium

If production capacity is limited to 1,000 units, managers must evaluate which product yields the highest overall contribution. Relevant information includes not only the numerical profit per unit but also market demand and production feasibility. Allocating resources to Product A may maximize revenue due to high demand, even though Product B has a higher per-unit profit.

Conclusion: Relevant information is a critical resource for managerial decision-making. It enables managers to assess alternatives, predict outcomes, minimize risks, and achieve strategic objectives. Management accounting systems provide the necessary framework to identify, collect, analyze, and report such information in a structured and timely manner. By focusing on relevant data, organizations can improve operational efficiency, profitability, and long-term competitiveness. Effective use of relevant information strengthens decision quality, ensuring sustainable business growth and value creation for stakeholders.

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EVALUATION OF THE EFFECTIVENESS OF EARLY REHABILITATION IN PATIENTS AFTER LUMBAR MICRODISCECTOMY

Abstract. *Lumbar microdiscectomy is one of the most commonly performed neurosurgical procedures for the treatment of herniated intervertebral discs. Postoperative rehabilitation plays a crucial role in functional recovery, prevention of recurrent pain, and improvement of quality of life. Early initiation of rehabilitation interventions, including physiotherapy, neuromuscular re-education, and gradual physical activity, can significantly shorten recovery time and reduce postoperative complications. This review analyzes the main approaches, timing, and effectiveness of early rehabilitation programs following lumbar microdiscectomy, based on recent clinical and experimental studies.*

Keywords: *microdiscectomy, lumbar spine, rehabilitation, physiotherapy, early mobilization, neurosurgery, functional recovery.*

Introduction. Lumbar disc herniation is one of the leading causes of low back pain and radiculopathy, significantly affecting the working-age population worldwide. Microdiscectomy remains the gold standard surgical intervention, offering minimal tissue damage and rapid postoperative recovery [1]. However, the success of surgery depends not only on the technical precision but also on postoperative rehabilitation, which ensures functional recovery and minimizes recurrence risk.

Recent research has shown that early mobilization and rehabilitation can accelerate neuromuscular restoration, enhance patient satisfaction, and prevent chronic pain syndromes [2]. The concept of “early rehabilitation” typically involves initiating physical therapy and functional exercises within the first few days after surgery under professional supervision.

Pathophysiological rationale for early rehabilitation. After lumbar microdiscectomy, patients often experience muscle weakness, altered biomechanics, and reduced spinal stability. Immobilization or delayed rehabilitation may lead to muscle atrophy, joint stiffness, and fibrosis around the surgical site. Early rehabilitation aims to restore normal spinal kinematics, strengthen paraspinal muscles, and promote neural recovery [3,8].

Neurophysiological studies have demonstrated that controlled mobilization stimulates proprioceptive feedback mechanisms, which are essential for motor control and postural balance. Moreover, early movement enhances local blood circulation, prevents thrombosis, and supports wound healing.

Rehabilitation protocols after lumbar microdiscectomy. The rehabilitation process is generally divided into three main phases: early, intermediate, and late.

1. Early Phase (0–2 weeks post-surgery):

The primary goal is to minimize pain and inflammation while promoting gentle mobility. Activities include breathing exercises, ankle pumps, gentle leg movements, and isometric contractions of the abdominal and gluteal muscles. Patients are encouraged to sit and walk within 24–48 hours postoperatively, depending on their condition [4].

2. Intermediate Phase (2–6 weeks post-surgery):

This stage focuses on improving flexibility, endurance, and strength of the lumbar and pelvic muscles. Supervised physiotherapy includes stretching, pelvic tilts, and core stabilization exercises. Hydrotherapy and balance training may also be introduced to improve coordination and gait stability.

3. Late Phase (6–12 weeks and beyond):

The objective is to restore full functionality and enable the patient to return to normal daily activities or occupational tasks. Progressive resistance training, proprioceptive neuromuscular facilitation, and ergonomic training are emphasized to prevent reinjury [5,9].

Clinical effectiveness of early rehabilitation. Several clinical trials have demonstrated that early postoperative rehabilitation after lumbar microdiscectomy leads to faster pain reduction and functional improvement compared to delayed programs. A randomized study by Ostelo et al. (2016) reported that patients who began supervised exercise therapy within two weeks of surgery experienced significantly improved lumbar function and earlier return to work [6]. Similarly, postoperative rehabilitation focusing on core stabilization reduced recurrence rates of disc herniation by 25–30% in long-term follow-up studies.

Furthermore, early rehabilitation has been associated with improved psychological outcomes. Patients who participate in structured physical therapy programs exhibit reduced anxiety, depression, and fear-avoidance behavior, which are known to delay recovery.

Modern approaches and technologies in rehabilitation. Recent advances in rehabilitation medicine have introduced new technologies to optimize postoperative recovery. These include robot-assisted training, virtual reality-based exercises, and neuromuscular electrical stimulation (NMES). NMES has proven effective in preventing paraspinal muscle atrophy and enhancing proprioception. In addition, wearable motion sensors and tele-rehabilitation systems allow remote monitoring and individualized feedback, which are particularly beneficial for patients in rural areas [7,10].

Integrating these technologies with traditional physiotherapy provides a multimodal approach to recovery, ensuring both physical and neurocognitive benefits.

Challenges and future perspectives. Despite the growing evidence supporting early rehabilitation, several challenges remain. Variations in patient adherence, surgical technique, and access to specialized physiotherapy services can affect

outcomes. There is also a need for standardized rehabilitation protocols tailored to patient age, comorbidities, and physical demands. Future studies should focus on developing personalized rehabilitation algorithms incorporating biomechanical assessment, AI-based motion analysis, and predictive modeling to optimize functional recovery.

Conclusion

Early rehabilitation following lumbar microdiscectomy is an essential component of postoperative care, contributing to faster recovery, reduced complications, and improved quality of life. Timely initiation of movement and structured exercise therapy restore spinal stability and prevent chronic pain. Integration of modern rehabilitation technologies and individualized approaches will further enhance the effectiveness of recovery programs.

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BOLALARNING TIL QOBILIYATINI ONTOLINGVISTIK NUQTAYI NAZARDAN RIVOJLANTIRISH METODIKASI

Annotatsiya. *Ushbu maqolada bolalarda ontolingvistik qobiliyatlarni shakllantirish va ularni muntazam ravishda rivojlantirishning pedagogik shart-sharoitlari yoritilgan. Shuningdek, bolalarning tengdoshlari hamda kattalar bilan o‘zaro muloqot jarayonida faol ishtirok etish ko‘nikmalarini rivojlantirish orqali ularni mustaqil hayotga tayyorlash masalalari tahlil qilinadi. Pirovard natijada bolalarda muloqot madaniyati va muloqotchanlik qobiliyatini takomillashtirish yo‘llari haqida fikrlar bayon etilgan.*

Kalit so‘zlar: *ontolingvistik qobiliyat, erkin ishtirok, kasbiy ko‘nikmalar, o‘zaro munosabat, faoliyat, samara, til, nutq, noverbal vositalar, verbal vositalar, muloqot.*

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THE METHODOLOGY OF DEVELOPING CHILDREN'S LANGUAGE ABILITY FROM AN ONTOLINGUISTIC PERSPECTIVE

Annotation. *The article provides information about the conditions for systematically and systematically improving ontolinguistic work in children, increasing children's ability to freely participate in interactions with peers and adults, and ultimately developing communication skills.*

Key words: o*ntolinguistic ability, free participation, professional skills, interaction, activity, effectiveness, language, speech, nonverbal means, verbal means, communication.*

Hozirgi globallashuv va axborot texnologiyalari tez rivojlanayotgan davrda**,** bolalar nutqi ham tez o‘zgaruvchan jarayon sifatida namoyon bo‘lmoqda. XXI asrning asosiy belgilaridan biri — raqamli texnologiyalar, ko‘p tillilik va axborot oqimining yuqori sur’ati bo‘lib, bu holat bolalarning nutqiy rivojlanishiga bevosita ta’sir ko‘rsatmoqda. Ontolingvistika — bolaning nutqiy rivojlanishini o‘rganadigan fan sifatida, zamonaviy sharoitda yangi ilmiy yondashuvlar va tadqiqotlarni talab etmoqda. Shu bois, ushbu maqolada global transformatsiya sharoitida bolalar nutqining rivojlanish jarayoni, mavjud muammolar va ularni bartaraf etish yo‘llari tahlil qilinadi.

Ontolingvistika — bolaning nutqiy rivojlanishini individual rivojlanish (ontogenez) jarayonida o‘rganadigan fan bo‘lib, transformatsiya davri unda alohida ahamiyat kasb etadi. Mazkur davrda bolaning nutqiy qobiliyatlari jadal rivojlanadi, lug‘at boyligi kengayadi, grammatik tizim shakllana boshlaydi. Shu bilan birga, tez o‘zgaruvchan muhit ta’sirida turli nutqiy muammolar va kommunikativ to‘siqlar ham vujudga kelishi mumkin. Til va nutqning eng muhim vazifasi — insonlar o‘rtasidagi muloqotni ta’minlashdir. Til orqali bola nafaqat fikrini ifodalaydi, balki atrof-muhitni anglaydi, dunyoqarashini kengaytiradi. Muloqot jarayonida fikrlar erkin ifoda etilib, umumiy g‘oya va tushunchalar shakllanadi. Bolalarda olam va uning tuzilishi haqidagi tasavvurlar dastlab murg‘ak va cheklangan bo‘ladi. Agar bu jarayon o‘z vaqtida rivojlantirilmasa, bola dunyoqarashi tor va bir yoqlama bo‘lib qolishi mumkin. Shuning uchun til va nutq yordamida muloqotni rivojlantirishda bolalar bilan yakka tartibda suhbatlar o‘tkazish, ularni o‘z fikrini erkin ifodalashga rag‘batlantirish muhimdir. Bunday yondashuv natijasida bolalarda kommunikativ kompetensiya shakllanadi, ular mustaqil fikrlash, o‘z nuqtai nazarini asoslash va muloqot madaniyatiga amal qilish ko‘nikmalariga ega bo‘ladilar. Ma’lumki, o‘quvchilarning nutqining boy, ravon, shu bilan birga, adabiy til me’yorlariga muvofiq bo‘lishi ularning maktab ta’limi yoshida olgan bilimlariga asoslanishi o‘z isbotini topgan haqiqatdir. Mazkur yoshda bola jismoniy, ruhiy, ma’naviy, shu bilan birga nutqiy bilimga ehtiyoj sezadi. Bola nutqdan o‘z fikri, his-tuyg‘ularini ifodalashga rag‘bat ko‘rsatadi, qiziqadi, undan atrofdagi insonlarga ta’sir qilish uchun faol foydalanadi. Bola tashqi dunyoni ruhiy jarayonlar yordamida, shuningdek, nutq yordamida bilib olish imkoniyatini doim sezib turadi. Bu o‘rinda buyuk adib Abdurauf Fitratning quyidagi fikrini eslab o‘tish joiz: “Suv qaysi rangdagi idishda bo‘lsa, o‘sha rangda tovlangani kabi bolalar ham qaysi muhitda bo‘lsalar, o‘sha muhitning har qanday odat va axloqini qabul qiladilar”. [8, 68; 208]

Bolalarda bunday nutqiy vaziyatlarni shakllantirish va rivojlantirishda, albatta, pedagog va ota-onalarning o’rni nihoyatda katta. Biroq, amaliyotdagi kuzatishlarimiz shuni ko‘rsatdiki, bolalarda ontolingvistik qobiliyatlarni shakllantirish kattalar va pedagoglar nazaridan chetda qolmoqda. Aksariyat bolalar o‘zaro bir-birlarini tushunmaydi, tinglashni ham istamaydi, ularda jahldorlik alomatlari seziladi va o‘zaro kelisha olmasliklaridan ular orasida kichik nizolar kelib chiqishi kuzatilmoqda. Yuzaga kelgan ushbu holatlar nafaqat bolalar o‘rtasidagi o‘zaro muloqotlarga to‘siq bo‘ladi, balki ta’limiy-tarbiyaviy jarayonlarga ham salbiy ta’sir ko‘rastishi aniq.

Bugun mamlakatimizda ta’lim-tarbiya, jumladan, maktab ta’limi sohasida tub islohotlar amalga oshirilmoqda. Bolalarni maktabga tayyorlash jarayonlarida ularning tengdoshlari va atrofdagilar bilan muloqotga kirishishida bir qator muammolarga duch kelinmoqda. Ayni paytda, boshlang‘ich maktabga o’qitishga o‘tish bola psixikasi uchun juda qiyin sinov hisoblanadi. [6,207]

Masalani o‘rganish va kuzatishlarimiz natijasida quyidagi muammolar aniqlandi:

– boshlang‘ich ta’ilm yoshidagi bolalarda lug‘at boyligining maktabda o‘qitiladigan umumta’lim fanlarini egallashi uchun yetarli emasligi;

– bolalarning o‘z fikrini erkin ifodalashi, nutqiy muhitga mos so‘zlashish ko‘nikmalarini rivojlantirishiga oid didaktik ta’minotning talab darajasiga javob bermasligi;

– ota-onalarning o‘z farzandini maktab ta’limiga nutqiy jihatdan tayyor bo‘lishining mezonlari va talablaridan yetarlicha xabar topmaganliklari;

–bolalarning muloqot jarayonida o‘z fikri, hissiyotlari va taassurotlarini namoyon eta olmayotganligi;

–bolalarning iltimos yoki ma’lumotlarni o‘z tengdoshlariga tugal aytolmasligi, tanish insonlari bilan muloqotga dadil kirisha olmasligi;

–bolalarda kompetensiyaviy ko‘nikmalarni maqsadli shakllantirishga yo‘naltirilgan o‘quv va didaktik topshiriqlarning tizimlashtirilmaganligi;

–bolalarda nutqning dialogik shaklini yetarli darajada shakllanmaganligi hamda kommunikativlikni rivojlantirishga mo‘ljallangan metodik manbalarning yetishmasligi;

–bolalar rivojlanishi uchun ijtimoiy-hissiy, nutqiy, muloqot, o‘qish va yozish malakalariga qo‘yiladigan davlat talablarini ular tomonidan samarali egallanishini ta’minlovchi didaktik tizimning ishlab chiqilmaganligi;

–bolalarda ontolingvistik qobiliyatlarni shakllantirishga yo‘naltirilgan texnologiyalar aniqlanib, amaliyotga joriy etilmaganligi.

Ontolingvistik qobiliyatlar bolalar xarakterining shakllanishida asosiy omillardan biri sifatida qaraladi hamda ularni ijtimoiy va intellektual jihatdan rivojlantirishda muhim vosita sifatida talqin etish mumkin. Boshlang‘ich ta’lim yoshidagi bolalarda ontolingvistik qobiliyatlarni shakllantirish jarayoni ularning ijtimoiy ko‘nikmalarini rivojlantirish bilan chambarchas bog‘liqdir.

Mazkur jarayonni samarali amalga oshirishda zamonaviy pedagogik va axborot texnologiyalaridan foydalanish muhim ahamiyat kasb etadi. Bu orqali bolalarning maktab ta’limiga moslashuvi yanada oson va tabiiy kechadi.

Inson bolasining ijtimoiy hayotga moslashuvi murakkab va asta-sekinlik bilan kechadigan jarayondir. Uning jamiyatdagi o‘rni, avvalo, nutqiy faolligi va fikrni ifoda etish qobiliyati bilan belgilanadi. Chunki nutq — bu amaliy ongning ifodasidir. Shunday ekan, bolada ontolingvistik qobiliyatlarni shakllantirish va ularni muntazam takomillashtirib borishning eng muhim sharti — bola ongini har tomonlama o‘stirish, uni faol muloqot muhiti bilan o‘rab olishdir.

Agar bolaning ijtimoiy ko‘nikmalari yetarlicha shakllanmagan bo‘lsa, u tengdoshlari va kattalar bilan muloqotda erkin ishtirok eta olmaydi, natijada uning ijtimoiy jarayonlarda faol qatnashish imkoniyatlari cheklanadi.

Shu bois, ushbu maqolada ilgari surilgan asosiy g‘oya — bolalarda ontolingvistik qobiliyatlarni shakllantirish orqali ularni maktab ta’limiga va mustaqil hayotga tayyorlash, pirovard natijada esa muloqotchanlikni rivojlantirish asosida ularni jamiyatga muvaffaqiyatli moslashtirish masalasidir.

Alohida ta’kidlash lozimki, bolalarga ontolingvistik qobiliyatlarni shakllantirishda muloqotning verbal va noverbal vositalaridan o‘rinli foydalanishni

o‘rgatish lozim. Shundagina ular muloqot vaqtida vaziyatga qarab savol va javob berishga odalanadilar, suhbatdoshlariga o‘z fikrlarini bildirishadi, iltimos, maslahat va takliflarini ayta oladi. Bundan tashqari, pedagoglar bolalarni nutqiy madaniyat qoidalariga rioya qilgan holda suhbatlashishga o‘rgatishi maqsadga muvofiq. Bolalarda verbal rivojlanish asosida nutqning kommunikativ vazifasi amalga oshadi. Ushbu vazifaning o‘z vaqtida bajarilishi bolaning ongi va tafakkuriga bog‘liq. Nutq jarayonlarida bolalarda erkin so‘zlash, turli nutq shakllaridan foydalanish, maslahat, ma’lumotlar bera olish ko‘nikmalari paydo bo‘lsa, bu ularda kommunikativ kompetensiya shakllanganidan dalolat beradi. Shuningdek, bolalar o‘zlarida kommunikativ kompetensiya shakllantirishi uchun til vositalarini o‘zlashtirishsh, o‘z fikrlarini nutq vositalari yordamida bayon etishsh, ma’lumotlarni uzatishda mantqiy fikrlay olishlari zarur. Bolalarda kommunikativ faoliyatni amalga oshirishning omillaridan birini til vositalaridan foydalanish ehtiyoji tashkil etadi. Ontolingvistik qobiliyatlarni shakllantirishda muhim o‘rin tutuvchi mantiqiy fikrlash katta tarbiyaviy ahamiyatga ega. Mantiqiy fikrlash bolalardagi o‘quv-bilish faolligini rivojlantirishda ham muhim o‘rin egallaydi. Bolalar nutqining me’yorda rivojlanishi kommunikativ xulq-avtorga bevosita bog‘liq. Kattalar bolalarga murojaat qilganlarida ularga kerakli yo‘l-yo‘riq ko‘rsatishga intiladilar, harakatlarni to‘g‘ri bajarish haqida tushuncha beradilar, suhbat vaqtida savollarga vaqt ajratib, bolalar nutqini nazoratga oladilar.

Bugungi raqamli asrda gadjetlarga haddan tashqari qaramlik ham bolalarning tabiiy muloqot tajribasini kamaytirmoqda. Do‘stlar va ota-onalar bilan jonli muloqotning kamayishi natijasida nutqiy rivojlanish sekinlashadi, lug‘at boyligi kengaymaydi, mantiqiy fikrni og‘zaki ifodalash qobiliyati pasayadi. Shunday holatda bola qisqa jumlalar va tayyor iboralar bilan cheklanadi, natijada nutqning tabiiy ravonligi va ifodaviyligi shakllanmay qoladi. Zero, boshlang‘ich ta’limning samaradorligi — bu 7–9 yoshli bolalarning maktab ta’limiga har tomonlama tayyorgarligi, mustaqil hayotda o‘z o‘rnini topa olishi hamda shaxs sifatida shakllanish darajasi bilan belgilanadi.

Mamlakatimiz o‘z taraqqiyotining Uchinchi Renessansiga qadam qo‘yayotgan hozirgi davrda “Yangi O‘zbekiston maktab ostonasidan boshlanadi” [2,56] degan shiorning o‘rtaga tashlangani bejiz emas, albatta. Prezident Shavkat Mirziyoyevning asarlarida ilgari surilgan ijtimoiy rivojlanishga oid fikr va mulohazalar barcha jabhadagi muvaffaqqiyatlarimizning dasturulamali sanaladi. Jumladan, bolalar tomonidan jamiyatda qabul qilingan me’yor va talablarni o‘zlashtirish, milliy-ma’naviy qadriyatlarni anglash, tengdoshlari, kattalar bilan bo‘ladigan muloqotni rivojlantirish, muloqotda mustaqil bo‘lish, o‘z xatti-harakati va qarashlarini maqsadli yo‘naltirish, ijtimoiy-hissiy intellektni rivojlantirish, tengdoshlari bilan hamkorlikdagi faoliyatga tayyor turish, kattalar va o‘rtoqlariga hurmat bilan munosabatda bo‘lish kabi talablarni amalga oshirishda ham mazkur fikr va mulohazalar katta ahamiyatga ega.

Boshlang‘ich ta’lim davrida muloqot qobiliyatlarini rivojlantirish juda muhimdir. Bu davrda bolalarning jamiyat hayotiga moslashishi, faol va ma’suliyatli ijtimoiy mavqega ega bo‘lishi, o‘zini anglay olishi, har qanday shaxs bilan doimo

til topishishi va do‘stlashishi uchun zarurdir, bu esa ko‘p vaqt talab qiluvchi jarayon sanaladi, chunki bola rivojlanishi bilan birga uning his-tuyg‘ulari, atrof-olamga munoasbati ham ham o‘zgarib boradi.

Inson bolasining ijtimoiy hayotga ko‘nikishi juda sekin amalga oshadigan jarayon sanaladi. Uning hayotdagi o‘rni nutqi bilan belgilanadi. Nutq esa amaliy ong sanaladi. Demak, bolalarda ontolingvistik qobiliyatlarini shakllantirish va muntazam takomillashtirib borish shartlaridan biri bu – bola ongini har jihatdan o‘stirishga borib taqaladi. Bu jarayondagi bosh mezon uni o‘rab turgan muhim sanaladi. Ijtimoiy ko‘nikmalari yetarlicha shakllanmagan bola tengdoshlari va kattalar bilan o‘zaro munosabatlarda erkin ishtirok eta olmaydi va uning ijtimoiy-iqtisodiy jarayonlarda harakatlanish imkoniyatlari chegaralanib qoladi. Shu bois, mazkur kichkina tadqiqot ishimizda ilgari surilgan g‘oya bu –bolalarda ontolingvistik qobiliyatlarini shakllantirish orqali ularni mustaqil hayotga tayyorlash, pirovard natijada muloqotchanlikni rivojlantirish vositasida ularni jamiyatga moslashtirishdan iborat.

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THE ROLE OF INNOVATIVE ECONOMY IN THE CONDITIONS OF NEW UZBEKISTAN

Annotation: *Within the framework of New Uzbekistan's development strategy for 2017–2030, the innovative economy has been designated as the primary driver of national economic growth. This study provides an in-depth analysis of the impact of innovations on economic growth, export diversification, youth employment, digital transformation, environmental sustainability, and social well-being. Drawing on data from the World Bank, UN, Uzbekistan's Ministry of Innovative Development, IT-Park, and the Statistics Agency, it highlights successful cases such as the "One Million Uzbek Coders" project, IT-Park ecosystem, "New Uzbekistan" technoparks, and the "Zero Risk" startup program. The article emphasizes the necessity of public-private partnerships (PPP), venture capital, intellectual property protection, education reform, research institutions, and digital infrastructure to advance the innovative economy. It is substantiated with quantitative indicators: Uzbekistan's position in the Global Innovation Index (2024 — 87th place, +25 positions since 2020) and a 12-fold increase in IT services exports from 2020–2024 ($25M → $300M). In conclusion, for New Uzbekistan, the innovative economy is not merely a growth engine but a strategic key to global competitiveness, youth potential, sustainable development, and public prosperity.*

Key words: *innovative economy, New Uzbekistan, digital transformation, IT-Park, startup ecosystem, "One Million Uzbek Coders", venture capital, export diversification, youth employment, sustainable development, intellectual property.*

Since the launch of the New Uzbekistan development strategy in 2017, the Republic of Uzbekistan has embarked on an ambitious journey to transition from a resource-dependent, centrally planned economy to a modern, open, and innovation-driven economic model. Under the visionary leadership of President Shavkat Mirziyoyev, the country has embraced a bold reform agenda grounded in the principle that "there is no development without innovation". This philosophy became the cornerstone of the National Strategy for Innovative Development for 2019–2030, officially approved in 2019, which positions the innovative economy not merely as a sector but as the central engine of sustainable national progress.

The transformation is nothing short of remarkable. In less than a decade, Uzbekistan has moved from economic isolation—characterized by heavy reliance on cotton, natural gas, and gold exports—to becoming one of the fastest-growing digital economies in Central Asia. The numbers tell a compelling story:

Indicator	2016	2024	Growth
GDP per capita (current USD)	$1,800	$3,200	**+78%**
IT services exports	$12 million	$300 million	**×25**
Number of registered startups	<100	**>3,500**	**×35**
Youth employment in IT sector	2%	**18%**	**×9**
Global Innovation Index ranking	112th	**87th**	**+25 positions**

Source: World Bank, Ministry of Innovative Development, IT-Park, Global Innovation Index 2024

This rapid evolution did not happen by chance. It is the result of targeted institutional reforms, massive investments in human capital, creation of innovation ecosystems, and strategic integration into global digital value chains. Key milestones include:

- Establishment of IT-Park Uzbekistan (2019) – a tax-free digital hub that now hosts over 1,200 resident companies and generates $420 million in annual revenue
- Launch of the "One Million Uzbek Coders" initiative (2020) – a nationwide free coding education program that has trained over 650,000 young people, with 85,000+ securing IT jobs at salaries 3–4 times the national average
- Creation of "New Uzbekistan" technoparks in Tashkent, Samarkand, and Bukhara – state-of-the-art innovation clusters combining R&D, prototyping, and commercialization
- "Zero Risk" startup support program – providing $50 million in seed funding, mentorship, and regulatory sandboxes, resulting in 1,800 supported ventures and 38% reaching Series A

The innovative economy in New Uzbekistan is more than a policy buzzword—it is a paradigm shift. It represents a deliberate move away from the extractive growth model toward a knowledge-based, inclusive, and sustainable economic architecture. This shift is particularly critical in a country where over 60% of the population is under 30, creating both a demographic dividend and an urgent imperative to generate high-value, future-proof jobs.

Moreover, innovation is being leveraged as a tool for social transformation. Digital public services now cover 98% of the population, saving citizens 45 million hours annually. AgriTech solutions using drones and AI have reduced water usage in irrigation by 40%, supporting both food security and environmental goals. E-commerce platforms like Uzum—valued at $1.2 billion in 2025—are not only driving consumer spending but also creating thousands of micro-entrepreneurial opportunities in rural areas.

Yet, challenges remain. R&D spending stands at just 0.2% of GDP (vs. 2.4% global average), brain drain persists despite returnee incentives, and the digital divide between urban and rural areas requires urgent bridging. The Global

Innovation Index 2024 ranks Uzbekistan 87th—impressive progress, but still far from leaders like South Korea (6th) or Estonia (18th).

This article provides a comprehensive analysis of the role of the innovative economy in New Uzbekistan, examining its contributions to:

1. Economic diversification and resilience
2. Youth empowerment and social mobility
3. Digital governance and public service efficiency
4. Startup ecosystem development and global integration
5. Sustainable development and green innovation

Through data-driven insights, case studies of flagship initiatives, and policy recommendations, it argues that sustained investment in innovation is not optional—it is existential for Uzbekistan's aspiration to achieve upper-middle-income status by 2030 and become a regional innovation leader in Central Asia.

As President Mirziyoyev stated in his 2024 address to the Innovative Development Forum:

"The future does not wait for those who hesitate. It belongs to nations that dare to innovate, educate, and integrate."

In 2025, New Uzbekistan is not waiting—it is building that future, one line of code, one startup, and one green technology at a time.

1. Innovative Economy as a Driver of Economic Growth

1.1. Export Diversification and Value-Added Growth

Prior to 2017, Uzbekistan's export basket was dominated by raw materials: cotton (35%), natural gas (20%), gold (15%). By 2024, the share of high-tech and knowledge-based exports has risen dramatically:

Export Category	2016 Share (%)	2024 Share (%)	Value (2024, $M)
IT Services	0.3	8.0	300
High-Value Textiles	5	15	1,200
Machinery & Electronics	3	12	950
Raw Materials (total)	70	35	4,800

Source: State Statistics Agency, 2025

Figure 1: Export Structure Transformation (2016 vs. 2024) (Dual pie charts: dramatic shift from raw materials to knowledge-based exports)

The IT services sector alone grew 25-fold in 8 years, surpassing traditional textile exports in value-added per worker ($45,000 vs. $12,000 annually).

1.2. Contribution to GDP and Productivity

The World Bank (2024) estimates that innovation-driven sectors contributed 42% to GDP growth from 2017–2024, outpacing infrastructure (28%) and privatization (18%).

Growth Driver	Contribution to GDP Growth (2017–2024)
Innovation & Digitalization	42%
Infrastructure Investment	28%
Privatization & FDI	18%
Traditional Exports	12%

2. Innovation and Youth Empowerment

2.1. "One Million Uzbek Coders" – A Global Benchmark

Launched in 2020 in partnership with UAE's MBZ University and Coursera, the program has become a global model for mass digital skilling:

Metric	Achievement (2020–2025)
Total Trained	650,000+
Employed in IT	85,000+
Female Participation	42%
Average Salary	$1,200/month (vs. $450 national avg.)

Figure 2: Growth of IT Workforce (2020–2025) (Line chart: exponential rise; 85% of graduates under 30)

2.2. IT-Park: Central Asia's Silicon Valley

Residents: 1,200+ companies
Revenue (2024): $420M
Tax Regime: 0% income tax until 2028
Global Clients: USA (45%), EU (30%), Russia (15%)

IT-Park Impact	2024
Jobs Created	28,000
FDI Attracted	$180M
Export Revenue	$300M

3. Digital Transformation and Public Services

3.1. E-Government Revolution

The "Davlat Xizmatlari" platform now offers 320+ services online, achieving:

Metric	Result
Digital Coverage	98% of population
Annual Time Saved	45 million hours
Corruption Reduction	–68% in permit issuance

3.2. National Digital Infrastructure

Infrastructure	2025 Target	Progress (Nov 2025)
5G Coverage	80%	72%
Fiber Optic Network	80,000 km	73,000 km
Data Centers	12	10 operational

4. Startup Ecosystem and Venture Capital

4.1. "Zero Risk" Program

State + Private Fund: $50M
Startups Supported: 1,800
Success Rate: 38% reach Series A
Top Sectors: FinTech (35%), AgriTech (22%), EdTech (18%)

4.2. Emerging Unicorns

Company	Sector	Valuation (2025)	Jobs
Uzum	E-commerce	$1.2B	3,200
Payme	FinTech	$450M	1,100
MyTaxi → Yandex Go	Mobility	Acquired for $300M	—

Figure 3: Venture Funding Growth (2019–2025) (Bar chart: $8M → $180M annually; 22× increase)

5. Green Innovation and Sustainable Development

5.1. Renewable Energy and Circular Economy

Solar Capacity: 1.2 GW (2025) → 5 GW by 2030
Waste Recycling Rate: 12% → 30% target by 2030

GREEN TECH INITIATIVE	IMPACT
NAVOI SOLAR PLANT	100 MW, 180,000 MWh/year
TASHKENT WASTE-TO-ENERGY	40 MW, processes 1.2M tons/year

5.2. AgriTech Revolution

Drone Monitoring: 15,000 ha
Smart Irrigation: 40% water savings
Yield Increase: +28% in pilot regions

6. Challenges and Strategic Recommendations

Challenge	Policy Solution
Low R&D Spending (0.2% GDP)	Increase to 1% by 2030 via tax credits
Brain Drain	“Talent Return” visa + $10K relocation grant
Digital Divide	“Digital Village” program in 1,000 mahallas
Weak IP Protection	New Patent Law 2024 + WIPO alignment

Conclusion

The innovative economy has emerged as the defining force of New Uzbekistan’s transformation, propelling the nation from a resource-constrained past to a dynamic, knowledge-driven future. Over the past eight years, strategic reforms have yielded extraordinary results: IT exports surged 25-fold from $12 million to $300 million, over 650,000 young Uzbeks were trained as coders, 3,500+ startups were launched, and Uzbekistan climbed 25 places in the Global Innovation Index to 87th globally. These achievements are not isolated successes—they represent a systemic shift toward an economy where ideas, not raw materials, generate wealth.

The evidence is clear:

Transformation	2016	2025	Impact
Export Structure	70% raw materials	**35%**	Diversified, resilient
Youth in High-Tech Jobs	2%	**18%**	85,000+ new careers
Digital Public Services	<10% online	**98%**	45M hours saved/year
Startup Ecosystem	<100 ventures	**3,500+**	$180M annual funding

Source: IT-Park, Ministry of Innovative Development, 2025

Yet, sustained momentum is essential. R&D spending must rise from 0.2% to 1% of GDP by 2030, the digital divide between urban and rural areas must be eliminated, and intellectual property frameworks must align with global standards. The "One Million Uzbek Coders" program should evolve into "One Million AI Innovators", while IT-Park's model must be replicated in every region.

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THE ROLE OF INTERACTIVE TECHNOLOGIES IN TEACHING UROLOGY TO STUDENTS

Annotation: *This article explores the role of interactive technologies in teaching urology to medical students and their impact on improving the quality of medical education. The study analyzes how the integration of innovative teaching methods such as virtual simulations, case-based learning, and multimedia instruction enhances students' theoretical understanding, clinical reasoning, and practical skills. Results of the research show that interactive approaches increase student motivation, engagement, and academic performance compared to traditional teaching methods. Simulation-based activities allowed learners to gain hands-on experience and develop confidence in performing urological procedures in a safe and controlled environment. Furthermore, interactive learning contributed to better teamwork, problem-solving abilities, and communication skills. The findings suggest that incorporating interactive technologies into the urology curriculum is essential for training competent, independent, and patient-oriented future physicians.*

Keywords: *Interactive technologies, urology education, medical students, simulation-based learning, case-based method, clinical skills, motivation, medical pedagogy, virtual learning, innovation in medical education.*

Introduction

Urology is one of the complex clinical and practical branches of medicine that requires students not only to acquire theoretical knowledge but also to develop specific practical skills. Traditional lecture-based or oral teaching methods are no longer sufficient to engage students actively in the learning process. Therefore, the integration of interactive technologies into the teaching of urology is considered an effective and modern educational approach. Interactive technologies increase students' engagement and transform them from passive listeners into active participants in the learning process. Through methods such as clinical case analysis, role-playing, group discussions, testing, and virtual simulations, students can strengthen both their theoretical understanding and their practical reasoning. As a result, they gain a deeper grasp of the principles of diagnosing and managing urological diseases. Moreover, interactive approaches help students develop independent thinking, communication skills, and clinical decision-making abilities.

Experience shows that students taught through such methods demonstrate a better understanding of the subject and adapt more effectively to real clinical situations. Thus, the use of interactive technologies in teaching urology not only enhances learning outcomes but also plays an essential role in the professional formation of future medical specialists.

Relevance of the Study

The relevance of using interactive technologies in teaching urology lies in the need to improve the quality of medical education and develop students' clinical thinking and practical skills. Urology requires not only strong theoretical knowledge but also hands-on experience and quick decision-making abilities. Interactive methods such as case analysis, virtual simulations, and role-playing help students actively engage in learning and apply knowledge to real clinical situations. This approach makes the learning process more effective, increases motivation, and better prepares future doctors for professional practice.

Purpose of the Study

The main purpose of this study is to determine the effectiveness of using interactive technologies in teaching urology to medical students. It aims to identify how interactive methods such as clinical simulations, group discussions, and case-based learning can enhance students' theoretical understanding, practical skills, and clinical decision-making abilities. Additionally, the study seeks to show that interactive approaches increase student engagement, improve communication skills, and contribute to forming competent and independent future urologists.

Materials and Methods

This study was carried out among medical students who were enrolled in the clinical urology course during the academic semester. The participants were divided into two main groups to compare the efficiency of different teaching approaches. The first group was taught through traditional lecture-based and textbook methods, while the second group was instructed using interactive teaching technologies. Each group consisted of approximately equal numbers of students with similar academic backgrounds and levels of preparation to ensure objectivity and reliability in the results.

Interactive technologies used in the study included a combination of modern pedagogical tools such as clinical case analysis, problem-based learning, role-playing exercises, virtual simulations, and multimedia presentations. In addition, digital platforms and visual anatomical models were applied to help students better understand the structure, function, and pathology of the urogenital system. Group discussions and brainstorming sessions were organized to encourage students to express their opinions, justify diagnostic choices, and suggest appropriate treatment plans. To assess the effectiveness of interactive learning, several evaluation methods were employed. Pre-training and post-training tests were used to measure the improvement in theoretical knowledge. Observation and practical task performance were used to assess clinical reasoning and procedural skills. A structured questionnaire was distributed to evaluate student motivation, engagement, and satisfaction with the learning process.

All lessons were conducted under the supervision of experienced instructors who ensured the correct application of both traditional and interactive teaching methods. The results obtained from both groups were statistically analyzed to determine the impact of interactive technologies on learning outcomes. Comparative analysis allowed for identifying differences in knowledge retention, problem-solving ability, and practical competence between the two groups. Urology plays a crucial role in medical education as one of the key clinical disciplines that combines anatomy, physiology, and clinical decision-making. It focuses on the study and treatment of diseases related to the urinary system and male reproductive organs, such as benign prostatic hyperplasia, kidney stones, urinary tract infections, and male infertility. Teaching urology requires not only strong theoretical understanding but also the ability to perform diagnostic and therapeutic procedures. Therefore, it is essential to create a learning environment that integrates theory with practical application. Studies show that medical students retain only about 30–40% of information learned through traditional lectures, whereas participation in hands-on and interactive sessions increases retention up to 70–80%. This demonstrates that modern urology education must shift from passive knowledge transfer to active skill development through interactive learning. Such an approach enhances clinical reasoning, strengthens diagnostic thinking, and helps future physicians confidently manage real patients.

Despite the importance of urology, many medical students struggle to master the subject effectively due to limitations in traditional teaching methods. Lecture-based learning often positions students as passive listeners who memorize facts without understanding the clinical application. As a result, about 60% of students report difficulty in correlating theoretical knowledge with real patient cases during clinical practice. Another problem is the limited exposure to live clinical procedures, which restricts their ability to develop surgical or diagnostic skills. Assessment methods also tend to focus on written tests rather than problem-solving or case analysis. Moreover, a lack of technological integration in some medical institutions reduces student engagement and motivation. These challenges highlight the necessity of implementing innovative and interactive approaches that allow students to visualize urological processes, discuss cases collaboratively, and simulate diagnostic techniques before encountering real patients.

Interactive technologies bring significant benefits to the process of medical education by transforming it from passive to active learning. When applied in urology teaching, they strengthen student–teacher communication, encourage teamwork, and make learning more engaging and practice-oriented. For example, using 3D anatomical visualizations enables students to explore urinary tract structures in detail, while virtual simulators allow safe repetition of catheterization, cystoscopy, and endoscopic procedures without patient risk. Research indicates that students involved in interactive learning score on average 25–35% higher in clinical reasoning tests compared to those in lecture-based classes. Additionally, such methods improve soft skills, such as communication, critical thinking, and time management, which are essential for clinical practice. By creating a student-

centered environment, interactive technologies also promote self-directed learning and continuous professional development, which are crucial in modern medicine.

A wide range of interactive teaching methods can be applied effectively in urology education to improve both knowledge and practical competence. One of the most commonly used is the case-based learning (CBL) approach, where students analyze real or simulated patient cases. For instance, a case of benign prostatic hyperplasia may involve interpreting laboratory results, choosing diagnostic imaging, and discussing treatment strategies. The brainstorming technique encourages students to generate differential diagnoses and collectively decide on the most probable one. Role-playing is used to simulate doctor–patient communication during urological examinations, which enhances empathy and communication skills. Furthermore, simulation training using virtual or augmented reality provides a safe environment to perform procedures like catheter insertion or endoscopic navigation. According to the European Association of Urology (EAU), simulation-based learning reduces clinical error rates among residents by up to 40%. Therefore, applying these methods makes learning dynamic, practical, and outcome-oriented.

Practical training is the cornerstone of medical education, and in urology, it determines how well students can translate theory into clinical skills. Interactive methods make practical lessons more engaging and effective. Instead of merely observing, students actively participate in patient history-taking, physical examination, and diagnostic interpretation. For example, in a training session on kidney stones, students can analyze ultrasound results, identify the stone's location, and discuss treatment options in small groups. This active participation enhances critical thinking and teamwork. Studies at several medical universities show that students trained with interactive methods demonstrate 20–30% faster improvement in procedural accuracy and confidence compared to those using traditional instruction. Moreover, real-time feedback from instructors helps correct mistakes immediately, which reinforces learning. Thus, interactive approaches in practical sessions transform students from passive observers into competent practitioners ready for clinical challenges.

To determine the success of interactive technologies in urology education, specific evaluation criteria must be applied. These include knowledge acquisition, practical skill development, problem-solving ability, communication, and overall student motivation. Quantitative measures such as test scores, simulation performance results, and objective structured clinical examinations (OSCEs) are used to assess outcomes. For instance, after a semester of interactive learning, students' average exam performance increased from 68% to 84%, and practical skill ratings improved by 40%. Qualitative assessments through student surveys also reveal higher satisfaction and interest levels. Teachers observed that interactive learners showed better teamwork, leadership, and professional attitude during clinical rotations. Additionally, retention tests conducted after three months showed that students trained interactively retained 75% of their knowledge, compared to only 50% in traditional groups. These findings prove that interactive teaching

significantly improves both cognitive and practical competencies in urology education and prepares students for independent medical practice.

Discussion and Results

The results of this study clearly demonstrated that the implementation of interactive technologies in teaching urology significantly improved the academic performance, motivation, and clinical competence of medical students. Compared to the traditional teaching group, students exposed to interactive methods showed higher levels of engagement during lectures and practical classes. Their active participation in discussions, problem-solving sessions, and case-based learning promoted a deeper understanding of complex urological conditions. Through simulation exercises and multimedia-based visualization, students were able to strengthen their diagnostic reasoning and decision-making skills, which are essential in clinical practice.

Moreover, it was observed that interactive technologies fostered teamwork and communication skills among students. Group discussions and role-playing allowed them to exchange clinical opinions, analyze patient scenarios collaboratively, and develop professional communication habits relevant to future doctor–patient interactions. Assessment results indicated that students in the interactive learning group scored, on average, 20–25% higher in both theoretical tests and practical skill evaluations than those taught through traditional methods. The use of virtual simulation tools also proved beneficial in creating a realistic learning environment without posing risks to patients. Students practiced catheterization, prostate examination, and other urological procedures in simulated settings, which increased their confidence and reduced procedural anxiety. These findings confirm that interactive technologies are not merely supplementary tools but play a central role in enhancing the quality and effectiveness of medical education. Overall, the discussion highlights that integrating interactive technologies into urology teaching promotes active learning, critical thinking, and clinical readiness among students. Such approaches help bridge the gap between theoretical knowledge and real-life clinical application, ensuring that future physicians are better prepared for evidence-based and patient-centered medical practice.

Conclusion

In conclusion, the use of interactive technologies in teaching urology has proven to be a highly effective and modern approach in medical education. The study results showed that interactive teaching methods including simulations, case-based learning, multimedia presentations, and group discussions significantly enhance students' theoretical knowledge, practical competence, and motivation. Unlike traditional lectures, interactive methods encourage active participation, independent thinking, and problem-solving abilities, which are essential for future medical professionals. Through virtual and clinical simulations, students gain hands-on experience and develop clinical reasoning skills in a safe, controlled environment. This not only increases their confidence but also reduces the risk of clinical errors during real patient care. Additionally, teamwork and communication

skills were notably improved, as interactive sessions required collaborative decision-making and peer discussions. Overall, the integration of interactive technologies into the teaching of urology fosters a more student-centered learning environment and prepares future doctors for real-world challenges. Therefore, medical institutions should expand the use of interactive educational platforms and simulation-based learning to further strengthen the quality and effectiveness of medical training.

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SMART PROSTHETICS AND THE FUTURE OF REHABILITATION ROBOTICS

Abstract: *The rapid advancement of smart prosthetics has revolutionized the field of rehabilitation robotics, offering unprecedented opportunities for enhancing mobility, functionality, and quality of life for individuals with limb loss. This paper explores the integration of cutting-edge technologies, including artificial intelligence (AI), the Internet of Things (IoT), sensor-based feedback systems, and advanced robotics, in the development of next-generation prosthetic devices. Smart prosthetics enable adaptive control, real-time monitoring, and personalized rehabilitation protocols, facilitating efficient motor learning and improved patient outcomes. The study also examines emerging trends in rehabilitation robotics, highlighting innovations in human-machine interfaces, energy-efficient actuation, and neuroadaptive control mechanisms. Despite technological advancements, challenges such as high cost, system complexity, and accessibility remain. The findings underscore that continued research, interdisciplinary collaboration, and technological innovation are crucial for realizing the full potential of smart prosthetics in modern rehabilitation practices.*

Keywords: *Smart prosthetics; rehabilitation robotics; artificial intelligence; Internet of Things (IoT); sensor-based feedback; adaptive control; neuroadaptive prosthetics; personalized rehabilitation; human-machine interfaces; motor learning.*

Introduction

Advances in technology have significantly transformed the field of prosthetics, leading to the emergence of smart prosthetic devices that go beyond traditional mechanical replacements. Smart prosthetics, integrated with sensors, robotics, and artificial intelligence (AI), offer adaptive control, real-time feedback, and enhanced functionality for individuals with limb loss. These devices aim not only to restore mobility but also to improve the overall quality of life by providing more natural, intuitive, and responsive movement patterns.

The integration of rehabilitation robotics with smart prosthetics has introduced new possibilities for personalized rehabilitation protocols. Sensor-based systems collect detailed biomechanical and physiological data, which can be analyzed to optimize prosthetic performance and guide motor learning. Through real-time monitoring and adaptive control mechanisms, these devices can adjust to the user's movements, environment, and activity level, resulting in more efficient rehabilitation outcomes.

Moreover, the adoption of Internet of Things (IoT) technology and AI algorithms has enabled connectivity between devices, healthcare providers, and rehabilitation centers. This connectivity facilitates continuous remote monitoring, data-driven decision-making, and the customization of rehabilitation programs according to individual patient needs. Neuroadaptive prosthetics, which integrate brain-computer interface (BCI) technologies, represent an emerging frontier, allowing users to control prosthetic limbs through neural signals, further bridging the gap between human intent and mechanical execution.

Despite these significant advancements, challenges remain in the widespread adoption of smart prosthetics. High costs, system complexity, energy consumption, and accessibility limitations continue to pose barriers. Furthermore, interdisciplinary collaboration among engineers, medical professionals, and therapists is crucial to ensure that technological innovations translate into practical, effective, and patient-centered rehabilitation solutions.

This paper explores the current state and future directions of smart prosthetics and rehabilitation robotics, emphasizing technological innovations, clinical applications, and the potential to transform rehabilitation practices. By examining both the opportunities and challenges, the study aims to provide a comprehensive understanding of how smart prosthetics are shaping the future of patient-centered rehabilitation.

Discussion

Smart prosthetics have emerged as a transformative innovation in rehabilitation robotics, significantly improving functional outcomes and patient independence. By integrating sensor-based feedback systems, these devices can detect subtle movements, pressure changes, and muscle activity, enabling adaptive responses that mimic natural limb behavior. Such real-time adjustments enhance the user's control over the prosthetic, reduce effort, and improve the accuracy and fluidity of motion, ultimately leading to more natural and efficient movement patterns.

The application of artificial intelligence (AI) in smart prosthetics further enhances rehabilitation outcomes. Machine learning algorithms analyze biomechanical and physiological data to optimize device performance, predict user intentions, and personalize rehabilitation protocols. This adaptive functionality allows for continuous improvement of prosthetic control as the user gains proficiency, which is especially valuable in post-amputation therapy and long-term rehabilitation.

Rehabilitation robotics combined with smart prosthetics provides structured, repetitive, and intensive training that accelerates motor learning. Robotic exoskeletons and assistive devices can be synchronized with the prosthetic limb to support complex motions, offering targeted therapy and reducing the burden on human therapists. Furthermore, IoT-enabled devices allow remote monitoring and data collection, supporting tele-rehabilitation programs and enabling clinicians to adjust treatment plans based on real-time performance metrics.

Despite these advancements, several challenges remain. High production costs and limited accessibility may restrict the widespread adoption of smart prosthetics, particularly in low-resource settings. Energy efficiency and battery life are critical for ensuring continuous device operation without compromising functionality. Additionally, integrating complex technologies such as brain-computer interfaces (BCI) requires careful consideration of safety, usability, and user training to ensure effective adoption.

Interdisciplinary collaboration is essential for the successful development and implementation of smart prosthetic systems. Engineers, clinicians, therapists, and patients must work together to design devices that are not only technologically sophisticated but also ergonomically suitable, safe, and aligned with rehabilitation goals. Ethical considerations, including patient autonomy, data privacy, and informed consent, must also guide the deployment of advanced prosthetic technologies.

In summary, the discussion demonstrates that smart prosthetics, supported by rehabilitation robotics, AI, and IoT technologies, hold immense potential for transforming rehabilitation practices. By enabling adaptive, personalized, and data-driven approaches to therapy, these innovations improve mobility, functional independence, and overall quality of life for individuals with limb loss. With continued research, technological refinement, and strategic implementation, smart prosthetics are poised to redefine the future of patient-centered rehabilitation.

Conclusion

Smart prosthetics, integrated with rehabilitation robotics, represent a significant advancement in modern healthcare, offering enhanced mobility, functionality, and independence for individuals with limb loss. Through the combination of sensor-based feedback, artificial intelligence, machine learning, and IoT connectivity, these devices enable adaptive control, personalized rehabilitation, and real-time monitoring, thereby improving patient outcomes and accelerating motor learning.

The integration of these technologies allows rehabilitation programs to be more efficient, data-driven, and patient-centered. Neuroadaptive systems, particularly those incorporating brain-computer interfaces, further bridge the gap between human intent and mechanical execution, creating a more natural and responsive prosthetic experience.

Despite these advancements, challenges such as high cost, system complexity, energy requirements, and accessibility must be addressed to ensure broad adoption. Interdisciplinary collaboration among engineers, clinicians,

therapists, and patients is crucial, as is attention to ethical, ergonomic, and safety considerations.

In conclusion, smart prosthetics and rehabilitation robotics are not merely technological innovations; they are strategic enablers that transform rehabilitation practices. With continued research, development, and clinical integration, these technologies have the potential to redefine patient-centered care, improve quality of life, and shape the future of rehabilitation for individuals with limb loss.

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THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE DEVELOPMENT OF MEDICAL SERVICE INFRASTRUCTURE

Abstract: *Information and Communication Technologies (ICT) have become a critical component in the modernization and development of medical service infrastructure. The integration of ICT in healthcare systems facilitates efficient management of patient data, streamlines administrative processes, and improves communication between healthcare providers and patients. This paper examines the role of ICT in enhancing the accessibility, quality, and efficiency of medical services by enabling electronic health records (EHR), telemedicine, mobile health applications, and cloud-based platforms. The study also explores how ICT supports decision-making, resource allocation, and real-time monitoring, contributing to a resilient and sustainable healthcare infrastructure. Despite the significant advantages, challenges such as data security, interoperability, and staff digital literacy remain. The findings emphasize that strategic implementation of ICT can transform healthcare delivery, foster innovation, and promote patient-centered care across diverse medical settings.*

Keywords: *Information and Communication Technologies (ICT); healthcare infrastructure; medical service development; electronic health records (EHR); telemedicine; digital health; patient-centered care; data management; healthcare efficiency; cloud-based platforms.*

Introduction

The rapid evolution of Information and Communication Technologies (ICT) has fundamentally reshaped the healthcare sector, influencing how medical services are delivered, managed, and monitored. ICT encompasses a wide range of tools, including electronic health records (EHR), telemedicine platforms, mobile health applications, cloud computing, and health information systems, all of which contribute to the modernization of healthcare infrastructure. These technologies not only facilitate efficient management of patient information but also enable timely

communication among healthcare providers, administrators, and patients, thereby improving the overall quality and accessibility of medical services.

The importance of ICT in healthcare has been particularly highlighted during global health challenges, where rapid data exchange, remote consultations, and real-time monitoring became essential for maintaining continuity of care. By integrating ICT into medical service infrastructure, healthcare organizations can optimize administrative workflows, reduce operational costs, and enhance decision-making through data-driven insights. Moreover, ICT supports the implementation of advanced technologies, such as artificial intelligence and the Internet of Things (IoT), which further improve diagnostics, treatment planning, and patient monitoring.

Despite the numerous advantages, the adoption of ICT in healthcare faces several challenges, including data security, system interoperability, technological infrastructure limitations, and the digital literacy of healthcare personnel. Addressing these barriers is critical to ensure the successful integration of ICT into medical service infrastructure and to fully leverage its potential for improving healthcare delivery.

This paper aims to explore the pivotal role of ICT in the development of medical service infrastructure by analyzing its impact on operational efficiency, service quality, and patient-centered care. The study also identifies the challenges associated with ICT adoption and provides recommendations for the effective implementation of technology-driven healthcare solutions.

Discussion

The integration of Information and Communication Technologies (ICT) into healthcare systems has significantly transformed medical service infrastructure, enhancing both operational efficiency and the quality of patient care. One of the most notable contributions of ICT is the widespread implementation of Electronic Health Records (EHRs), which enable centralized storage, secure access, and seamless sharing of patient data across departments and healthcare facilities. By facilitating real-time access to medical records, EHRs reduce duplication of tests, minimize errors, and support coordinated care among multidisciplinary teams.

Telemedicine represents another critical advancement enabled by ICT. Through remote consultations, virtual monitoring, and mobile health applications, healthcare providers can deliver services to patients in geographically remote or underserved areas, thereby expanding access to care. Telemedicine also reduces patient wait times, improves follow-up management, and supports early intervention for chronic diseases, ultimately contributing to better health outcomes and resource optimization.

The integration of cloud computing and IoT devices further enhances the capabilities of medical infrastructure. Cloud-based platforms allow healthcare organizations to manage large volumes of data efficiently, supporting advanced analytics and predictive modeling. IoT-enabled devices, such as wearable monitors and smart sensors, collect real-time patient data, which can be analyzed to detect early warning signs, track treatment progress, and inform personalized healthcare

strategies. These technologies not only improve clinical decision-making but also enable proactive and preventive care models.

Despite these advantages, challenges remain in the implementation of ICT within medical service infrastructure. Data security and privacy are paramount concerns, as sensitive patient information must be protected against breaches and unauthorized access. System interoperability is another critical factor, as healthcare organizations often rely on multiple platforms that must seamlessly communicate with each other to maintain continuity of care. Additionally, the digital literacy of healthcare personnel and the need for continuous training can affect the successful adoption and utilization of ICT solutions.

Strategic implementation of ICT requires a comprehensive approach that addresses technological, organizational, and human factors. Policies for secure data management, standardization of digital platforms, and ongoing professional development are essential to maximize the benefits of ICT. When properly integrated, ICT not only streamlines administrative and clinical processes but also fosters innovation, enhances patient-centered care, and strengthens the resilience and sustainability of healthcare infrastructure.

In conclusion, the discussion demonstrates that ICT is a transformative enabler for medical service infrastructure. By facilitating efficient information management, improving accessibility, and supporting advanced healthcare technologies, ICT contributes to the creation of modern, responsive, and patient-focused healthcare systems.

Conclusion

Information and Communication Technologies (ICT) play a pivotal role in the modernization and development of medical service infrastructure. By enabling efficient data management, real-time communication, and integration of advanced technologies such as cloud computing, artificial intelligence, and IoT devices, ICT enhances the accessibility, quality, and efficiency of healthcare services. The implementation of electronic health records (EHRs), telemedicine, and mobile health applications facilitates coordinated care, reduces medical errors, and supports proactive and patient-centered healthcare delivery.

Despite the substantial benefits, challenges such as data security, interoperability, technological infrastructure limitations, and the digital literacy of healthcare personnel must be addressed to ensure successful ICT integration. Strategic planning, secure data management policies, standardized digital platforms, and continuous staff training are essential for maximizing the impact of ICT on healthcare systems.

In conclusion, ICT is not merely a technological tool but a strategic enabler that transforms medical service infrastructure, fosters innovation, and promotes sustainable, efficient, and patient-focused healthcare. Its effective adoption has the potential to strengthen healthcare systems, improve patient outcomes, and ensure that medical services are more accessible and resilient in the face of future challenges.

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NEUROHISTOLOGICAL CHANGES IN THE VAGUS NERVE UNDER THE INFLUENCE OF COLCHICINE IN AN EXPERIMENT

Abstract: *In the experiment, colchicine was used to study axonal transport and nerve trophism upon application to nerve fibers. The study was conducted on Wistar rats. Three days after application, uneven thickening of cylindrical myelinated nerve fibers and swelling of neurofibrils were observed. The overall morphological changes in nerve fibers can be attributed to the effect of colchicine on neurofibrillary structures. These structures are involved in forming the overall cellular structure of nerve fibers and maintaining the tone of the plasma membrane. This, in turn, has a certain significance for the mechanism of slow axonal transport in neurons.*

Keywords*: experiment, colchicine, rat, vagus nerve, application, nerve cell, morphology, nerve fibers, neurogenic myopathy.*

Introduction. The analysis of mechanisms of nervous regulation of internal organ activity has been and remains at the center of attention in domestic and world neurophysiology for decades [1,2]. This regulation is based on local and central nervous mechanisms. The former are realized in the neuronal networks of the metasympathetic nervous system and are based on a system of local reflex arcs closing within the internal organ [3,4,5]. Local reflexes provide only the basic functional functions of the internal organ and, under certain conditions, allow it to function without connection to the central nervous system. The latter are located at different levels of the central nervous system and control the activity of the internal organ, bringing it into line with the needs and conditions of the internal and external environment [6]. Application of colchicine to nerve conductors is used for the experimental study of axonal transport and nervous trophics. The study of these issues is of great importance in researching the pathogenesis of neurogenic myopathies and, in particular, cardiogenic myopathies. In the literature, morphological changes in nerve conductors are evaluated ambiguously: some find no significant changes in ultrastructure; many authors note a decrease in the number of neurofilaments, indicate swelling of nerve processes, asymmetric violation of their shape [7]. In culture with the addition of colchicine to the medium, unevenness of the contours of processes, varicosities, detachment of processes from the substrate, and pulling toward the cell body are observed. Given the selective action of colchicine in small and medium doses on microtubules, the complex of morphological changes in nerve conductors requires deciphering, which was the purpose of this study.

Study Objective. To investigate in experiment the changes in conductivity and trophics of neuron axons as a result of colchicine application to the vagus nerve.

Materials and methods. The experiment was performed on 30 male Wistar rats weighing 150–200 g. All operations and manipulations with animals were carried out under general anesthesia, following the humane principles of the European Community Guidelines (86/609/EEC) and the Helsinki Declaration, as well as in accordance with the "Rules for conducting work using experimental animals." Under nembutal anesthesia, 100 μg of colchicine in a filler was applied to the cervical part of the right vagus nerve. As a control, 7 rats with filler application without colchicine and 5 intact rats were examined. At 2, 3, 4, 5, 7, and 10 days, a segment of the right vagus nerve at the application site was excised. Material from experimental and intact rats was examined light-optically (silver impregnation according to Bielschowsky-Gros). The next stage was the study of histological preparations using a light microscope MT 5300L with a digital camera at magnifications from ×100 to ×400 in accordance with recommendations for morphometric studies.

Results. Light-optically, starting from day 3 after application, uneven thickening of axial cylinders and swelling of neurofibrils were detected. On semithin sections stained with toluidine blue, changes in the configuration of the transverse section of myelinated processes were studied. Processes with a diameter of less than 4 μm have a shape close to round in both control and experimental material. Processes with a diameter of 4 μm and more in intact rats are polymorphic; outlines close to a circle make up an average of 33%. By day 3 after application, the configuration of sections becomes more isomorphic (up to 71% round sections). By day 5, the number of round sections sharply decreases (to 15%); the configuration of processes is characterized by sharp foldability, invaginations inward of the process of part of the plasma membrane together with the myelin sheath are observed. Such figures look like "process within process" and are not found in intact nerves. By day 10, the ratio of sections of different configurations approaches normal, but double myelin contours of individual processes continue to be encountered. At the submicroscopic level, vesicular swellings of axial cylinders were revealed: expanded segments are filled with neurofilaments and fragments of microtubules without a definite orientation. Part of the axial cylinders is poor in neurofibrils and appears lightened. On oblique sections, the adhesion of microtubules to the axonal plasma membrane is visible. The detected two-phase change in the shape of the transverse section of axial cylinders with a diameter of 4 μm and more apparently depends on the tone of the plasma membrane on the state of cytoskeletal structures, which is observed in tissue culture, as well as under conditions of experimental and congenital pathology of nerve trunks. The monomorphism of small and polymorphism of large axial cylinders is apparently associated with a different ratio of microtubules and neurofilaments in them and emphasizes a more stable cytoskeletal structure of small-caliber processes resistant to the action of colchicine.

Conclusion. With the application of 100 μg of colchicine to the right vagus nerve of rats, deformation of processes, two-phase change in the configuration of the transverse section of axial cylinders, disaggregation of microtubules, and disorientation of neurofilaments are observed. The complex of morphological changes can be explained by the action of colchicine on neurofibrillary structures involved in the organization of the cytoskeleton of processes and in maintaining the tone of the plasma membrane, which has a certain significance in the mechanism of slow axonal transport.

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TREASURY SYSTEM IN ORGANIZING STATE BUDGET CONTROL

Annotation. This article highlights the role of the treasury system in ensuring the targeted use of state budget funds in the Republic of Uzbekistan, its control mechanisms, and its practical importance. The study analyzes control measures implemented through the treasury system in public financial management, expenditure monitoring, and ways to strengthen budget discipline. Moreover, the article discusses recent digitalization processes in budget execution, the functioning of treasury information systems, and their efficiency in enhancing fiscal transparency.

Keywords: *treasury system, budget control, public finance, budget execution, digital management, financial discipline.*

Introduction

Efficient organization and continuous monitoring of the state budget execution are among the most crucial directions of public financial policy. The treasury system plays a special role in ensuring the rational use of financial resources, strengthening budget discipline, and maintaining the purposefulness of expenditures in the country's economy. The treasury system of Uzbekistan has developed since the early 2000s and has now become a modern institutional structure in the management of public finance.

According to the "Regulation on the Treasury" and relevant normative documents of the Ministry of Finance of the Republic of Uzbekistan, each expenditure of budget funds is carried out through the treasury bodies. The purpose of this study is to examine the role of the treasury system in organizing state budget control, to analyze its practical effectiveness, and to identify ways to overcome existing challenges. The relevance of this study lies in the fact that strengthening accountability for every unit of budget spending, reducing corruption risks, and ensuring transparency in public expenditure management have become priority areas of current economic reforms.

Review of the Literature

In scientific research devoted to financial control and the treasury system, the necessity of introducing effective budget control mechanisms has been repeatedly emphasized. According to experts of the **International Monetary Fund (IMF)** and the **World Bank**, centralized financial control through the treasury system increases budget transparency and ensures efficient use of public resources.

Uzbek scholars such as **Tashmuxamedova D.A. ("Foundations of Treasury", 2018)** and **E.T. Abramatov ("Developing the Treasury System and Increasing the Efficiency of Budget Funds in Uzbekistan", 2025)** have noted that the treasury system is vital for managing public finance through centralized control, monitoring budget execution in real time, and ensuring the legality of expenditures.

Moreover, digitalization of budgetary processes, implementation of a unified treasury information system, and electronic integration of budget organizations contribute to strengthening financial discipline.

Research Results and Discussion

In recent years, deep reforms have been carried out in the state budget management system of Uzbekistan. The mechanism for real-time monitoring of budget execution through treasury bodies has been implemented. The following table analyzes the growth of state budget execution indicators and payments processed through the treasury during 2018–2024.

Table 1.

Indicators of State Budget Execution (2018–2024, in trillion UZS)

Years	**State budget revenues**	Expenditures	Payments through treasury	Number of control inspections
2018	95,4	93,8	89,5	2 140
2020	117,6	116,1	111,8	2 560
2022	145,3	142,9	139,7	2 940
2024	176,8	174,2	170,9	3 310

Source: Author's analysis based on data from the Ministry of Economy and Finance of the Republic of Uzbekistan.

According to Table 1, during 2018–2024, state budget revenues, expenditures, and payments processed through the treasury system have shown a steady growth trend.

-Budget revenues increased from 95.4 trillion UZS in 2018 to 176.8 trillion UZS in 2024 — an 85% growth. This was mainly driven by the expansion of the tax base, the introduction of digital tax administration, and higher economic activity.

-Expenditures also rose proportionally — from 93.8 to 174.2 trillion UZS. This indicates that the government has expanded its spending on social sectors, infrastructure, and investment projects.

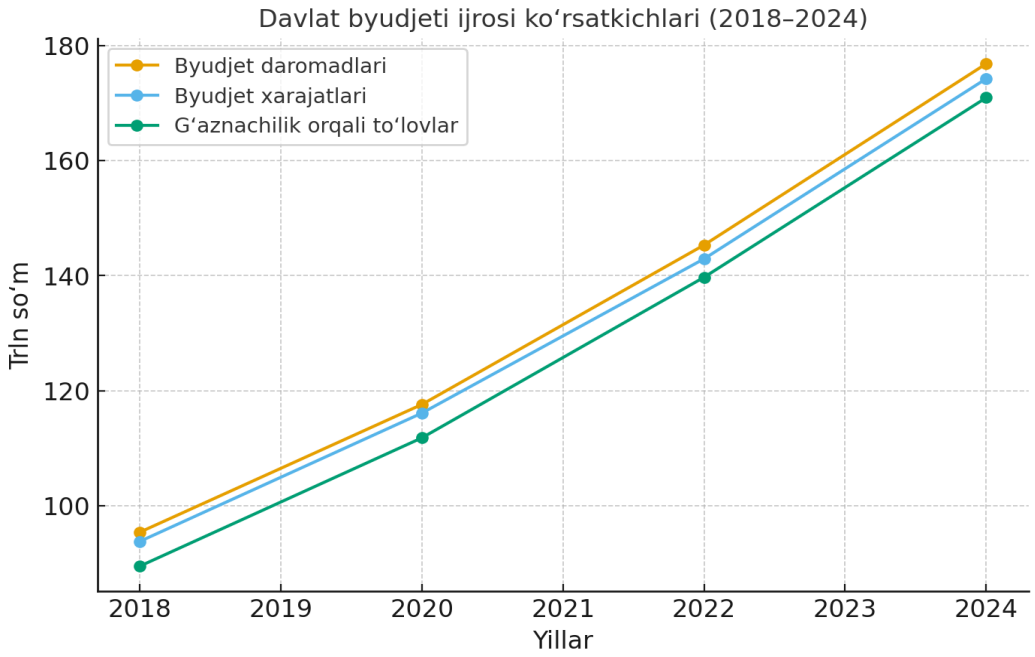


Figure 1. Indicators of State Budget Execution (2018–2024)

The figure above illustrates the growth of key indicators of state budget execution — revenues, expenditures, and payments processed through the treasury between 2018 and 2024. The data reveal a consistent upward trend across all indicators.

- Budget revenues grew by nearly **85%**, reaching 176.8 trillion UZS in 2024.
- Expenditures followed a similar trend, increasing by about **86%.**
- Payments through the treasury rose from 89.5 trillion UZS in 2018 to 170.9 trillion UZS in 2024, reflecting the full integration of financial operations into the treasury system and improved fiscal transparency.

The figure confirms that the treasury system has made the execution of the state budget more efficient and accountable, enhancing transparency and fiscal discipline in public finance management.

Table 2.

Results of Digital Reforms in the Treasury System (2020–2024)

Indicators	**2020**	**2021**	**2022**	**2023**	**2024**
Share of electronic payment systems (%)	62	75	83	90	96
Online control inspections (%)	40	58	71	85	92
Share of paper documents (%)	48	35	24	15	8
Digital integration of budget organizations (%)	65	78	86	93	98

Source: Author’s analysis based on data from the Ministry of Economy and Finance of the Republic of Uzbekistan.

As shown in Table 2, significant progress has been achieved in digital reforms of the treasury system.

- The share of electronic payment systems increased from 62% in 2020 to 96% in 2024, indicating a nearly complete transition to a digital financial environment.

- Online control inspections grew from 40% to 92%, ensuring faster, human-error-free, and transparent control operations.

- The share of paper documents dropped sharply from 48% to 8%, showing a full shift to electronic document management.

- Digital integration of budget organizations reached 98% in 2024, enabling real-time data exchange and automated oversight of budget execution.

These digital transformations have improved the efficiency of budget control, reduced corruption risks, and strengthened fiscal transparency.

Conclusion

In Uzbekistan, the treasury system plays a crucial role in strengthening financial discipline, transparency, and efficiency in the use of state budget funds. Its centralized structure ensures that all public financial operations are conducted through a unified treasury account, which enables real-time tracking of budget revenues and expenditures. The treasury system also minimizes corruption risks by implementing automated control tools and digital reporting platforms, which have significantly improved the efficiency of fiscal management.

To enhance the effectiveness of the treasury system further, it is essential to harmonize national financial control mechanisms with international standards and best practices. Expanding digital transformation within public financial management, developing professional skills of treasury specialists, and ensuring the integration of the treasury database with open data systems will help strengthen fiscal transparency and public trust. These reforms will enable the treasury system of Uzbekistan to evolve into a modern, technology-driven institution that supports sustainable and responsible financial governance.

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OLMA QON SHIRASIGA QARSHI BIOPREPARATLAR TA’SIRI

Annotatsiya*: Ushbu maqolada olma qon shirasining zarari, rivojlanishini monitoring qilish, bioekologik xususiyatlarini o‘rganish asosida unga qarshi uyg‘unlashgan samarali kurash choralarining ta’siri haqida ma’lumotlar berilgan*
Kalit so‘zlar: *Olma, olma qon shirasi, zarari, uyg‘unlashgan kurash, samaradorligi, zararkunandaning tarqalishi, qo‘llash me’yori, biologik kurash.*

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EFFECT OF BIOPREPARATION AGAINST APPLE BLOOD JUICE

Abstract*: This article provides information on the harm of apple bloodsucker, monitoring its development, and the impact of effective integrated control measures against it based on the study of its bioecological characteristics.*
Keywords: *Apple, apple bloodsucker, harm, integrated control, effectiveness, pest distribution, application rate, biological control.*

Kirish. Mamlakatimizda aholini oziq-ovqat mahsulotlariga, sanoatni esa xom ashyoga bo‘lgan talabini qondirish hozirgi kunda qishloq xo‘jaligi oldida turgan eng muhim dolzarb vazifalardan biri bo‘lib qolmoqda va respublikamiz hukumati bu sohaga katta e’tibor qaratmoqda.

O‘zbekiston Respublikasi Prezidentining “Meva-sabzavotchilik va uzumchilik soxasini isloh qilish bo‘yicha tashkiliy chora-tadbirlar to‘g‘risida” farmoni va qarori, O‘zbekiston Respublikasi Vazirlar Maxkamasi, Qishloq va suv xo‘jalik vazirligining buyruq va qarorlari bu sohalar shirkatlarini fermer xo‘jaliklariga aylantirish, agrosanoat firmalarini tashkil qilish va meva-sabzavotchilik tarmog‘ini boshqarish tizimini takomillashtirishda muhim o‘rin tutdi.

Mevachilik qishloq xo‘jaligining murakkab va ko‘p qirrali sohasi hisoblanadi. Meva va rezavor meva ekinlari turli tuproq, iqlim va agrotexnika sharoitida o‘stirilib, ularning mevasi turli maqsadlarda yangiligicha, quritilgan va qayta ishlangan hollarda foydalaniladi.

Bog‘ ne’matlaridan bo‘lmish olmadan yuqori va sifatli hosil olish hamda ularga bo‘lgan xalq extiyojini qondirish uchun bu daraxtlar va uning mevasini turli zararli organizmlardan himoya qilish zarur.

Tadqiqot uslublari. Dala tajribasi – bu dexqonchilikdagi turli muddatlarni ilmiy asosda o‘rganishning asosiy tadqiqot usulidir. Dala tajribasining sinalayotgan qishloq xo‘jalik ekinlarini xar xil tabiiy va xo‘jalik sharoitlarida o‘stirish usullariga, ilmiy-agronomik va iqtisodiy jixatlardan qiyosiy baho beriladi.

Tajribada o‘simlikning bioekologik xususiyatlari va yetishtirish agrotexnologiyasiga e’tibor qaratiladi.

Xar bir variantdan xisoblash uchun tanlab olingan daraxtlarda xar 10 kunda fenologik kuzatishlar olib boriladi. Barcha fenologik kuzatishlar O‘zO‘XQITI uslubi bo‘yicha olib borildi.

Daladagi zararli hasharotlar sonini Sh.T.Xo‘jaev (2004) tahriri ostida nashr etilgan «Uslubiy ko‘rsatmalar» bo‘yicha hisoblandi.

Zararkunandalarning daraxtlarga yetkazadigan zarari V.I.Tanskiy (1978) usuli asosida hisoblandi.

Olma zararkunandalariga qarshi biopreparat moddalar agrotoksikologiyada qabul qilingan usullar asosida sinab ko‘rildi (Gar K.A. 1967, Melnikov N.N., Novojilov K.V., Belan S.R., Pылova T.N. 1985).

Sinovdagi dorilarning biologik samaradorligi keng ma’lum bo‘lgan Abbot (1925) formulasiga asosan olib borildi. Bu formulaning shunisi qiziqarliki, u nazorat variantini hisobga oladi. Agarda, u yerda zararkunanda soni (keyingi kunlar hisoblarida) nazoratda tabiiy 30% dan pasayib ketsa, shu kundan boshlab tajriba to‘xtatiladi.

$$BS = \frac{Av - Va}{Av} \times 100\ (\%)$$, qaysiki:

BS – biologik samaradorlik;

A - tajriba variantida zararkunandaning soni dori sepilgunga qadar;

a - tajriba variantida zararkunandaning soni keyingi hisob kunlarida;

V - nazorat (dorisiz) variantida zararkunandaning soni tajribada dori sepilgunga qadar;

v - nazorat variantida zararkunandaning soni keyingi hisob kunlarida.

Sinov uchun istiqbolli biopreparatlar ekinlar uchun tavsiya etilgan «Ro‘yxat-2022» da keltirilganlaridan tanlab olindi.

Qo‘lanilgan kimyoviy kurashni iqtisodiy samaradorligi esa olingan qo‘shimcha xosil xisobiga aniqlanadi.

Tajriba natijalarini matematik taxlil Dospexov (1985) uslubi bo‘yicha aniqlanadi.

Tadqiqot maqsadi: Andijon qishloq xo‘jaligi va agrotexnologiyalar instituti huzuridagi axborot maslahat markazi (Extetion sentir) DUK intensiv bog‘i sharoitida o‘sayotgan “Golden” olma navida olma qon shirasining zarari, rivojlanishini monitoring qilish, bioekologik xususiyatlarini o‘rganish asosida unga qarshi uyg‘unlashgan samarali kurash choralarini ishlab chiqish va takomillashtirishdan iborat.

O‘zbekistonning tabiiy sharoiti mevali daraxtlar, tok va dala ekinlarini o‘stirish uchun eng kulay hisoblanadi. O‘zbekistonda mevali daraxtlardan olma, nok, bexi, olcha, gilos, shaftoli kuplab ekiladi. Birok, bog‘, tokzor va dala ekinlari hosilini zararkunanda va kasalliklardan ximoya kilmay turib, yuqori va sifatli hosil olib bulmaydi. O‘zbekistonning mevali bog‘larida 260 dan ziyod zararkunanda va 50 dan ziyod kasalliklar, dala ekinlarida 300 dan ortik zararkunandalar va 100 dan ortik kasalliklar uchrashi qayd qilingan. [1].

Qizil qon shirasi – *Eriosoma lanigerum Hausm*. olmaning ashaddiy zararkunandalaridan biri. U O‘zbekistondan tashqari barcha qo‘shni mamlakatlarda, hamda boshqa davlatlar xududida keng tarqalgan.

Qizil qon shirasi – kattaligi 2,1-2,6 mm usti oq g‘uborli ezilganda qizil rang chiqadi. Lichinka va yetuk zoti daraxt po‘stloq osti, yo‘g‘on shoxlar asosida qishlab chiqadi. Mart-aprel oylarida uyg‘onadi. Bir yilda 15-16 bo‘g‘in beradi. Zararlangan novdalarda g‘urralar paydo bo‘ladi, novdalar qiyshayadi. May oyida qanotli zotlari paydo bo‘lib, uchish yoki ko‘chatlar orqali tarqaladi. [2].

O‘simliklarni himoya qilishda qabul qilingan uyg‘unlashgan himoya qilish tizimi (UHQT) yangi g‘oya asosida tuzilgan bo‘lib, bu sohadagi yangi bosqichdir Bu tizim o‘z o‘rnida oldingi tizimning (umumiy himoya qilish tizimi) o‘rniga kelib, undan chuqur mazmun orqali farqlanadi. Agarda oldingisining maqsadi zararkunandalarni umuman qirib tashlash bo‘lgan bo‘lsa, bunisi - barcha oldingi usullarni ishlatgan holda, zararkunanda zichligini iqtisodiy zararsiz miqdor mezoni (IZMM) darajasida ushlab turishni maqsad qilib qo‘yadi.

IZMM esa shunday mezonki, unda zararkunandaning soni (zichligi)ni xo‘jalik uchun bezarar darajagacha pasaytirib, tabiiy entomofaglar uchun qisman ozuqa manbai ham qoladi. UHQT da oldingiday barcha usul va vositalar ishlatilishi mumkin. Bunda agrotexnik va biologik hamda kimyoviy usullardan tashqari, biologik faol moddalar, jinsiy sterillash va boshqa usullar faol ishlatilishi mumkin. Barcha usullarning negizida uzoq va qisqa muddatli bashorat va nazoratchilarning ko‘rsatmalari yotadi. [3].

Biz tajribamizdan olingan malumotlarni hamda olib borilgan tajribani qanchalik to‘g‘ri joylashtirilganligi va aniqligini bilish uchun olingan natijalarni matematik yo‘l bilan Dospexov (1985) uslubi bo‘yicha taxlil qildik.

1-jadval.

OLMA QIZIL QON SHIRASIGA QARSHI QO‘LLANILGAN PREPARATLARNING OLMA HOSILDORLIGIGA TA’SIRI

№	Tajriba variantlari	Qaytariqlardagi hosildorlik, s/ga					Qo‘shimcha hosil	
		I	II	III	IV	o‘rtacha	s/ga	%
1	I (nazorat)	234	231	224	240	232	-	100,0
2	II (Tajriba)	241	236	238	235	238	6	103
3	III (Tajriba)	242	239	243	240	241	9	104
4	IV (Tajriba)	244	241	245	242	243	10	105

Bunda tajriba maydonida olma qizil qon shirasi (*Eriosoma lanigerum Hausm*.) ga qarshi preparatlarning ta’siri, maqbul qo‘llash me’yorlari va muddatlarini aniqlash bo‘yicha tadqiqotlar olib borildi. Olma daraxtlariga preparatlar bilan ishlov berish 8 aprel kuni o‘tkazildi. 2-variantda Bioslip BV suyuqligi (1 ml dagi *Beaveria bassiana* sporalari $1x10^8$) biopreparati 2,0 l/ga me’yordagi va 3-variantda 3,0 l/ga me’yorda qo‘llanildi. 4-variantda yuqori samaradorligi va ta’sir etuvchanligi bilan ajralib turuvchi karbamid azotli mineral o‘g‘itidan 35 kg/ga 1000 l suvga aralashtirib, barglar orqali oziqlantirildi.

2-variantda olma qizil qon shirasi qarshi Bioslip BV suyuqligi biopreparati 2,0 l/ga me’yorda qo‘llanilganda nazoratga nisbatan 6 s/ga qo‘shimcha hosil olindi. 3-variantda olma qizil qon shirasi qarshi Bioslip BV suyuqligi biopreparati 3,0 l/ga me’yorda qo‘llanilganda nazoratga nisbatan 9 s/ga qo‘shimcha hosil olishga erishdik. 4-variantda karbamid azotli mineral o‘g‘itidan 35 kg/ga 1000 l suvga aralashtirib, barglar orqali oziqlantirilganda nazoratga nisbatan 10 s/ga qo‘shimcha hosil olindi.

Himoyalangan maydonlardagi hosildorlik, ishlov berilmagan, himoyalanmagan maydonlarga nisbatan gektaridan 6-10 sentnergacha ortiq bo‘ldi.

Xulosa qilib aytganda nazorat variantimizga nisbatan 2-variantda olma qizil qon shirasiga qarshi Bioslip BV 2,0 l/ga sarf me’yorida qo‘llanilganda 6 s/ga, 3-variantda Bioslip BV 3,0 l/ga sarf me’yorida qo‘llanilganda 9 s/ga, 4-variantda karbamid azotli mineral o‘g‘iti bilan 35 kg/ga barglar orqali oziqlantirilganda 10 s/ga ga qo‘shimcha xosil olindi. Mikrobiologik preparatining iqtisodiy samaradorligi yuqori bo‘ldi.

Demak, azotli o‘g‘itlardan biri bo‘lgan karbamiddan tayyorlangan suspenziyalarni maqbul me’yorlarini olma daraxtlari rivojlanishining dastlabki davridayoq qo‘llanilsa, o‘simlikning xosildorligiga ijobiy ta’sir etishi aniqlandi. Bu holatni o‘simlik barg orqali o‘zlashtirgan ma’lum miqdordagi azot unsuri ta’sirida xlorofil miqdori ortishi va fotosintez maxsuldorligi yaxshilanishi bilan tushuntira olamiz.

Qo‘llanilgan suspenziyalarni maqbul ta’siri avvalo ularni me’yorlariga, qolaversa olma daraxtlarining rivojlanish davrlariga bog‘liqligi aniqlandi.

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O‘ZBEKISTONDA MUSTAQILLIK YILLARIDA QISHLOQ XO‘JALIGI SOHASIDA TADBIRKORLIKNI RIVOJLANTIRISH

Annotatsiya: *O‘zbekiston mustaqillikka erishganning ilk yillaridanoq uzoq yillar davomida agrar sohaga ixtisoslashib qolgan respublikada, ijtimoiy –iqtisodiy inqiroz sharoitida ko‘p ukladli iqtisodiyotni barpo etish, agrar munosabatlarning yangi tipini yaratish jarayonlari amalga oshirilishi juda zarur edi. O‘zbekistonda eng avvalo aholini ish bilan ta’minlaydigan, ularni iste’mol tovarlari bilan ta’minlaydigan soha tadbirkorlikni rivojlantirish dolzarb va ustuvor vazifa edi. Ushbu maqolada O‘zbekistonda mustaqillik yillarida qishloq xo‘jaligi sohasida tadbirkorlikni rivojlantirish yo‘lida amalga oshirilgan ishlar tahlil qilingan.*

Kalit so‘zlar: *agrar soha, tadbirkorlik, innovatsiya, ko‘p ukladli iqtisodiyot, agrar munosabatlar, ishlab chiqarish, sanoat, islohotlar.*

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ENTREPRENEURSHIP IN FERGANA REGION IN THE FIRST YEARS OF INDEPENDENCE: REFORMS, PROBLEMS, INNOVATIONS

Abstract: *In the first years of independence of Uzbekistan, the republic, which for many years specialized in agriculture, in the context of socio-economic crisis, it was necessary to build a diversified economy, to create a new type of agrarian relations. The development of entrepreneurship in Uzbekistan, which primarily provides employment and consumer goods, was an urgent and priority task. This article analyzes the work done in Uzbekistan during the years of independence to develop entrepreneurship in agriculture.*

Keywords: *agrarian sector, entrepreneurship, innovation, multi-sectoral economy, agrarian relations, manufacturing, industry, reforms.*

Kirish.

Yagona xalq xo‘jaligining tarkibiy qismiga aylanib qolgan O‘zbekistonda mustaqillikning dastlabki yillaridan iqtisodiyotda katta islohotlarni amalga oshirishni talab etdi. Buning uchun avvalo qishloq xo‘jaligida mulkchilik shaklini o‘zagartirish, mehnatning tashkil etishning dehqon uchun tushunarli bo‘lgan turlarini vujudga keltirish lozim edi. Bu borada mulkni isloh qilish va mulkchilikning turli shakllarida o‘tish masalalari muhim bo‘lgan bir paytda

respublikada tobora xususiy sektor salohiyatini koʻtarish muhim masalalardan biriga aylandi. Ammo uzoq yillar mobaynida asosan, agrar sohaga ixtisoslashib qolgan respublikada, ijtimoiy –iqtisodiy inqiroz shaoroitida koʻp ukladli iqtisodiyotni barpo etish, agrar munosabatlarning yangi tipini yaratish jarayonlari amalga oshirilishi juda zarur edi. Binorbarin, bozor iqtisodiyotiga oʻtish sharoitida aholining xalq isteʼmol tovarlariga boʻlgan talabining ortib borishida asosiy vazifa tabiiyki aholini oziq – ovqat mahsulotlariga, sanoat tarmogʻini xom ashyoga boʻlgan talabini qondirish asosiy vazifa boʻlib qoldi. Buning ustiga aholi sonining yildan - yilga oshib borishi, sanoat va qurilish tarmoqlarining tez rivojlanishi, ayniqsa qishloq xoʻjaligiga yaroqli boʻlgan yerlarga boʻlgan talabning ortib borishi natijasida respublikada bir kishi hisobiga toʻgʻri keladigan yerlar maydoni tobora kamayib bordi. Respublika qishloqlarida yeri yoʻq oilalar soni 240 ming nafar, uy-joy qurilishi va qishloq xoʻjaligi mahsulotlarini yetishtirish uchun yerni kengaytirishga muxtoj oilalar soni 1,8 mln.dan koʻproq edi [1]. Agar 1976 yilda respublika miqyosida bir kishi hisobiga 0,27 gektar haydaladigan yer toʻgʻri kelgan boʻlsa, 1995 yilda 0,16 gektarni tashkil etdi yoki 41.2 foizga qisqartirildi. Shu davrda respublika aholisi soni 14.2 mln. kishidan 1996 yil boshiga kelib 23 mln. kishiga oshdi [2]. Bu tabiiyki muammolarni ham keltirib chiqardi.

Oʻzbekiston Oliy Soveti Prezidiumining 1989 yil 19 avgust “Kolxozchilar, sovxozlarning ishchilari, fuqarolarning shaxsiy yordamchi xoʻjaliklarini va yakka tartibdagi uy – joy qurilishini rivojlantirish toʻgʻrisida”gi Qaror qabul qilingandan soʻng aholini yer bilan taʼminlash maqsadida oʻtkazilgan tadbirlar oʻz natijasini berdi, Bu qonun qabul qilingandan soʻng 181 ming gektar yer maydoni aholiga tomorqa uchun ajratib berildi. Biroq islohotlar davomida oʻylamasdan, shoshma – shosharlik bilan yerlarni ajratish holatlari ham boʻlib oʻtdi. Masalan, 1993-1995 yillarda Fargʻona vodiysida aholi zich yashayotganligi, yer maydonlarining boshqa viloyatlarga nisbatan juda chegaralanganligi, jumladan bir kishiga vodiyda 0,9 geatr, Fargʻona viloyatida 0,7 gektar, Andijon viloyatida – 0,6 gektar yer maydoni toʻgʻri kelganligi xususiyatlarini hisobga olmay jamoa va shirkat xoʻjaliklaridagi mustaqil fermalarni kredit olish bilan fermerlikka aylantirish oqibatida 1996 yil sentyabrdan boshlab, ular yana juda zaiflashib bordi, mollar soni kamayib, chorva mollarni saqlash va yem-xashak bilan taʼminlash sharoiti yomonlashdi, dehqon (fermerlar)dan fermalar jamoa xoʻjaliklariga qaytarib olish hollari yuz berdi. Masalan, Fargʻona viloyati Beshariq tumani “Rapqon” jamoa xoʻjaligi fermani 5 mln. soʻmga kreditga fermerlika olingan yer katta zarar bilan qaytarib berildi. Bunday holatlar Oltiariq, Fargʻona, Toshloq tumanlarida ham boʻldi [3].

1991 yil 11 yanvarda “Aholining shaxsiy yordamchi xoʻjaliklarini yanada mustahkamlash toʻgʻrisida”gi Farmon chiqib, unga muvofiq 516.6 ming gektar yer maydoni aholining shaxsiy yordamchi xoʻjaliklariga muddatsiz foydalanish uchun ajratib berildi. Natijada 1993 yilga kelib aholining shaxsiy yordamchi xoʻjaliklaridagi ekin maydonlari 343,6 ming gektarga yetib, ulardan unumli foydalanish hisobiga 210 ming tonna don, 1843,6 ming tonna sabzavot, 198,5 ming

tonna kartoshka, 363.5 ming tonna poliz mahsulotlari hamda 281,5 ming tonna meva yetishtirildi. 1995 yilga kelib respublikada yetishtirilayotgan donning 10 foizi, kartoshkaning 42 foizi, sabzavotning 62 foizi, polizning 65 foizi, sutninng 75 foizi, tuxumning 43 foizi, junning 64 foizi aholining shaxsiy yordamchi xoʻjaliklarida yetishtirildi [4].

1991 yil mustaqillik qoʻlga kiritilgach, tabiiyki muammolar ham kelib chiqa boshladi. Iqtisodiy tang ahvolda boʻlgan Oʻzbekistonda aholini ish bilan taʼminlash muhim muammolardan hisoblandi. Aholining 61 fioizdan ortiqrogʻi qishloq joylarda yashagan Oʻzbekistonda esa avvalo mulkchilikni davlat tasarrufidan chiqarib, uning turli shakllarini rivojlantirish dolzarb boʻlib qoldi. Aholini ish bilan taʼminlash, oila byudjetini yaxshilash va kishilarni xalq isteʼmol mollariga boʻlgan talabini qondirishning asosiy yoʻllaridan biri qishloq joylarida turli sanoat korxonalarini tashkil etish edi. Bu muhim ijtimoiy va iqtisodiy ahamiyatga ega boʻlib, bu birinchidan, qishloq xoʻjaligidagi mavjud xom ashyo bazalaridan unumli foydalanish imkonini berar, ikinchidan, aholini ish joylari bilan ta'minlashi, ularning oila byudjetlari, turmush darajasini yaxshilash, uchinchidan, jamoa xoʻjaliklarining daromadini oshirish, iqtisodiyotni mustahkamlashi, toʻrtinchidan, qishloq joylarida qurilish industriyasini rivojlantirish imkonini berar edi.

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ortiq kishi mehnat qildi. Bunday xoʻjaliklarga Beshariq tumanidagi “Rapqon”, “Oʻzbekiston” jamoa xoʻjaliklari, Bogʻdod tumanidagi “Namuna” jamoa xoʻjaligi, Buvayda tumanidagi “Buvayda”, “Yangiqoʻrgʻon” jamoa xoʻjaliklari, Toshloq tumanidagi “Yakkatut” va “Zarkent” jamoa xoʻjaliklarini kiritish mumkin edi. Bu xoʻjaliklarning har birida oʻnlab yordamchi xoʻjaliklar boʻlib, ularda qishloq yoshlari mehnat qilishdi.

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Oʻzbekiston tumanidagi Gʻofur Gʻulom nomli jamoa xoʻjaligining aholisi zich joylashgan boʻlib, har bir jon boshiga 0,09 gektardan ekin maydoni, har bir ishlovchi hisobiga esa 0,6 gektardan ekin maydoni toʻgʻri kelar edi. Bu xoʻjalikda dehqonchilikning boshqa tarmoqlari qatori chorvachilik ham rivojlantirildi. Xoʻjalikning jami yer maydoni 3.612 gektar, aholi soni esa 24.500 kishini tashkil qilgan boʻlsa, shundan 3.250 nafari jamoa xoʻjaligida ishladi. Xoʻjalik oʻzida yetishtirgan xom – ashyoni qayta ishlab, mahsulot holiga keltirib ishlaydigan gʻisht, konserva, atlas, gilam, sharf va roʻmol toʻqish, tikuvchilik, ohak ishlab chiqarish, kulolchilik, ipak tolasi ishlab chiqarish, sholcha toʻqish, telpak tikish, makoran sexlari ishlab chiqaruvchi korxonalar sonini koʻpaytirishi natijasida ularning soni 16 taga yetdi. 1993 yilda esa paxta tozalash sexi ishga tushirilib, Nursux qishlogʻining 30 nafar yoshlarini ish bilan taʼminlagan. Zavod kompleksiga kirgan toʻqimachilik sexida 3 mahsulot: paypoq, gazlama va tayyor kiyim –kechak ishlab chiqarish yoʻlga qoʻyilgan va 86 nafar kishi ish bilan taʼminlangan, atlas toʻqish sexida 35 kishi mehnat qildi [9].

1995 yilda belgilangan 61000 korxona tuzilishi oʻrniga 64428 ta kichik va oʻrta korxonalar tashkil topdi. Fargʻona vodiysining oʻzida Andijonda 5272 ta, Fargʻonada 5005 ta, Namanganda 5010 ta kichik korxonalar tuzilib, oʻz faoliyatini olib borganlar [10].

Bunday korxonalarni rivojlantirish, xalqaro bozorda raqobatbardosh mahsulotlar ishlab chiqaradigan yangi korxonalar barpo etish va mavjud quvatlarni modernizatsiya qilish tizimli ravishda davom ettirildi. Eksport qiluvchi korxonalar har tomonlama qoʻllab –quvvatlanib, kichik biznes va xususiy tadbirkorlik subʼektlari eksport faoliyatiga keng jalb qilindi. Shuningdek, sarmoya kirituvchi korxonalar, tashkilotlar bilan ham hamkorlik yoʻlga qoʻyildi.

Umuman. Mustaqillik yillari Oʻzbekistonda sovet davlatidan soʻng qolgan murakkab iqtisodiy ahvolni izga solish borasida bir qator tadbirlar amalga oshirilsada, tang ahvolda qolgan qishloq xoʻjaligi, sanoatni izga solib olishda oʻziga xos murakkab vaziyatlar kelib chiqdi. Oʻzbekiston, ayniqsa Fargʻona viloyati tumanlarining qishloq xoʻjaligiga moslashganligi bu yerda asosan dehqonchilik

bilan shugʻullanish lozimligini koʻrsatdi. Biroq, mustaqillikning dastlabki yillari bu oʻziga xos qiyinchilar bilan amalga oshirildi.

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O‘ZBEKISTONDA TADBIRKORLIKNI RIVOJLANISHIDA KICHIK BIZNES VA XUSUSIY TADBIRKORLIKNING O‘RNI

Annotatsiya: *O‘zbekiston mustaqillikka erishganning ilk yillaridanoq uzoq yillar davomida agrar sohaga ixtisoslashib qolgan respublikada, ijtimoiy –iqtisodiy inqiroz sharoitida ko‘p ukladli iqtisodiyotni barpo etish, agrar munosabatlarning yangi tipini yaratish jarayonlari amalga oshirilishi juda zarur edi. O‘zbekistonda eng avvalo aholini ish bilan ta’minlaydigan, ularni iste’mol tovarlari bilan ta’minlaydigan soha hunarmandchilikni rivojlantirish dolzarb va ustuvor vazifa edi. Ushbu maqolada O‘zbekistonda mustaqillik yillarida qishloq xo‘jaligi sohasida hunarmandchilikni rivojlantirish yo‘lida amalga oshirilgan ishlar tahlil qilingan.*

Kalit so‘zlar: *agrar soha, hunarmandchilik, innovatsiya, ko‘p ukladli iqtisodiyot, agrar munosabatlar, ishlab chiqarish, sanoat, islohotlar.*

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THE ROLE OF SMALL BUSINESS AND PRIVATE ENTREPRENEURSHIP IN THE DEVELOPMENT OF ENTREPRENEURSHIP IN UZBEKISTAN

Abstract: *In the first years of independence of Uzbekistan, the republic, which for many years specialized in agriculture, in the context of socio-economic crisis, it was necessary to build a diversified economy, to create a new type of agrarian relations. The development of entrepreneurship in Uzbekistan, which primarily provides employment and consumer goods, was an urgent and priority task. This article analyzes the work done in Uzbekistan during the years of independence to develop entrepreneurship in agriculture.*

Keywords: *agrarian sector, entrepreneurship, innovation, multi-sectoral economy, agrarian relations, manufacturing, industry, reforms.*

Kirish. Yagona xalq xo‘jaligining tarkibiy qismiga aylanib qolgan O‘zbekistonda mustaqillikning dastlabki yillaridan iqtisodiyotda katta islohotlarni amalga oshirishni talab etdi. Buning uchun avvalo qishloq xo‘jaligida mulkchilik shaklini o‘zgartirish, mehnatning tashkil etishning dehqon uchun tushunarli

bo‘lgan turlarini vujudga keltirish lozim edi. Bu borada mulkni isloh qilish va mulkchilikning turli shakllarida o‘tish masalalari muhim bo‘lgan bir paytda respublikada tobora xususiy sektor salohiyatini ko‘tarish muhim masalalardan biriga aylandi. Ammo uzoq yillar mobaynida asosan, agrar sohaga ixtisoslashib qolgan respublikada, ijtimoiy –iqtisodiy inqiroz shaoroitida ko‘p ukladli iqtisodiyotni barpo etish, agrar munosabatlarning yangi tipini yaratish jarayonlari amalga oshirilishi juda zarur edi. Binorbarin, bozor iqtisodiyotiga o‘tish sharoitida aholining xalq iste’mol tovarlariga bo‘lgan talabining ortib borishida asosiy vazifa tabiiyki aholini oziq – ovqat mahsulotlariga, sanoat tarmog‘ini xom ashyoga bo‘lgan talabini qondirish asosiy vazifa bo‘lib qoldi. Buning ustiga aholi sonining yildan - yilga oshib borishi, sanoat va qurilish tarmoqlarining tez rivojlanishi, ayniqsa qishloq xo‘jaligiga yaroqli bo‘lgan erlarga bo‘lgan talabning ortib borishi natijasida respublikada bir kishi hisobiga to‘g‘ri keladigan erlar maydoni tobora kamayib bordi. Respublika qishloqlarida eri yo‘q oilalar soni 240 ming nafar, uy-joy qurilishi va qishloq xo‘jaligi mahsulotlarini etishtirish uchun erni kengaytirishga muxtoj oilalar soni 1,8 mln.dan ko‘proq edi [1]. Agar 1976 yilda respublika miqyosida bir kishi hisobiga 0,27 gektar haydaladigan er to‘g‘ri kelgan bo‘lsa, 1995 yilda 0,16 gektarni tashkil etdi yoki 41.2 foizga qisqartirildi. SHu davrda respublika aholisi soni 14.2 mln. kishidan 1996 yil boshiga kelib 23 mln. kishiga oshdi [2]. Bu tabiiyki muammolarni ham keltirib chiqardi.

Adabiyotlar tahlili va tadqiqot metodologiyasi.

O‘zbekiston Oliy Soveti Prezidiumining 1989 yil 19 avgust “Kolxozchilar, sovxozlarning ishchilari, fuqarolarning shaxsiy yordamchi xo‘jaliklarini va yakka tartibdagi uy – joy qurilishini rivojlantirish to‘g‘risida”gi Qaror qabul qilingandan so‘ng aholini er bilan ta’minlash maqsadida o‘tkazilgan tadbirlar o‘z natijasini berdi, Bu qonun qabul qilingandan so‘ng 181 ming gektar er maydoni aholiga tomorqa uchun ajratib berildi. Biroq islohotlar davomida o‘ylamasdan, shoshma – shosharlik bilan erlarni ajratish holatlari ham bo‘lib o‘tdi. Masalan, 1993-1995 yillarda Farg‘ona vodiysida aholi zich yashayotganligi, er maydonlarining boshqa viloyatlarga nisbatan juda chegaralanganligi, jumladan bir kishiga vodiyda 0,9 geatr, Farg‘ona viloyatida 0,7 gektar, Andijon viloyatida – 0,6 gektar er maydoni to‘g‘ri kelganligi xususiyatlarini hisobga olmay jamoa va shirkat xo‘jaliklaridagi mustaqil fermalarni kredit olish bilan fermerlikka aylantirish oqibatida 1996 yil sentyabrdan boshlab, ular yana juda zaiflashib bordi, mollar soni kamayib, chorva mollarni saqlash va em-xashak bilan ta’minlash sharoiti yomonlashdi, dehqon (fermerlar)dan fermalar jamoa xo‘jaliklariga qaytarib olish hollari yuz berdi. Masalan, Farg‘ona viloyati Beshariq tumani “Rapqon” jamoa xo‘jaligi fermani 5 mln. so‘mga kreditga fermerlika olingan er katta zarar bilan qaytarib berildi. Bunday holatlar Oltiariq, Farg‘ona, Toshloq tumanlarida ham bo‘ldi [3].

1991 yil 11 yanvarda “Aholining shaxsiy yordamchi xo‘jaliklarini yanada mustahkamlash to‘g‘risida”gi Farmon chiqib, unga muvofiq 516.6 ming gektar er maydoni aholining shaxsiy yordamchi xo‘jaliklariga muddatsiz foydalanish uchun ajratib berildi. Natijada 1993 yilga kelib aholining shaxsiy yordamchi xo‘jaliklaridagi ekin maydonlari 343,6 ming gektarga etib, ulardan unumli

foydalanish hisobiga 210 ming tonna don, 1843,6 ming tonna sabzavot, 198,5 ming tonna kartoshka, 363.5 ming tonna poliz mahsulotlari hamda 281,5 ming tonna meva etishtirildi. 1995 yilga kelib respublikada etishtirilayotgan donning 10 foizi, kartoshkaning 42 foizi, sabzavotning 62 foizi, polizning 65 foizi, sutninng 75 foizi, tuxumning 43 foizi, junning 64 foizi aholining shaxsiy yordamchi xo‘jaliklarida etishtirildi [4].

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1994-1995 yillarda Beshariq tumani “Rapqon” jamoa xo‘jaligida teri oshlash va undan har xil oyoq kiyimlari hamda kurtkalar tikishssexi ishga tushirildi. Bu jamao xo‘jaligi har yili paxta, pilla, meva – sabzovot etishtirish rejalarini bajarib kelgan. Bu erda 13 ta yordamchi va kichik korxonalar barpo etilgan. Ularda 308 nafar qishloq yoshlari mehnat qildi. Toshloq tumani “Zarkent” jamoa xo‘jaligida konservassexi va nutriya terisidan telpak tikishssexlari ishga tushirildi [8].

O‘zbekiston tumanidagi G‘ofur G‘ulom nomli jamoa xo‘jaligining aholisi zich joylashgan bo‘lib, har bir jon boshiga 0,09 gektardan ekin maydoni, har bir ishlovchi hisobiga esa 0,6 gektardan ekin maydoni to‘g‘ri kelar edi. Bu xo‘jalikda dehqonchilikning boshqa tarmoqlari qatori chorvachilik ham rivojlantirildi. Xo‘jalikning jami er maydoni 3.612 gektar, aholi soni esa 24.500 kishini tashkil qilgan bo‘lsa, shundan 3.250 nafari jamoa xo‘jaligida ishladi. Xo‘jalik o‘zida etishtirgan xom – ashyoni qayta ishlab, mahsulot holiga keltirib ishlaydigan g‘isht, konserva, atlas, gilam, sharf va ro‘mol to‘qish, tikuvchilik, ohak ishlab chiqarish, kulolchilik, ipak tolasi ishlab chiqarish, sholcha to‘qish, telpak tikish, makoranssexlari ishlab chiqaruvchi korxonalar sonini ko‘paytirishi natijasida ularning soni 16 taga etdi. 1993 yilda esa paxta tozalashssexi ishga tushirilib, Nursux qishlog‘ining 30 nafar yoshlarini ish bilan ta’minlagan. Zavod kompleksiga kirgan to‘qimachilikssexida 3 mahsulot: paypoq, gazlama va tayyor kiyim –kechak ishlab chiqarish yo‘lga qo‘yilgan va 86 nafar kishi ish bilan ta’minlangan, atlas to‘qishssexida 35 kishi mehnat qildi [9].

1995 yilda belgilangan 61000 korxona tuzilishi o‘rniga 64428 ta kichik va o‘rta korxonalar tashkil topdi. Farg‘ona vodiysining o‘zida Andijonda 5272 ta, Farg‘onada 5005 ta, Namanganda 5010 ta kichik korxonalar tuzilib, o‘z faoliyatini olib borganlar [10].

Bunday korxonalarni rivojlantirish, xalqaro bozorda raqobatbardosh mahsulotlar ishlab chiqaradigan yangi korxonalar barpo etish va mavjud quvatlarni modernizatsiya qilish tizimli ravishda davom ettirildi. Eksport qiluvchi korxonalar har tomonlama qo‘llab –quvvatlanib, kichik biznes va xususiy hunarmandchilik sub’ektlari eksport faoliyatiga keng jalb qilindi. SHuningdek, sarmoya kirituvchi korxonalar, tashkilotlar bilan ham hamkorlik yo‘lga qo‘yildi.

Umuman. Mustaqillik yillari O‘zbekistonda sovet davlatidan so‘ng qolgan murakkab iqtisodiy ahvolni izga solish borasida bir qator tadbirlar amalga oshirilsada, tang ahvolda qolgan qishloq xo‘jaligi, sanoatni izga solib olishda o‘ziga xos murakkab vaziyatlar kelib chiqdi. O‘zbekiston, ayniqsa Farg‘ona viloyati tumanlarining qishloq xo‘jaligiga moslashganligi bu erda asosan dehqonchilik bilan shug‘ullanish lozimligini ko‘rsatdi. Biroq, mustaqillikning dastlabki yillari bu o‘ziga xos qiyinchilar bilan amalga oshirildi.

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ETIOLOGICAL IDENTIFICATION OF FOODBORNE TOXIC INFECTIONS BY TYPE OF PATHOGEN

Abstract. *Foodborne toxic infections (FTIs) remain a significant public health problem worldwide and are characterized by acute intestinal disorders caused by the ingestion of food contaminated with pathogenic microorganisms or their toxins. Etiological identification of the causative agents is crucial for accurate diagnosis, epidemiological surveillance, and the development of effective preventive measures. This review summarizes the modern approaches to the etiological identification of foodborne infections, focusing on bacterial, viral, and toxin-mediated pathogens. It also highlights the application of molecular diagnostic techniques and the role of microbiological and immunological testing in determining the causative agent of foodborne illness.*

Keywords: *foodborne infection, etiology, pathogen identification, bacterial toxins, diagnostics, microbiology, public health.*

Introduction. Foodborne diseases are among the most widespread infectious conditions globally, representing a considerable burden on healthcare systems. According to the World Health Organization (WHO), more than 600 million cases of foodborne illness occur annually, resulting in approximately 420,000 deaths [1]. The etiological spectrum of foodborne toxic infections includes bacteria, viruses, and bacterial toxins, with pathogens such as Salmonella spp., Staphylococcus aureus, Clostridium perfringens, and Bacillus cereus being among the most common culprits [2].

Etiological identification plays a central role in outbreak investigations, guiding clinical treatment, and informing public health interventions. Traditional microbiological methods, combined with modern molecular diagnostics, allow rapid and precise detection of pathogens responsible for foodborne diseases.

Bacterial etiological agents. Bacteria are the most frequent cause of foodborne toxic infections. Among them, Salmonella spp. Remains one of the leading etiological agents worldwide, often associated with contaminated poultry, eggs, and dairy products. The pathogenesis is primarily linked to enterotoxin production and intestinal invasion [3].

Staphylococcus aureus causes intoxication due to the presence of preformed enterotoxins in improperly stored food. The clinical picture develops rapidly—within 2–6 hours—manifesting with nausea, vomiting, and diarrhea. Detection relies on isolating the microorganism and identifying enterotoxin genes by PCR [4].

Clostridium perfringens type A causes foodborne illness through the release

of heat-labile enterotoxin. Improperly cooked meat and poultry are the primary sources. Rapid anaerobic culture and detection of cpe gene fragments are essential for etiological confirmation.

Bacillus cereus produces two types of toxins—emetic and diarrheal—depending on the strain. The emetic toxin (cereulide) is associated with rice dishes, while the diarrheal form results from enterotoxin production in the intestine [5,8].

Viral and other pathogens. Although bacterial agents dominate, viral pathogens such as Norovirus, Hepatitis A virus, and Rotavirus are also significant causes of foodborne outbreaks, particularly in institutional settings. Norovirus accounts for up to 50% of nonbacterial foodborne infections.

Etiological identification of viral foodborne diseases is based on RT-PCR testing and immunochromatographic assays for viral antigens. Proper differentiation from bacterial pathogens is vital, as treatment and preventive measures differ fundamentally [6,9].

Modern diagnostic approaches. Recent advancements in diagnostic technology have dramatically improved the speed and accuracy of etiological identification. Traditional bacteriological culture remains the gold standard for detecting viable organisms. However, molecular and immunological methods—such as polymerase chain reaction (PCR), multiplex PCR, enzyme-linked immunosorbent assay (ELISA), and next-generation sequencing (NGS)—are increasingly used for simultaneous identification of multiple pathogens and their virulence genes [7,10,11].

The combination of culture-based and molecular diagnostics enables comprehensive analysis of outbreaks, providing information not only about the pathogen but also about antimicrobial resistance and virulence profiles.

Epidemiological Significance and Preventive Measures. Correct etiological identification of foodborne pathogens allows timely epidemiological interventions, including source tracing, control of contaminated products, and public health notifications.

Prevention of foodborne infections requires adherence to hygienic food processing standards, temperature control, and education on safe food handling. Strengthening laboratory networks and data-sharing systems is critical for national food safety monitoring programs.

Conclusion. Etiological identification of foodborne toxic infections is essential for accurate diagnosis, clinical management, and effective outbreak control. Advances in molecular microbiology, especially PCR and genomic sequencing, have revolutionized the identification of pathogens. Integrating these tools with traditional methods ensures a comprehensive approach to combating foodborne infections and improving public health safety.

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O‘ZBEKISTON RESPUBLIKASI PENSIYA TIZIMINING MOLIYAVIY TAHLILI VA DEMOGRAFIK TENDENSIYALARI

Annotatsiya. *Ushbu maqolada O‘zbekiston Respublikasi pensiya tizimining moliyaviy barqarorligi va demografik tendensiyalari ilmiy jihatdan tahlil qilingan. Tadqiqotda Pensiya jamg‘armasi daromad va xarajatlarining dinamikasi, davlat transfertlari ulushi, ijtimoiy sug‘urta bazasining kengayish tendensiyalari o‘rganilgan. Ma’lumotlar asosida 2020–2024-yillar davomida ish haqi fondining o‘sishi, soliq imtiyozlari natijasidagi yo‘qotishlar, pensiya jamg‘armasining transfertlarga bog‘liqligi hamda iqtisodiy faol aholi va pensionerlar nisbati hisoblangan. Ilmiy tahlil natijalari pensiya tizimining barqarorligini ta’minlash uchun raqamlashtirish, investitsion diversifikatsiya va nodavlat jamg‘armalarni rivojlantirish zarurligini ko‘rsatdi. Shu asosda muallif tomonidan tizimni moliyaviy va institutsional jihatdan mustahkamlashga qaratilgan ilmiy tavsiyalar ishlab chiqilgan.*

Kalit so‘zlar: *pensiya tizimi, pensiya jamg‘armasi, ijtimoiy sug‘urta, davlat transfertlari, imtiyozlar siyosati, ish haqi fondi, demografik bosim, moliyaviy barqarorlik, dependency ratio, raqamlashtirish, nodavlat jamg‘arma, investitsion diversifikatsiya.*

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FINANCIAL ANALYSIS AND DEMOGRAPHIC TRENDS OF THE PENSION SYSTEM OF THE REPUBLIC OF UZBEKISTAN

Abstract: *This article presents a scientific analysis of the financial stability and demographic trends of the pension system of the Republic of Uzbekistan. The study examines the dynamics of the Pension Fund’s revenues and expenditures, the share of government transfers, and the trends in the expansion of the social insurance base. Based on data from 2020 to 2024, the analysis includes wage fund growth, losses due to tax benefits, the Pension Fund’s dependence on transfers, and the ratio between economically active population and pensioners. The findings highlight the need for digitalization, investment diversification, and the development of non-state pension funds to ensure the system's sustainability. Based on these insights, the author proposes scientific recommendations aimed at*

strengthening the system financially and institutionally.

Keywords: *pension system, Pension Fund, social insurance, government transfers, tax incentives, wage fund, demographic pressure, financial stability, dependency ratio, digitalization, non-state fund, investment diversification.*

Pensiya tizimi — ijtimoiy-iqtisodiy munosabatlarni tartibga soluvchi asosiy institutlardan biri bo‘lib hisoblanadi. Uning vazifasi aholiga mehnat faoliyatini yakunlagandan keyin moddiy ta’minotini kafolatlash, ijtimoiy adolatni ta’minlash va milliy iqtisodiyotning barqarorligini saqlash hisoblanadi. Pensiya tizimi shuningdek ichki investitsiya manbai sifatida ham iqtisodiy rivojlanishga hissa qo‘shadi. O‘zbekistonda amalga oshirilayotgan islohotlar asosan davlat transfertlari, majburiy ijtimoiy to‘lovlar va nodavlat jamg‘armalarning uyg‘unlashuvini nazarda tutadi.

Pensiya tizimi nafaqat aholini ijtimoiy himoya qiladi, balki iqtisodiyotning quyidagi yo‘nalishlariga ta’sir ko‘rsatadi:

Ichki iste’mol bozori — pensiya daromadlari aholining xarid qobiliyatini qo‘llab-quvvatlaydi, bu esa umumiy yalpi talabni barqarorlashtiradi.

Investitsion faoliyat — pensiya jamg‘armalari mablag‘larini moliya bozoriga yo‘naltirish orqali iqtisodiy o‘sish sur’atlariga ta’sir ko‘rsatadi.

Mehnat bozori — pensiya yoshi va mehnat staji orqali mehnat resurslarining faol yoshdagi qismini boshqarish imkoni yaratiladi.

Pensiya tizimining barqarorligi birinchi navbatda aholining demografik dinamikasiga bog‘liq bo‘lib, agar ishlayotgan aholi ulushi pensiya yoshidagi aholidan kamaysa, tizimda “demografik nomutanosiblik” yuzaga keladi. Shu sababli ko‘pgina davlatlar pensiya yoshini oshirish, ish staji talablarini kuchaytirish yoki nodavlat jamg‘armalarni rag‘batlantirish orqali muvozanatni saqlashga intiladi.

Moliyaviy barqarorlik nuqtayi nazaridan esa, pensiya tizimidagi asosiy muammo — to‘lov qobiliyatidir. To‘langan badallar bilan amalga oshirilgan pensiya to‘lovlari o‘rtasidagi muvozanat buzilganda, davlat transfertlari hisobiga qoplash zarurati tug‘iladi. Tahliliy ma’lumotlar asosida O‘zbekiston Respublikasida Pensiya tizimidagi mavjud holat va muammolarni o‘rgandik.

1-jadval

Byudjetdan tashqari Pensiya jamg‘armasining 2024-yildagi ijrosi (mlrd.so‘mda)

Ko‘rsatkichlar	Reja (mlrd so‘m)	Ijro (mlrd so‘m)	Ijro (%)
Hisobot davri boshiga qoldiq	3 183,8	3 037,3	-
Jami daromadlar	63 459,9	63 415,6	99,9
Pensiya jamg‘armasi tushumlari	47 478,3	47 145,0	99,3
Davlat byudjeti transfertlari	15 981,6	16 270,6	101,8
Jami xarajatlar	64 094,8	64 041,0	99,9
Hisobot oxirida qoldiq	2 402,4	2 411,9	-

1-jadval ma’lumotlaridan ko‘rinib turibdiki 2024-yilda jami daromadlar rejaga nisbatan 99,9% ijro etilgan. Pensiya jamg‘armasi tushumlari (47145,0 mlrd.so‘m) rejaga nisbatan kam miqdorda yig‘ilgani ish haqi fondidan tushumlarning to‘liq yig‘ilmasligi — norasmiy sektor va imtiyozlar bilan bog‘liq. Davlat transfertlari 16270,0 mlrd. so‘m bilan rejadan 101.8% ijro qilib, kamomadni yopishda asosiy rol o‘ynagan. Bu holat jamg‘armaning byudjetdan mustaqil faoliyat yuritish qobiliyati cheklanganligini ko‘rsatadi. Yil oxirida saqlangan 2411,9 mlrd so‘mlik qoldiqning 1,45 trlni depozitda ekanligi jamg‘armaning likvid aktivlari mavjudligini ko‘rsatadi, ammo bu mablag‘lar jamg‘arma xarajatlarini barqaror moliyalashtirishga yetarli emasligini ko‘rsatdi.

2-jadval ma’lumotlari asosida tahlillarimizni davom ettiradigan bo‘lsak, ish haqi fondining yarimdan ko‘proq o‘sishi jamg‘arma daromadlarining o‘sishida asosiy omil hisoblanadi. Biroq imtiyozlar tufayli yo‘qotishlar 2020-yilda 17,7 trln.dan 2024-yilda 36,6 trln.gacha o‘sgan.

2-jadval

Pensiya jamg‘armasi daromadlarining dinamikasi tahlili

(mlrd.so‘mda)

Yil	Ish haqi fondi (mlrd so‘m)	Jamg‘arma daromadlari (mlrd so‘m)	O‘sish (%)	Imtiyozlar tufayli yo‘qotish (mlrd so‘m)
2020	118 007,8	20 592,3	—	17 677,5
2021	147 387,7	26 569,0	129,0	21 553,9
2022	189 863,6	33 180,0	124,9	26 959,4
2023	232 760,1	39 805,6	120,0	31 993,1
2024	271 737,5	47 145,0	118,4	36 574,6

Bu ko‘rsatkichlar soliq siyosatining ijtimoiy yo‘nalishdagi qo‘llab-quvvatlovi natijasida jamg‘arma uchun potensial tushumlarning yo‘qolishiga olib kelmoqda. Agar imtiyozlar saqlansa, transfertlar orqali bu kamomadni to‘lash zarur bo‘lib qoladi — bu esa byudjetga bo‘lgan bosimini oshiradi.

3-jadval

Pensiya jamg‘armasiga transfertlar ajratilishi tahlili, (mlrd.so‘mda).

Yil	Daromadlar (mlrd)	Xarajatlar (mlrd)	Transfert (mlrd)	Transfert/Daromad (%)	Transfert/Xarajat (%)
2020	20 592,3	31 807,8	9 117,0	44,3	28,6
2021	26 569,0	36 605,3	10 744,2	40,4	29,3
2022	33 180,0	44 927,6	11 092,0	33,4	24,7
2023	39 805,6	53 589,4	13 797,5	34,6	25,7
2024	47 145,0	64 041,0	16 270,6	34,5	25,4

3-jadvalda esa Pensiya jamg‘armasiga transfertlar ajratilishi tahlili keltirilgan bo‘lib, transfertlar pensiya jamg‘arma daromadlarining 2024-yilda 34,5% ini takshkil etganligini ko‘rishimiz mumkin. Bu koeffitsiyent jamg‘armaning bozor-

asosida mustaqil faoliyat ko‘rsatmasini cheklaydi. O‘z navbatida 2024 yilda transfert/xarajat nisbati 25.4%ni tashkil etgani shuni ko‘rsatadiki, xarajatlarning ¼ qismi doimiy ravishda davlat byudjetidan qoplangan. Strategik nuqtayi nazardan bu tizimni uzoq muddatda barqaror qiladigan yanada samarali mexanizmlarni — nodavlat jamg‘arma, investitsiya portfellarini va ijtimoiy to‘lovlarning to‘liq adolatli yig‘ilishini talab etadi.

4-jadval

2020–2024-yillarda aholi, pensionerlar va iqtisodiy faol aholi dinamikasi

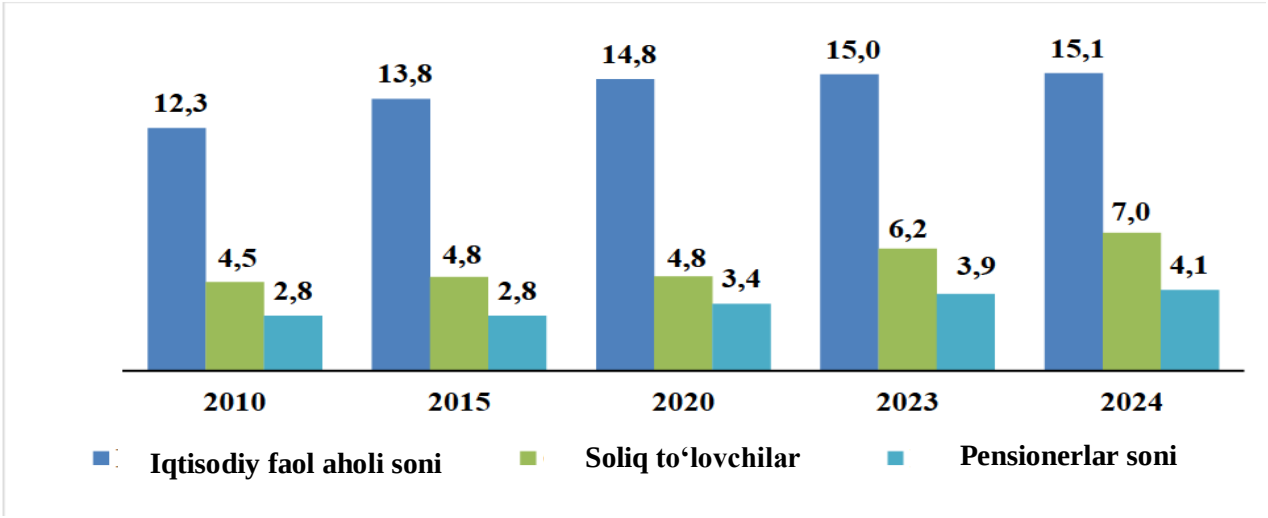
Yil	Aholi (mln)	Pensionerlar (mln)	Faol aholi (mln)	Pensioner ulushi (%)	Dependency ratio (%)
2020	34,6	3,42	14,8	9,9	23.1
2021	35,3	3,59	15,0	10,2	23.9
2022	36,0	3,77	15,0	10,5	25.1
2023	36,8	3,93	15,0	10,7	26.2
2024	37,6	4,10	15,1	10,9	27.2

Bu jadvalda soddalashtirilgan dependency ratio (pensionerlar/faol aholi *100) tahlili orqali pensiya tizimida demografik bosimni tahlil qilishimiz mumkin. 2020-yilda taxminan 23,1% bo‘lgan ko‘rsatkich 2024-yilda 27,2% ga yetdi. Bu demografik bosimning sezilarli darajada o‘sganligini ko‘rsatadi — ya’ni har bir 100 faol ishchidan o‘rtacha 23–27 nafargacha pensiya oluvchilar to‘g‘ri keladi. Agar bu tendensiya davom etsa, kelgusida xarajatlar va transfertlarga bo‘lgan ehtiyoj yanada ortari, bu esa jamg‘armaning moliyaviy barqarorligiga salbiy ta’sir ko‘rsatadi.

1-diagramma ma’lumotlari ko‘rinib turibdiki, soliq to‘lovchilar sonining oshishi ijtimoiy sug‘urta bazasini kengaytirishga xizmat qilmoqda, xolos. Biroq norasmiy sektorning hali ham yuqori ulushi va imtiyozlar tufayli yo‘qotishlar jamg‘armaning haqiqiy to‘langan daromad bazasini pasaytirmoqda. Bu sharoitda jamg‘armaning investitsiyadan kiritgan daromadlari va depozitli zaxiralari muhim ahamiyat kasb etadi.

1-diagramma

Iqtisodiy faol aholi, soliq to‘lovchilar va pensionerlar soni dinamikasi. mln nafar.



Hisob-kitoblar va tahlillar asosida aytish mumkinki, O‘zbekiston pensiya tizimi murakkab transformatsion bosqichda turibdi. Daromadlar va xarajatlar tendensiyalari, demografik o‘zgarishlar hamda imtiyozlar bilan bog‘liq yo‘qotishlar hisobga olingan holda muvozanatli siyosat va islohotlar kerak. Iqtisodiy jihatdan samarali va ijtimoiy adolatli pensiya tizimini ta’minlash uchun yuqoridagi tavsiyalarni bosqichma-bosqich amalga oshirish lozim. Bu uzoq muddatli investitsiyalar, raqamlashtirish va institutlar rivoji orqali amalga oshirilishi mumkin.

Takliflar sifatida quyidagilar amalga oshirilishi lozim:

1. Raqamlashtirish va integratsiya: Soliq qo‘mitasi va Pensiya jamg‘arma ma’lumotlari o‘rtasida to‘liq elektron integratsiyani joriy qilish zarur. Bu boqimanda mablag‘larini kamaytirish va o‘z vaqtida to‘lovlarni undirishni ta’minlaydi.

2.Sohada imtiyozlar siyosatini qayta ko‘rib chiqilishi lozim: Imtiyozlar mexanizmining koeffitsiyentlarini tahlil qilib, jamg‘armaga keladigan yo‘qotishlarni minimallashtirish choralari qo‘llanilishi zarur. Imtiyozlar uchun ma’lum yosh va daromad shartlari qo‘yish kerak.

3.Investitsion portfelni diversifikatsiyalash: Jamg‘arma mablag‘larini infratuzilma, davlat obligatsiyalari (xarid sifatida) va yuqori sifatli korporativ obligatsiyalarga yo‘naltirish orqali uzoq muddatli daromadni oshirish mumkin.

4. Nodavlat pensiya tizimini rivojlantirish: Subsidiyalash va soliq imtiyozlari orqali ixtiyoriy nodavlat jamg‘armalarini kengaytirish lozim, bu davlat transfertlariga bog‘liqlikni kamaytiradi.

5. Demografik siyosat: Pensiya yoshi va mehnatga layoqatli yoshni demografik prognozlar bilan uyg‘unlashtirish, hamda mehnat bozorida ayollar va katta yoshdagilar uchun qo‘shimcha imkoniyatlar yaratish.

6. Modellashtirish va stress-testlar: Pensiya jamg‘armasi moliyaviy barqarorligini prognozlash uchun aktuariy modellar, ssenariy tahlillari va stress-testlarni muntazam o‘tkazish tavsiya etiladi.

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O‘QUVCHILARDA TABIIY-ILMIY SAVODXONLIKNI RIVOJLANTIRISHNING MAZMUNI, SHAKLLARI

Annotsiya: *Xalqaro baholash tadqiqotlarida ishtirok etish, o‘quvchilarning o‘z bilimlarini sinab ko‘rish va yaxshi natijalarga erishish uchun xalqaro tadqiqotlar talablariga mos ravishda o‘qish doir mazkur maqola ushbu muammoga yechim bo`ladi. O‘quvchilarga o‘quv mashg‘ulotlarda ko‘p holatlarda to‘liq, kompleks o‘quv vazifa ustida emas, balki shu kompleks o‘quv vazifaning bo‘laklari yoki “qism o‘quv vazifalari” beriladi. Aksariyat hollarda o‘quv vazifalar o‘quvchilarni baholash maqsadidagina foydalaniladi.*

***Kalit so`zlar:*** *Innovatsion jamiyat, tabiiy-ilmiy savodxonlik,milliy o`quv dasturi, o‘quv vazifalari.*

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CONTENT AND FORMS OF DEVELOPING STUDENTS' SCIENTIFIC LITERACY

Annotation: *This article is about participating in international assessment studies, testing students' knowledge and studying in accordance with the requirements of international studies in order to achieve good results. In most cases, students are given not a complete, complex learning task in their lessons, but fragments of this complex learning task or "partial learning tasks". In most cases, learning tasks are used only for the purpose of assessing students.*

Keywords: *Innovative society, scientific literacy, national educational program, educational objectives.*

Ta‘limning pirovard maqsadi umumta‘lim maktabi o‘quvchilarni jamiyatda muvaffaqiyatli hayot kechirishi uchun zaruriy hayotiy-amaliy kompetensiyalarni rivojlantirishdan iboratdir. Kreativ fikrlash doimiy tarzda va shiddat bilan o‘zgarayotgan, “XXI asr” ko‘nikmalaridan biri hisoblanib, o‘quvchilarning potensial yosh mutaxassis sifatida jamiyatga moslashishga ko‘maklashadi. Bugungi o‘quvchidan yangi muammolarni yangi texnologiyalar orqali hal etishi kutilmoqda. O‘quvchi kreativ fikrlash ko‘nikmasi yordamida tobora murakkablashayotgan mahalliy va global muammolarni innovatsion yondashuv orqali hal etish imkonini beradi. o‘z navbatida bu talablar ta‘lim tizimi uchun juda muhim bo‘lib, aksariyat xorijiy mamlakatlardagi kabi, ta‘lim va fan sohalari rivojlanishini baholash va monitoring qilish orqali ta‘lim sifatini oshirishga qaratilgan ilg‘or tajribalarni sohaga jalb qilish kerakligini anglatadi. Shu maqsadda respublika xalq ta‘limi

tizimida ta‘lim sifatini baholash sohasidagi xalqaro tadqiqotlarni tashkil etish, xalqaro aloqalarni o‘rnatish, o‘quvchi-yoshlarning ilmiy-tadqiqot va innovatsiya faoliyatini, eng avvalo, yosh avlodning ijodiy g‘oyalari va ijodkorligini har tomonlama qo‘llab-quvvatlash hamda rag‘batlantirish ta‘lim sohasidagi islohatlarning asosiy mazmuniga aylandi.

Hozirgi innovatsion jamiyatda tabiiy-ilmiy savodxonlik bilimning o‘zigagina asoslanmaydi. Tabiiy fanlarni misolida aytish mumkinki, avvallari tabiiy fanlar fizika, kimyo, biologiya, geografiya haqidagi bilimlar edi. O‘quvchilarga qo‘yilayotgan zamonaviy talab esa o‘quvchilarning analitik fikrlay olishi, tajribani loyihalashtira olishi, ilmiy tadqiqot o‘tkazish mumkin bo‘lgan savollarni bir-biridan, unchalik farq qilmaydigan savollardan ajrata olishini taqozo etadi.

Jamiyatning axborotlashuv jarayonida zamonaviy dunyo o‘quvchilarni bilimi bilan “rag‘batlantirmaydi”. “Google qidiruv xizmati barcha savollarga yetarli bilim taqdim eta oladi. Hozirda egallangan bilim bilan ma‘lum bir faoliyatni amalga oshirish ta‘limning maqsadi ekanligi o‘z isbotini topmoqda”.[7]

Tabiiy fanlar bo‘yicha o‘quv darsliklari tahlili shuni ko‘rsatadi-ki, o‘quvchilarning o‘rganilgan bilimlarning amalda qo‘llay olish qobiliyatiga e’tibor qaratilmoqda, Finlandiya tajribasi asosida ishlab chiqilgan yangi o‘quv darsliklarida 4 K tamoyilini qo‘llagan holda shakllantirilgan. Tabiiy fanlar bo‘yicha yangi avlod darsliklarining o‘quv-metodik komplekslari aynan 4K tamoyili asosida shakllantirilmoqda. 4K tamoyili quyidagilarni o‘z ichiga oladi:

- kritik (tanqidiy) fikrlash;
- kollaboratsiya (jamoaviy ishlash);
- kreativlik (ijodkorlik);
- kommunikatsiya (muloqot ko‘nikmalari).

Bugungi kunda o‘quvchidan yangi muammolarni zamonaviy texnologiyalar orqali mustaqil hal etishi kutilmoqda.

Hozirgi zamonaviy ta’lim jarayonida o‘quvchini majburlash orqali uni o‘quv materiallari bilan ta’lim jarayoniga faol jalb etish imkonsizdir. O‘quvchilarning qiziqishi, dunyoqarashini hisobga olgan holda turli o‘quv vazifalar, didaktik o‘yinlar, interfaol metodlar, hayotiy-amaliy faoliyatga bog‘liqligini keltirib chiqaruvchi emotsional-labilizatsiyani rivojlantirish, mavzuni nima maqsadda o‘rganish zarurligini tushuntirish orqali dars mashg‘ulotlarini tushuntirishni taqozo etadi.

Innovatsion hamda virtual texnologiyalar o‘quv va sinov o‘quv vazifalarini kengaytirilgan reallik texnologiyalaridan foydalangan holda ishlab chiqishni, chunki hozirgi avlod zamonaviy texnologiyalarni o‘zlashtirishi, tushunishi, o‘z hayotining bir qismi sifatida ko‘rishi pedagogik-psixologik jihatdan maqsadga muvofiq deb qaraladi. Jumladan darslarda elektron doska, gadjetlardan foydalanish tavsiya etiladi. Tabiiy-ilmiy savodxonlikni rivojlantirishda o‘quv vazifalari nafaqat o‘quv darsliklari balki elektron ta‘lim platformalarida joylashtirish orqali fanlardan

[7] Shlyaher A. “Ta’limdagi xalqaro tadqiqotlarning Yangi O‘zbekiston taraqqiyotidagi o‘rni” https://youtu.be/KPom8_Mn6Oo?list=TLPQMTcwODIwMjIGj6KmA09cEA&t=14).

olgan bilimlarini joy, vaqtdan qat'iy nazar mustaqil o'rganish imkoniyatini yaratadi. Bunday platformalardan darsda ham, bo'sh vaqtda uyda ham foydalanish mumkin bo'ladi. Pedagogik amaliyotda hozirgi darsliklar ishlab chiqishdagi zamonaviy tendentsiyalari darsliklarni xalqaro baholash dasturlari PISA, PIRLS, TIMSS, EGMA, EGRA talablarini hisobga olayotganini kuzatish mumkin bo'ladi. Bu xalqaro baholash dasturlarining milliy ta'lim tizimiga tadbig'ining yaqqol misoli sifatida qarash mumkin bo'ladi.

O'quvchilarda tabiiy-ilmiy savodxonlikni rivojlantirish o'quv jarayonida o'qituvchining yo'naltiruvchi va qo'llab-quvvatlovchi vazifasini bajarishni taqozo etadi. O'quv jarayonida o'quvchilarda tabiiy-ilmiy savodxonlikni rivojlanishi quyidagi talablarni bajarishni nazarda tutadi:

- o'quvchilarning kognitiv faolligi va mustaqilligini ta'minlashni;
- o'qishga sog'lom, kuchli hamda ta'sirchan motivatsiyasini shakllantirish;
- o'zini mustaqil va o'zini o'zi boshqaruvchi sub'ekt sifatida his etishi;
- erkin so'zlashi va faol ishtirok etishini qo'llab-quvvatlash.

Tabiiy-ilmiy savodxonlikni rivojlantirishga yo'naltirilgan o'quv vazifalarini shakllantirishda o'quvchining ijtimoiy-psixologik, fiziologik xususiyatlari fanga bog'liq ravishda berilishini hisobga olish kerak. O'quv vazifalari o'quvchilarga jamiyatda, kundalik hayotda, kasbiy hayotda turli o'quv vazifalar, rollarni egallashni va shu orqali mas'uliyatni va javobgarlikni his etish, fanlararo bog'liqlik va mustaqil o'rganishning ahamiyatini anglash imkonini beradi.

O'quv vazifasi – bu o'quvchilarning bilim, ko'nikma va kompetensiyalarini rivojlantirishga qaratilgan, maqsadli pedagogik o'quv vazifadir. Bu tushuncha zamonaviy ta'lim nazariyalarida ko'plab nomlar ostida talqin etiladi: masalan, ingliz tilida "learning task", "instructional task", "performance task", "authentic task" kabi iboralar ishlatiladi. Har bir atama o'z didaktik vazifasiga ega, lekin ularni umumlashtirib aytganda, o'quv vazifasi quyidagi asosiy xususiyatlarga ega bo'ladi:

- O'quv vazifasi aniq o'quv maqsadiga yo'naltirilgan bo'lib, u orqali o'quvchi o'rgatilayotgan tushunchani amalda qo'llaydi. Bu maqsad Blum taksonomiyasi asosida aniqlanishi mumkin: bilim, tushunish, qo'llash, tahlil, sintez va baholash bosqichlarini qamrab olgan vazifalar mavjud.

- O'quv vazifalari ko'p hollarda "muammoli vaziyat" asosida quriladi. Bunda o'quvchi ma'lumotlarni o'rganadi, rejalashtiradi, muammoni tahlil qiladi, bir nechta variantdan iborat yechimlar topadi. Bu yondashuv "muammoga asoslangan ta'lim" yondashuvining asosiy qismini tashkil etadi.

- O'quvchi o'quv vazifani bajarayotganda o'z bilimi, tajribasi va mulohazalariga asoslanadi. Bu esa konstruktivistik yondashuvning asosiy talabi bo'lib, bilim tashqi manbadan emas, ichki ongli faoliyatdan kelib chiqishini nazarda tutadi.

- O'quv vazifasi natijalari baholanadigan holatda bo'lishi shart. Bu holatda aniq mezonlar, testologik indikatorlar belgilanadi. Masalan, yozma o'quv vazifani baholashda grammatik aniqlik, dalillarning mantiqiyligi, uslubiy to'g'rilik kabi mezonlar ko'rsatiladi.

Milliy o‘quv dasturlarida “o‘quv vazifasi” tushunchasi ko‘proq darsda o‘tiladigan mashq yoki yozma o‘quv vazifa sifatida talqin etiladi. Biroq xalqaro baholash dasturlarida bu tushunchaning mazmuni ancha keng: o‘quv vazifasi - bu o‘quvchi faolligini rag‘batlantiradigan, o‘qituvchi tomonidan avvaldan metodik va didaktik jihatdan loyihalashtirilgan o‘quv vazifadir. Rus tilidagi ilmiy manbalarda “учебная задача”, “учебное задание”, “проблемная задача”, “учебно-познавательная задача” atamalari qo‘llanadi. V.V. Davidov va D.B. Elkoninlarning ilmiy asarida o‘quv vazifasi o‘quvchining yangi bilimni egallashga yo‘naltirilgan faoliyat ekanligi, bu faoliyatni “o‘quv vazifasi emas, balki bilimni mustaqil ochishga xizmat qiladigan psixologik konstruktsiya[8]” deb bayon qilishgan.

Xorijiy tadqiqotchilardan Jon Biggs (Constructive Alignment modeli), Grant Wiggins (Authentic Assessment), va David Boud (Assessment for Learning)lar o‘quv vazifalarini nafaqat o‘rgatish, balki o‘quvchining fikrlash tarzini o‘zgartirishga xizmat qiluvchi vosita sifatida baholaganlar[9].

O‘quv vazifalarini loyihalash mavjud holatni qiyosiy tahlil qilishni taqozo etadi. Quyida fizika fani misolida o‘quvchilarning tabiiy-ilmiy savodxonligini rivojlantirishning mavjud holati metodik jihatdan tahlili keltirib o‘tilgan. Tabiiy fanlarda amaliy va laboratoriya ishlarining qanday bajarilishi, bosqichlari, fanga oid atamalar va texnik vositalar tushuntiriladi. Afsuski, o‘quv mashg‘ulotlarida manbalarga asosan baholash va asoslash, muammolarni maqsadli verbalizatsiya qilish, ilmiy bilimlarning rivojlanishiga o‘zining mustaqil fikrini bildirish, o‘rganilgan bilimlarning hayotiy faoliyatda ahamiyatiga kam e’tibor qaratiladi. Tabiiy fanlar doirasida fanning mazmuniy jihatlariga asoslangan o‘quv vazifalarni bajarish jarayonida o‘quvchilarda sezilarli darajadagi qiyinchiliklar kuzatilmaydi. Jumladan, fanga oid tushunchalar, atamalar, qoidalar va qonuniyatlarni topishga qaratilgan savollarga 80-90% to‘g‘ri javob berishadi. Atrof-muhit muhofazasi, odam salomatligi, tabiiy resurslar bilan bog‘liq savollarga qisman to‘g‘ri yondashganini kuzatish mumkin. Ammo bu o‘quv vazifalarning fikrlashga yo‘naltirilgan savollariga yechim topish va mustaqil qaror qabul qilish, xulosa qilishni talab qiluvchi ochiq javobli savollarida qiynalishgan[10].

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THE DEVELOPMENT OF THE SCIENTIFIC AND TECHNICAL REVOLUTION AND ITS ECOLOGICAL CONSEQUENCES ON THE ENVIRONMENT

Abstract: *This article provides detailed information about the scientific and technical revolution, its impact on the environment today, and its ecological consequences.*

Keywords: *natural resource, intensive, industry, agriculture, dust, soot, smoke, industrialization, urbanization, atmosphere, soil, anthropogenic factor, river, canal.*

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ILMIY-TEXNIK INQILOBNING RIVOJLANISHI VA UNING EKOLOGIK OQIYATLARI AVTO MUHIT

Annotatsiya: *Mazkur maqolada fan-texnika inqilobi va uning hozirgi kunda atrof-muhitga ta'siri hamda uning ekologik oqibatlar to'g'risida batafsil ma'lumot berib o'tilgan.*

Kalit so'zlar: *tabiiy resurs, intensiv, sanoat, qishloq xo'jaligi, chang, qurum, tutun, industriya, urbanizatsiya, atmosfera, tuproq, antropogen omil, daryo, kanal.*

The current stage of environmental protection has reached a global scale due to human influence on nature. Since approximately the 1950s of the 20th century, with the rapid growth of productive forces known as the "Scientific and Technical Revolution," the interaction between humans and nature has reached an unprecedented scale and, in many respects, has taken on new forms.

During the period of the scientific and technical revolution and the development of technology, the desire of private property owners to obtain

maximum profit from natural resources and means of production led to the intensive and, at the same time, ruthless exploitation of all the riches of nature. In the 18th and 19th centuries, due to industrial development, many natural resources began to be used more extensively—such as underground minerals, agricultural lands, fish stocks, water and land animals, and plant life—while forest areas sharply decreased [4].

In the second half of the 19th century and the beginning of the 20th century, the development of the chemical industry, the construction of railways, the appearance of ships on seas and rivers, and especially the increasing use of mineral resources became widespread. For example, worldwide pig iron production rose from 4.2 million tons in 1860 to 38 million tons in 1900. By that time, the widespread use of internal combustion engines in industry and other sectors of the economy brought significant changes in technological development. The introduction of new complex machinery and tools, along with the growth of cities and industrial centers, led to a sharp increase in the amount of fuel consumed. As a result, non-recyclable waste, industrial residues, slags, dust, soot, and smoke began to accumulate, causing significant changes and pollution in the natural environment. Despite the continuous rise in environmental pollution, insufficient attention has been paid to maintain the balance of nature. Moreover, industrial waste, residues, and garbage collected from cities are being discharged into clean water bodies—mainly rivers. Nevertheless, nature still retains its self-purifying ability and the potential to restore renewable biological resources [5].

Due to powerful technology, humans in the 20th century directly influenced the processes of material and energy exchange within the geographical shell, even disturbing the balance of nature in many places. This impact of human activity is rapidly increasing. Consequently, as a result of scientific and technological progress, the anthropogenic factor, as mentioned earlier, has become comparable to natural geographical and geological factors on a planetary scale. Certain areas of human economic activity—such as the use of rocks, extraction of mineral resources, canal construction, regulation of river flows, and the building of reservoirs—have led to the ruthless exploitation of nature. The negative environmental consequences of human economic activities vary across different regions of the Earth. Initially, such harmful impacts were observed primarily in areas undergoing industrialization and. The Western countries that embarked on the path of urbanization (the United Kingdom, France, Belgium, the Netherlands, and others) encountered these challenges.

Thus, the aforementioned stages of industrial development gradually reduced the efficiency of natural resource use, and the irreversible negative changes in the geographical environment ceased to be local — they reached a regional scale, encompassing vast areas. However, nature, throughout its long evolution, has retained the ability to restore disrupted natural processes and balance.

In addition to the depletion of natural resources, the development of industry gave rise to a new problem — environmental pollution. It is known that water bodies, the atmosphere, and soils have been heavily contaminated with industrial

waste. Today, these factors pose a serious threat to plant and animal life, as well as to human health. Gradually, this negative phenomenon began to extend its influence across the entire globe.

The main reason for this is that while human economic activity had a local or regional character up to the early 20th century, it has now acquired a planetary, that is, global scale. This trend became especially evident beginning in the 1940s and 1950s.

At present, the ways and forms of the impact of scientific and technological progress on nature are extremely diverse. As a result of this influence, not only quantitative but also qualitative changes are occurring in nature. The main characteristics of the impact of the scientific and technological revolution on the environment can be summarized as follows: The consumption of natural resources has increased, and pollution of the environment with industrial and consumer waste has intensified. In the second half of the 20th century, due to the scientific and technological revolution, the possibilities for intensive use of natural resources to meet society's material and spiritual needs and to further develop production have expanded immensely [4].

As the First President of the Republic of Uzbekistan, I.A. Karimov, emphasized in his work "Uzbekistan at the Threshold of the 21st Century: Threats to Security, Conditions for Stability, and Guarantees of Development", today's rapid global scientific and technological progress has led to an increasing use of natural resources for economic purposes.

Moreover, as the world's population continues to grow year by year, there is an increasing demand for the production of larger quantities of food, fuel, clothing, and other goods. This, in turn, has led to a rapid reduction of forested areas, the expansion of deserts, soil degradation, impacts on the ozone layer in the upper atmosphere, a rise in the Earth's average air temperature, and other negative consequences [1].

It has also been emphasized that the ongoing arms race and the production, storage, and testing of nuclear, chemical, and other weapons of mass destruction pose a serious threat to the environment in which humanity lives. Scientific and technological progress, while improving tools of labor, simultaneously intensifies industrial impacts on the natural environment and increases pollution. The "demographic explosion," that is, the sharp rise in the world's population, also exerts a negative influence on nature. Anthropogenic pressures have begun to affect the functioning of the global ecological system — the biosphere — and are creating a real risk of a planetary-scale ecological catastrophe.

In particular, the countries of Central Asia are considered a complex and unique region from the viewpoint of ecological issues. This region has an arid climate, and environmental problems are worsening due to water scarcity, industrial and agricultural activities, population growth, and the improper use of natural resources. In the second half of the 20th century, the large-scale diversion of the Amu Darya and Syr Darya rivers for cotton cultivation caused the Aral Sea to dry

up. This led to climate changes, health problems (such as dust storms and the spread of salt and pesticides), and the collapse of the local economy [2].

During the Soviet period, the Republic of Uzbekistan was one of the agrarian republics within the union. As it was turned into a raw-material production base, the republic began expanding agricultural lands for cultivation. As a result, the rate of water usage has increased. This has led to a decrease in the amount of water flowing into the Aral Sea, and in the following period, it may stop flowing entirely.

Desertification processes include the reduction in the types and quantities of natural vegetation, soil erosion, soil salinization, and a decline in soil fertility. As a result of desertification, the area of deserts expands, and desert-like landscapes emerge. Nearly 48.5 million km² of the Earth's surface consists of deserts and semi-deserts, of which approximately 10 million km² have formed under the influence of human activity. In arid regions, the process of desertification is mainly linked to the growing population in these areas and the increasing impact of human economic activities—agriculture, industry, and rapid exploitation of natural resources—on desert landscapes. Addressing ecological problems in these regions requires not only local but also regional and global approaches. Human well-being depends on living in harmony with nature. Therefore, the responsibility of every citizen and organization for environmental protection is of great importance.

In conclusion, it should be emphasized that the scientific and technological revolution has created significant opportunities for humanity to use natural resources wisely and improve the environment. However, at the same time, it has often led to considerable environmental pollution and the degradation of natural conditions. Environmental pollution involves the release of harmful substances and compounds into nature, which causes adverse changes in the physical, chemical, and biological properties of air, soil, and water. Naturally, this can increasingly negatively affect plants, animals, human life, industrial and agricultural production, and the state of natural resources in the future.

Thus, in the context of the scientific and technological revolution, the increase in the consumption of natural resources is accompanied by the intensification of industrial production and the growth of humanity's energy consumption.

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LABORATORY TESTING METHODS FOR BRUCELLOSIS

Abstract: *Brucellosis is a widespread, polyetiological zooanthroponosis, an extremely dangerous infectious disease with various transmission routes, characterized by damage to many organs and systems, mainly the musculoskeletal system and the nervous system, intoxication of the body and the manifestation of allergies, as well as the development of the infectious process, which in most cases becomes chronic, often subsequently leading to disability in patients. The main importance of brucellosis diagnostics is that it helps to detect the disease early, provide proper treatment, and prevent widespread complications that can pose a serious threat to the patient's health. The main diagnostic methods include laboratory blood tests (general and biochemical), as well as bacterial culture, PCR, and serological studies to detect brucellae or antibodies to them in blood, urine, and other biological fluids.*

Keywords: *Bacteriological method, blood culture, Wright reaction, Ifa, Coombs reaction, acute brucellosis, chronic brucellosis.*

Introduction. In practice, it is often difficult to distinguish brucellosis from other diseases accompanied by an increase in body temperature. In 30-40% of patients, it takes 1 to 3 months for the diagnosis to be made. This situation causes unnecessary suffering for the patients. Delays in diagnosis are also caused by patients' late referral to medical institutions. A comprehensive assessment of the symptoms of baldness, epidemiological factors that cause brucellosis, and laboratory tests is one of the main conditions for diagnosing brucellosis.

Bacteriological method:

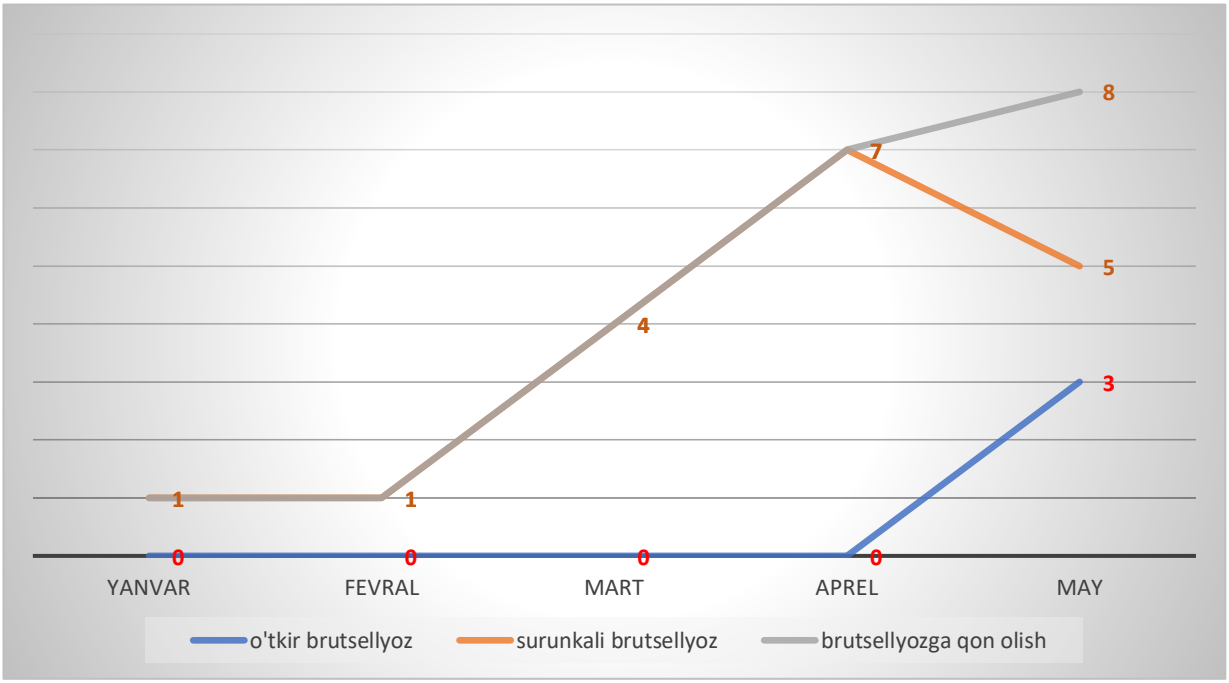
Isolation of Brucella culture from biomaterial obtained from a patient is the gold standard of diagnosis.

Blood, bone marrow, cerebrospinal fluid, tissue puncture or other body biofluids obtained from a patient can be used as material for culture. According to the relevant documents of the Ministry of Health of the Republic of Uzbekistan, patients with elevated body temperature for more than three days should be tested for brucellosis by culture (hemoculture) on clinical nutrient medium, even in the absence of relevant epidemiological indications.

Blood culture in chronic brucellosis often gives a low positive result. If the patient has an unexplained febrile condition, serological tests for brucellosis are

negative, and there are appropriate epidemiological indications, bone marrow culture instead of blood is more likely to give a positive result for brucellosis. However, obtaining the biomaterial itself is painful and carries a high risk of complications, and it is a method that requires special qualifications from the doctor. Therefore, this method is not used in a number of endemic countries.

Within 1–2 weeks after the onset of the disease, IgM and then IgG antibodies appear. Antibody titers can remain high for a long time even against the background of treatment and negative blood culture. Therefore, in the fight against brucellosis, it is difficult to determine the stage of the disease and the background of treatment.



In areas endemic for brucellosis, antibody titers can remain high due to the continuous ingress of microbes into the body.

Although a rapid decrease in IgG titers is considered an indicator of successful treatment, the preservation of the titer, on the contrary, indicates the activity of the infectious process. In patients with local complications, antibody titers decrease very slowly. During the period of exacerbation of the disease, IgG and IgA titers increase, but IgM titers do not increase.

Serological tests:

- Wright reaction (PA)
- Rose-Bengal test
- Hedelson reaction
- Coombs's reaction
- IFA

Titer	Interpretation
<1:40	Negative (no infection
1:80	Doubtful or early infection
≥1:160	Positive (suggestive of active brucellosis
≥1:320	Strongly positive (acute brucellosis

Platelet Agglutination Reaction - Rose Bengal Test

The Rose Bengal test is commonly used in Western countries and in veterinary medicine as a rapid test.This test is useful when the patient has not previously been exposed to Brucella, but is of little value in areas where people are frequently infected or endemic.The agglutination of inactivated stained cells of B. abortus with IgG or IgM antibodies in patient samples.The agglutination reaction is read within 4 minutes.The Rose Bengal test is considered a screening test in endemic areas.

A positive serum result must be confirmed by a more sensitive ELISA test.

Interpretation. The presence of agglutination indicates a titer of antibodies to Brucella greater than 25 IU/ml.

- Specificity 71% to 80%
- Sensitivity 78% to 100%

Conclusion. The longer the disease lasts, the lower the percentage of positive results of serological tests. In cases where bacteriological analysis and Wright's reaction give negative results, Coombs's reaction or ELISA is used in patients with suspected brucellosis. Used in chronic and clinically nonspecific forms of brucellosis.

This reaction identifies incomplete antibodies. Titrated antiglobulin serum is used.

First, Wright's reaction is performed. Then, at least three tubes are taken from the first dilutions that gave a negative result or at least three tubes from those that gave a low positive result. Centrifuge, wash the precipitate three times, add antiglobulin serum, and incubate for 20 hours. A 2+ agglutination titer in a 1:50 dilution is considered diagnostic. This test is not used in our country due to the scarcity of reagents. 2-mercaptoethanol testis used to differentiate acute and chronic brucellosis.

IFA is more sensitive than Wright's reaction in the diagnosis of chronic brucellosis and post-brucellosis conditions. In the acute phase of the disease, Wright's and Rose-Bengal reactions are more reliable and cheaper.

Although ELISA detects Ig well during the acute phase of the disease, it can give a false positive result if the patient has rheumatoid factor or a false negative result if the patient has a high level of IgG in a patient with brucellosis.

Therefore, it is necessary to determine both IgM and IgG immunoglobulins in patients.

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PREVENTION, EPIDEMIOLOGY AND LABORATORY ANALYSIS OF VIRAL HEPATITIS B

Abstract: *Viral hepatitis B is a chronic, sometimes acute, infectious disease caused by the Hepadnavirus. The disease manifests itself with a variety of clinical symptoms, often leaving severe complications, and is widespread among the population. The causative agent of HBV is a DNA-containing hepadnavirus. These viruses have been isolated from humans and Peking ducks. The virus has a complex structure, consisting of two parts: the outer shell contains the surface antigen, HBsAg, and the inner core contains double-stranded DNA, the DNA polymerase enzyme, and HBsAg.*

Keywords: *Acute hepatitis, chronic hepatitis, sterilization, dispensary, IFA, PCR, special prophylaxis.*

Introduction. Hepatitis B virus, compared to other viruses, is very resistant to environmental factors, physical and chemical factors. This virus retains its activity when frozen and thawed several times, and also does not lose its activity for up to 7 days when dried at +250 degrees. When heated to +600 degrees, the virus dies after 10 hours, when boiled or in an autoclave after 10-20 minutes, and in dry hot air at 1600 degrees after 1 hour. Modern disinfectants lose the activity of viruses only after 60 minutes.

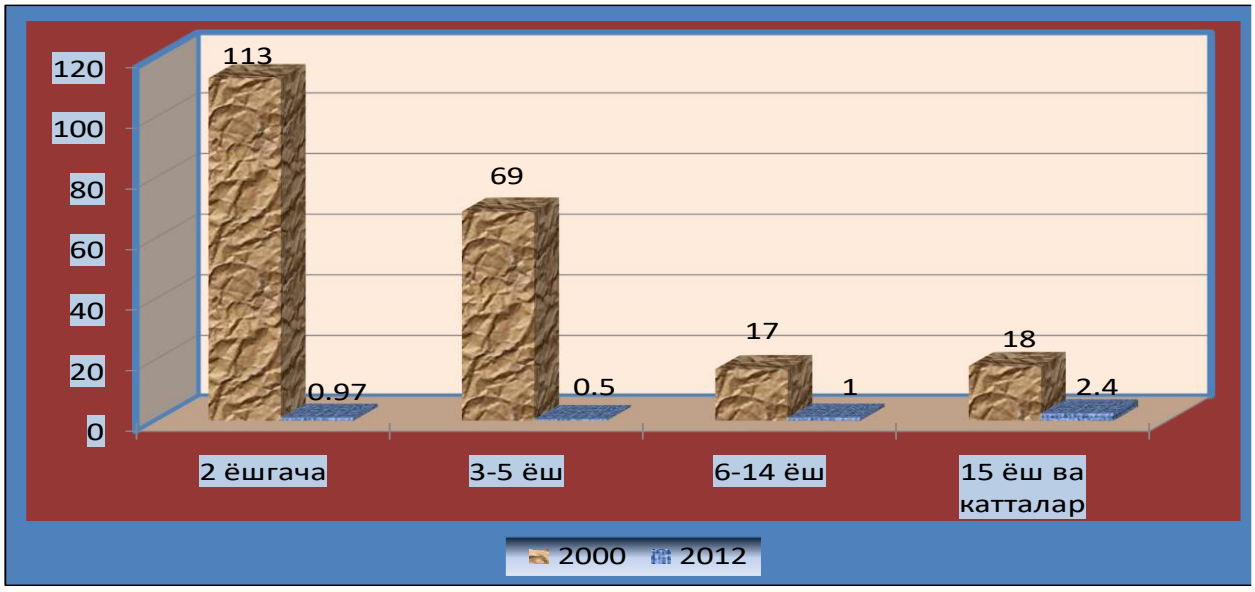
The main source of the causative agent can be patients experiencing chronic VGV disease, chronic virus carriers, patients with acute form with obvious clinical symptoms, patients with mild form without clinical symptoms.

The period from infection to the appearance of clinical signs of the disease can vary from 60 to 180 days. The average latent period is 2.5-3 months. After the viruses enter the skin or mucous membranes, local lymphadenitis occurs, then the viruses enter the blood, viremia develops, and the viruses enter the bone marrow and liver cells, i.e., hepatocytes.

Mechanism of transmission: Viral hepatitis B is transmitted by contact, when the integrity of the skin or mucous membranes is broken and the viruses are transmitted to a healthy person through blood or other body fluids. The most dangerous epidemiologically is the presence of viruses in the blood. Viruses in the body are mainly released into the external environment by natural and artificial means.

Viral hepatitis B is transmitted to healthy people by natural and artificial means of transmission. The natural transmission route is during sexual intercourse, from a pregnant mother to her baby during childbirth, and from the father to his baby through infected semen.

Patients are discharged from the hospital when there are no complaints, they feel well, their liver size decreases to normal levels in dynamics, the activity of ALT, AST and bilirubin decreases to twice the norm, and other analytical tests normalize, but at least 21 days later. Patients with OVHG undergo primary dispensary examination by the infectious disease specialist of the hospital where they were treated within 30 days after discharge from the hospital. Based on clinical indications, patients treated with OVHG may undergo examination in the infectious diseases departments of hepatological centers or regional polyclinics upon the written recommendation of the attending physician. The duration of dispensary observation is 1 year, with ALT, AST, and bilirubin tests being performed every 3 months.



Diagnostic evaluation of hepatic and hepatobiliary disorders requires a comprehensive and systematic approach that includes both basic and additional laboratory and instrumental investigations. These diagnostic procedures allow for an accurate assessment of the functional state of the liver, detection of structural changes, and identification of viral and metabolic etiologies.

At the outpatient level, the primary goal of diagnostic testing is the initial evaluation of the patient's condition and identification of potential hepatic dysfunction. The following basic investigations are routinely performed:

- Complete Blood Count (CBC): provides information on hemoglobin levels, erythrocyte indices, leukocyte count, and erythrocyte sedimentation rate (ESR), which reflect general systemic responses to hepatic pathology.
- Urinalysis: helps in detecting bilirubinuria, urobilinogen, and other abnormalities associated with hepatocellular or cholestatic conditions.

•Biochemical Tests: include the determination of alanine aminotransferase (ALT), aspartate aminotransferase (AST), total and fractional bilirubin, and the thymol turbidity test, which together assess hepatic cytolysis and synthetic function.

•Serological Markers for Viral Hepatitis: detection of anti-HAV-IgM, HBsAg, and anti-HCV antibodies to identify acute or chronic viral hepatitis infections.

•Ultrasound Examination of the Abdominal Cavity (USG/UTT): provides non-invasive visualization of the liver, gallbladder, pancreas, and spleen, allowing assessment of organ size, echogenicity, and structural changes.

At the inpatient level, a more detailed evaluation is performed to confirm diagnosis, assess the degree of hepatic impairment, and monitor disease progression or treatment response. The mandatory diagnostic measures include:

•CBC with Platelet Count: essential for evaluating cytopenia and potential hypersplenism.

•Urinalysis: for continued monitoring of renal and hepatic parameters.

•Expanded Biochemical Profile: including ALT, AST, total and fractional bilirubin, thymol test, total protein, albumin, cholesterol, alkaline phosphatase (AP), and gamma-glutamyl transpeptidase (GGT).

•Coagulation Parameters: prothrombin index, fibrinogen, and international normalized ratio (INR) are assessed to evaluate hepatic synthetic capacity and risk of bleeding.

•Serological Markers of Viral Hepatitis (HBV Panel): detection of anti-HAV-IgM, anti-HEV-IgM, HBsAg (qualitative), anti-HBsAb, HBeAg, anti-HBeAb, anti-HBc, and total anti-HDV antibodies.

•Ultrasound of the Abdominal Cavity: for structural and vascular assessment.

•Coprogram: to evaluate intestinal absorption and digestive function.

Additional investigations are performed to refine differential diagnosis, assess comorbidities, and detect complications. These may include:

•Extended Biochemical Tests: measurement of lipoproteins, triglycerides, protein fractions, glucose, electrolytes (potassium, sodium, chlorides), amylase, nitrogen balance, urea, and creatinine to assess metabolic and renal function.

•Coagulogram: includes prothrombin time (PT), total fibrinogen, plasma recalcification time, ethanol test, and blood clotting time to evaluate hemostatic disturbances.

•Blood Acid-Base Status: determined in emergency settings to assess metabolic derangements.

•Anti-HIV Testing: performed with informed patient consent to rule out immunodeficiency-related hepatic manifestations.

•Polymerase Chain Reaction (PCR) Diagnostics: qualitative detection of HBV-DNA, HCV-RNA, and HDV-RNA for confirming viral replication and disease severity.

•Blood Group Determination: for clinical management and transfusion readiness.

•Autoimmune Markers: detection of antinuclear antibodies (ANA) and antimitochondrial antibodies (AMA) to identify autoimmune hepatitis and primary biliary cholangitis.

•Ceruloplasmin Test: indicated in the differential diagnosis of Wilson–Konovalov disease.

•Pregnancy Test: mandatory for women of reproductive age to guide therapeutic decision-making.

•Electrocardiography (ECG): for patients over 50 years old or with known cardiovascular disease to assess cardiac function prior to hepatotoxic treatment.

•Doppler Ultrasound of Hepatic and Splenic Vessels: to evaluate hemodynamic alterations and portal hypertension.

•Esophagogastroduodenoscopy (EGD/EPGDS): to detect varices and portal hypertensive gastropathy.

•Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) of the Abdominal Organs: for detailed structural and volumetric assessment of hepatic parenchyma and surrounding organs.

•Liver Elastography: to quantify the degree of hepatic fibrosis and stiffness.

•Chest Radiography (R-graphy): to evaluate possible pulmonary or cardiomegaly-related complications.

Conclusion. In the focus of acute and chronic HBV, final disinfection is carried out after the patient is admitted to an infectious disease's hospital or after his death. Regular current disinfection is carried out around the patient. The patient's personal hygiene items (toothbrush, comb, razor, manicure tools) must be separate, these items must be disinfected with disinfectants or by boiling. It is necessary to use protective equipment during sexual intercourse.

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GEOSYSTEMS AND THE INTERRELATION OF THEIR COMPONENTS (BASED ON THE EXAMPL OF BUKHARA REGION)

Annotation. *This article examines the theoretical foundations of geosystems, their structural components, and the significance of intercomponent relationships in maintaining ecological stability. Using the Bukhara Region as an example, the study analyzes the landscape structure of geosystems, including the levels of landscape - urochishche - facia. The interactions between climate, soil, water resources, and vegetation, as well as degradation and desertification processes within the "water - soil - vegetation" system, are discussed. The research highlights the importance of maintaining balance among natural components for the sustainable management of regional geosystems.*
Keywords: *geosystem, landscape, urochishche, ecological balance, Bukhara facia, desertification.*

Introduction. Geosystems are complex territorial natural complexes in which climate, relief, soil, water, vegetation, and wildlife are interrelated and function as a single ecological and functional unit. The stability and sustainability of geosystems depend on the dynamic interaction between these components. Any change in one element may trigger a cascade of effects that alter the structure and functioning of the entire system.

Bukhara Region, located in the central part of Uzbekistan, is characterized by an arid and continental climate, low annual precipitation, and limited water resources. These factors, combined with anthropogenic pressures such as agriculture, urban expansion, and industrial activities, have resulted in significant transformations of local geosystems. Therefore, understanding the interactions between geosystem components is crucial for the development of sustainable land and water management strategies.

The aim of this study is to analyze the structure of geosystems at various hierarchical levels and to examine the interrelationships between componentsusing the Bukhara Region as a case study.

Theoretical Foundations of Geosystems

The concept of a "geosystem" was introduced by V.B.Sochava and refers to a natural territorial complex characterized by the exchange of matter and energy between its components. A geosystem is an open system where all components - climate, relief, soil, water, vegetation, wildlife, and human activity - interact dynamically. Geosystems are hierarchical, consisting of:

- Landscape: The largest structural unit characterized by common climatic and geomorphological features.
- Urochishche (local natural complex): A medium-sized homogeneous natural area within a landscape.
- Facia (smallest homogenous unit): The smallest unit, uniform in soil, vegetation, microclimate, and hydrological conditions.

Components of Geosystems.

The main components of geosystems include:

1.Climate determines temperature, precipitation, and humidity, influencing vegetation and soil formation.
2.Relief affects drainage, soil erosion, distribution of vegetation.
3.Soil provides nutrients, supports plant growth, and regulates water retention.
4.Water resources control the availability of moisture, influence irrigation potential, and shape ecosystems.
5.Vegetation and wildlife participate in energy and nutrient cycles, stabilize soil, and maintain biodiversity.
6.Human activity alters natural processes, converts landscapes into agricultural, urban, and industrial areas.

Dynamic Relationships

Components of geosystems interact reciprocally. Changes in climate influence vegetation patterns, which then impact soil composition and water retention. Similarly, anthropogenic activities such as irrigation or deforestation affect soil quality, water availability and biodiversity.

This triad forms the foundation of ecosystem stability:
-Vegetation reduces soil erosion, maintains microclimate, and retains soil moisture.
-Soil supplies essential nutrients and water to vegetation.
-Climate sets the limits for vegetation growth and soil processes.

Geosystems of Bukhara Region

Landscape Structure: Landscape – Urochishche – Facia Bukhara Region exhibits two main landscape types:

Kyzylkum desert landscapes
- Characterized by arid conditions, sandy and saline soils.
- Vegetation: saxaul and other xerophytes.
- Environmental problems: vegetation degradation, sand and dust storms, wind erosion.

Irrigated agro-landscapes of the Zarafshan valley
- Fertile soils due to irrigation; main crops include cotton, alfalfa, vineyards, and melons.
- Environmental problems: secondary soil salinization, groundwater depletion.

Within each landscape:
- Urochishche: Medium-scale homogeneous natural areas, such as sandy plains or irrigated fields.
- Facia: Smallest units, homogenous in soil type, vegetation, microclimate.

Transformation of the “Water - Soil - Vegetation” system.

Current environmental challenges in Bukhara include:
1. Reduced water flow in the Zarafshan river.
2. Secondary salinization of irrigated soils.
3. Decline of saxaul forests.
4. Increased frequency of dust and sand storms.

Soil humus and nitrogen levels in Bukhara region: According to a recent study, the soils in the Bukhara region show extremely low humus content (around 0.5% in sandy desert soils) and nitrogen content between 0.04–0.05% in those soils. Grey-brown soils on the periphery of irrigation zones have humus of 0.6–0.9%, and in intensively irrigated areas up to 1.2–1.8%. Nitrogen content in those soils is 0.05–0.16%. These poor soil fertility metrics underline the high vulnerability of the geosystem to degradation and desertification.

Water salinization downstream of the Zarafshan River: In the Zarafshan Valley irrigated system, the salinity levels of surface waters increase significantly downstream: near Bukhara the values reach 1,600–1,800 mg/L compared to 250–300 mg/L upstream. Groundwater salinity also mirrors this trend, making irrigation water poorer in quality and raising salt loads in eluviated s oils.

Climatic extremes and aridity: Studies show that the region has extremely high evapotranspiration (around 2,000 mm/year) compared to very low annual precipitation (120–140 mm/year) in parts of Bukhara region. Such a disparity makes the system heavily reliant on irrigation and vulnerable to water-table rise, salinization and soil saturation.

Vegetation and biodiversity pressures: In the region, for example in the Romitan District area of Bukhara Province, halophilic vegetation communities (such as Aeluropus littoralis, Salicornia europaea, Halostachys caspica) occupy saline depressions caused by subsidence of salt-bearing rocks and high groundwater levels. Also, some 25 plant species in Bukhara Province are listed in the national Red Book, 14 of which are endemic. These facts highlight that beyond land degradation, biodiversity loss and habitat fragmentation are major concerns.

Recommendations for sustainability:
- Introduce water-saving irrigation technologies (drip and sprinkler systems).
- Reforest degraded desert areas with native species like saxaul.
- Cultivate low-water-demand crops to reduce pressure on groundwater.
- Monitor and manage industrial and agricultural waste.

Recent desertification mitigation efforts: Local media reported that in 2025, over 1,800 trees were transplanted along a 20 km stretch of road in the Bukhara region (A-380 highway) to make way for road expansion. While intended as mitigation, concerns were raised about survival of the transplanted trees and exacerbation of desertification due to removal of roadside vegetation. This underscores the social and ecological interface: infrastructure development may inadvertently weaken geosystem components (vegetation) and reduce resilience.

Conclusion. The geosystems of Bukhara Region are complex and highly sensitive to both natural and anthropogenic influences. Maintaining ecological stability requires the careful management of water, soil, and vegetation, alongside sustainable agricultural practices. By preserving the balance among geosystem components, it is possible to mitigate land degradation, prevent desertification, and ensure sustainable development of the region.

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TUPROQNING GIGIYENIK AHAMIYATI, UNI IFLOSLANTIRUVCHI MANBALAR VA EKOLOGIK NAZORAT USULLARI

Annotatsiya: *Ushbu maqolada tuproqning gigiyenik ahamiyati, uning fizik, kimyoviy va biologik xususiyatlari hamda inson salomatligiga ta’siri o‘rganilgan. Tuproqning ifloslanish manbalari — sanoat chiqindilari, qishloq xo‘jaligi kimyoviy vositalari, maishiy chiqindilar, mikrobiologik va radiatsion omillar — kompleks tarzda tahlil qilinadi. Tadqiqot davomida Buxoro viloyatining turli hududlaridan olingan tuproq namunalarida og‘ir metall ionlari (Pb, Cd, Zn), pestitsid qoldiqlari va bakterial ifloslanish darajalari baholandi. Maqolada tuproq ifloslanishining gigiyenik tasnifi keltirilib, ekologik monitoringni takomillashtirish bo‘yicha tavsiyalar ishlab chiqilgan.*

Kalit so‘zlar: *tuproq gigiyenasi, og‘ir metallar, pestitsidlar, ekologik monitoring, ifloslanish manbalari, sanitariya nazorati.*

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HYGIENIC SIGNIFICANCE OF SOIL, SOURCES OF ITS POLLUTION AND METHODS OF ENVIRONMENTAL CONTROL

Abstract:*This article examines the hygienic importance of soil, its physical, chemical, and biological characteristics, and their influence on human health. The main sources of soil contamination—industrial waste, agricultural chemicals, household waste, microbiological, and radiation factors—are analyzed in detail. Soil samples collected from various regions of Bukhara were tested for heavy metals (Pb, Cd, Zn), pesticide residues, and bacterial contamination. The article presents a hygienic classification of soil pollution and proposes recommendations for improving environmental monitoring and public health protection.*

Keywords: *soil hygiene, heavy metals, pesticides, environmental monitoring, sources of pollution, sanitary control.*

Kirish

Tuproq — biosferaning eng muhim tabiiy komponenti bo‘lib, u inson faoliyatining barcha jabhalariga bevosita yoki bilvosita ta’sir ko‘rsatadi. Tuproq orqali oziq-ovqat zanjiri, ichimlik suvlari va havo ifloslanish jarayonlariga kimyoviy va biologik moddalar kirib boradi. Shu sababli tuproqni gigiyenik nuqtai nazardan o‘rganish va ekologik monitoringni tashkil etish inson salomatligini himoya qilishda muhim ahamiyatga ega.

Adabiyotlar sharhi

Dunyo miqyosida tuproq ifloslanishining asosiy manbalari sifatida sanoat chiqindilari, metallurgiya korxonalari, avtomobil transporti va pestitsidlardan foydalanish ko‘rsatiladi. (WHO, 2023; FAO, 2024). Rossiya va Markaziy Osiyo davlatlarida olib borilgan tadqiqotlar (Iskandarova,

2021; Bekmurodov, 2022) tuproqdagi qo‘rg‘oshin va kadmiy konsentratsiyasining gigiyenik me’yordan 2–5 baravar yuqori ekanini qayd etgan.

Tadqiqot materiali va uslublari

Tadqiqot Buxoro viloyatining G‘ijduvon, Romitan va Kogon tumanlarida olib borildi. Tuproq namunalarida og‘ir metallarning miqdori atom-absorbsion spektrometriya orqali, pestitsid qoldiqlari gaz-xromatografik usulda, bakterial ifloslanish esa sanitar-indikatorli mikroorganizmlar (E.coli, Enterococcus spp.) bo‘yicha aniqlanib, SanPiN 2.1.7.1287–03 me’yorlari asosida baholandi.

Natijalar va muhokama

O‘rganilgan hududlarda qo‘rg‘oshin (Pb) miqdori 0,12–0,45 mg/kg, kadmiy (Cd) 0,01–0,05 mg/kg, rux (Zn) esa 2,3–5,6 mg/kg diapazonda bo‘lib, ayrim joylarda gigiyenik me’yordan yuqori ekani aniqlandi. Pestitsid qoldiqlari asosan qishloq xo‘jalik hududlarida (xususan, paxta dalalarida) aniqlangan. Mikrobiologik tahlil natijalariga ko‘ra, ichak tayoqchasi guruhi bakteriyalarining soni 1 g tuproqda 1×10^3 gacha yetgan.

Gigiyenik tasnif

Tuproqning gigiyenik tasnifi — bu uning tarkibida mavjud kimyoviy, biologik va radioaktiv moddalarning miqdori, ularning inson sog‘lig‘iga ta’sir darajasi hamda sanitar xavflilik ko‘rsatkichlariga asoslangan baholash tizimidir. Ushbu tasnif O‘zbekiston Respublikasi **SanPiN 2.1.7.1287–03**, **GOST 17.4.1.02–83** va Jahon sog‘liqni saqlash tashkiloti (JSST) tavsiyalariga tayanadi.

Tasniflashda quyidagi **asosiy mezonlar** inobatga olinadi:

1. **Kimyoviy ifloslanish darajasi** – og‘ir metallar, pestitsidlar, neft mahsulotlari, fenollar, nitratlar va boshqa toksik birikmalar miqdori bilan aniqlanadi.
2. **Biologik ifloslanish darajasi** – ichak tayoqchasi guruhi bakteriyalari (E. coli), streptokokklar, gelmint tuxumlari va patogen mikroorganizmlar mavjudligi bilan belgilanadi.
3. **Radiatsion ifloslanish** – tabiiy radionuklidlar (uran, toriy, radiy) yoki antropogen manbalar (Cs-137, Sr-90) kontsentratsiyasi orqali baholanadi.

1. Toza (gigiyenik xavfsiz) tuproq

- Kimyoviy moddalarning kontsentratsiyasi gigiyenik me’yorlardan oshmaydi.
- E. coli 1 g tuproqda topilmaydi yoki 10^0–10^1 darajada.
- Radiatsion fon 20 μR/soatdan oshmaydi.
- Bunday tuproq ekologik jihatdan xavfsiz va sanitariya talablari nuqtai nazaridan foydalanishga yaroqli hisoblanadi.

2. Shartli ifloslangan tuproq

- Og‘ir metallarning (masalan, qo‘rg‘oshin, rux, kadmiy) miqdori gigiyenik me’yordan 1,1–3,0 marta yuqori.
- Mikrobiologik ko‘rsatkichlar o‘rtacha darajada oshgan (E. coli 1×10^2–10^3 gacha).
- Radiatsion fon 20–40 μR/soat atrofida.

• Bu toifa tuproqlarda ekologik xavf past bo‘lsa-da, uzoq muddatda sog‘liq uchun potensial xavf tug‘dirishi mumkin.

3. O‘rtacha darajada ifloslangan tuproq

• Kimyoviy moddalar gigiyenik me’yordan 3–5 baravar yuqori (masalan, Pb > 0,6 mg/kg, Cd > 0,05 mg/kg).

• Mikrobiologik ifloslanish yuqori (1×10^3–10^4 E. coli/g).

• Radiatsion fon 40–60 μR/soat gacha.

• Bunday tuproqlar oziq-ovqat yetishtirish uchun yaroqsiz bo‘lib, faqat texnik yoki sanoat maqsadlarida foydalanilishi mumkin.

4. Yuqori darajada ifloslangan tuproq

• Toksik elementlar me’yorlardan 5–10 marta yuqori.

• E. coli va patogen mikroflora ko‘rsatkichlari 1×10^4–10^5 gacha.

• Radiatsion fon 60–100 μR/soat.

• Ushbu tuproq inson salomatligiga bevosita xavf tug‘diradi. Sanitar qoidalar asosida dezaktivatsiya, rekultivatsiya yoki chiqindini utilizatsiya qilish zarur.

5. Ekstremal darajada ifloslangan tuproq

• Og‘ir metallar, pestitsidlar yoki radionuklidlar gigiyenik me’yorlardan 10 martadan ortiq yuqori.

• Kuchli mikrobiologik kontaminatsiya mavjud (E. coli >10^6/g).

• Radiatsion fon 100 μR/soatdan yuqori.

• Bunday tuproqlar **sog‘liq uchun xavfli zonalar** toifasiga kiradi va ular ekologik favqulodda hudud sifatida e’tirof etiladi.

Gigiyenik baholashning umumiy mezonlari (SanPiN asosida):

Ko‘rsatkich turi	Me’yoriy qiymat	O‘rta daraja	Yuqori daraja	Ekstremal daraja
Qo‘rg‘oshin (Pb)	≤0.3 mg/kg	0.31–0.6	0.61–1.0	>1.0
Kadmiy (Cd)	≤0.02 mg/kg	0.03–0.05	0.06–0.1	>0.1
Rux (Zn)	≤3 mg/kg	3.1–5.0	5.1–7.0	>7.0
E. coli (CFU/g)	<10^2	10^3	10^4–10^5	>10^6
Radiatsion fon	≤20 μR/soat	21–40	41–60	>60

Gigiyenik tasnifning amaliy ahamiyati

Tuproqning bunday tasnifi:

• ekologik xavfli hududlarni erta aniqlashga;

• oziq-ovqat va ichimlik suv xavfsizligini baholashga;

• sanitariya-epidemiologik nazorat choralarini rejalashtirishga;

• sog‘liq uchun xavfli ishlab chiqarish zonalarini lokalizatsiya qilishga imkon beradi.

Ushbu yondashuv orqali ekologik monitoring tizimi **profilaktik tibbiyot** maqsadlariga integratsiya qilinib, atrof-muhitni muhofaza qilish samaradorligi oshiriladi.

Xulosa va tavsiyalar

1. Tuproqdagi og‘ir metall va pestitsid qoldiqlarini muntazam nazorat qilish uchun ekologik monitoring tizimini kengaytirish lozim.

2. Qishloq xo‘jaligida ekologik xavfsiz o‘g‘it va biopestitsidlardan foydalanish tavsiya etiladi.

3. Aholi punktlari yaqinida chiqindi poligonlarini joylashtirish qat’iyan cheklanishi kerak.

4. Tuproq ifloslanishining gigiyenik xaritasini tuzish va elektron ma’lumotlar bazasini yaratish zarur.

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INTENSIFYING THE PROCESS OF PURIFYING TECHNICAL WATER FROM MECHANICAL MIXTURES (USING THE EXAMPLE OF SHURTAN GAS CHEMICAL COMPLEX)

Abstract: *This article covers the scientific and technological foundations for improving wastewater treatment processes at the Shurtan Gas Chemical Complex. The study considers ways to increase the efficiency of water purification and reduce the negative impact on the environment through the use of modern technologies. The results show that a significant increase in efficiency from innovative filtration and biological purification methods has been achieved.*

Keywords. *Shurtan Gas Chemical Complex, wastewater, treatment technologies, environmental efficiency, biological treatment, filtration.*

Introduction Water used in the oil and gas industry is contaminated with hydrocarbon compounds, various salts, and mechanical impurities, which must be technically purified before reuse and disposal.

Wastewater of the Shurtan Gas Chemical Complex enterprise is liquid mixed waste generated during the production and domestic activities of the enterprise. They represent water, which is a mixture of dissolved and undissolved liquid, solid, and gaseous substances.

A large amount of water is consumed in the production processes of the Shurtan Gas Chemical Complex, and ensuring the quality of recycled water is of great importance. Dirty wastewater can negatively affect technological processes and lead to environmental problems. Therefore, the improvement of wastewater treatment technologies is considered one of the urgent problems. This article analyzes the technologies and methods that can be used for effective wastewater treatment at the Shurtan Gas Chemical Complex.

The efficient use of water resources and the improvement of treatment technologies at the Shurtan Gas Chemical Complex are of great importance for the sustainable development of the enterprise. Wastewater systems reduce the pressure on natural resources through water recycling and allow for wastewater treatment in accordance with environmental standards. This article examines the existing problems of the wastewater treatment process at the Shurtan Gas Chemical Complex and proposals for their solution.

Literature analysis and methodology Analysis of scientific literature shows that modern membrane filtration and biological treatment technologies significantly increase the efficiency of wastewater treatment.

[1] studies conducted by authors of the literature indicate that membrane filtration is 20% more efficient than traditional methods in terms of energy efficiency. The authors also found that optimizing the use of chemical reagents in water treatment plays an important role in bringing the composition of wastewater to an environmentally safe level.

[3] investigated ways to increase the energy efficiency of water purification technologies.

[4] proposed innovative solutions for biological purification for the gas chemical industry

In domestic research on the gas chemical industry of our country, the authors of the literature [5] consider measures to ensure the compliance of circulating water with environmental standards.

The following methods were used in the study:

Laboratory experiments: the efficiency properties of various types of filtration materials and biological reactors were studied.

Computer simulation: simulation was carried out to optimize wastewater flows[6].

Experiment: The composition of wastewater in real conditions at the Shurtan Gas Chemical Complex was studied, which is presented in Table 1 below.

Results of wastewater analysis of the Shurtan Gas Chemical Complex

Table 1

Component name	**Value of detected components**	
	According to the regulatory document	**As of today**
	Biological pool, outlet	
pH	6,5-8,5	8,16
Suspended matter, mg/l	30	30
Ammonium nitrogen, mg/l	2,0	1,8
Nitrite ion, mg/l	3,3	0,066
Nitrate ion, mg/l	45	8,3
Chlorides, mg/l	350	329
Petroleum products, mg/l	0,3	0,22
Phosphate ion, mg/l	1,0	0,36
Sulfate ion, mg/l	500	472
Dry residue, mg/l	1000	976
Iron ion (+3), mg/l	0,3	0,12
Dissolved oxygen, mg/l	4-6	5,42
BPK, mg/l	6,0	-
XPK, mg/l	40	36,0

The following methods were used in the research: Technological processes of wastewater systems were analyzed.

The effectiveness of the membrane filtration method and biological purification was tested in laboratory conditions.

The energy consumption of the cleaning process was determined, and the environmental impact indicators were studied.

The research results were modeled for industrial implementation.

Results: The results of the study showed:

The efficiency of wastewater treatment using the membrane filtration method reached 95%.

Energy consumption during the biological purification process decreased by up to 15% compared to traditional methods.

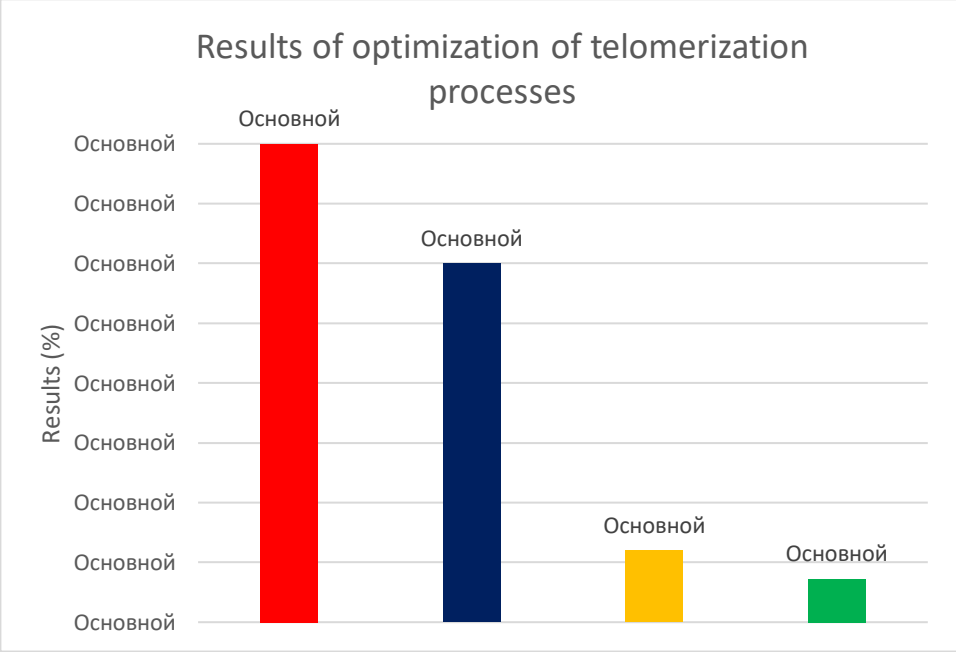
The overall efficiency of the wastewater system has increased by 30%, which allows for saving water resources.

The environmental safety of treated water meets the requirements of international standards.

The multi-stage filtration method made it possible to reduce the content of solid particles in the water up to 95%.

Through biological reactors, it was possible to remove up to 80% of organic substances from the water.

Energy consumption has been reduced by up to 20% thanks to the new membrane filtration technology.



The quality of treated water has been ensured to comply with the requirements of international environmental standards.

The results of optimization parameters of the telomerization process are shown in the graph above. Temperature 200%, pressure 150, catalyst efficiency 30%, and energy saving 18%.

Conclusion: To improve wastewater treatment processes at the Shurtan Gas Chemical Complex, it is recommended to use modern filtration and biological treatment methods. These technologies not only ensure environmental safety but also contribute to increasing production efficiency. Further research is needed to improve the efficiency of water purification processes.

Improving the wastewater treatment process at the Shurtan Gas Chemical Complex will enhance the environmental safety and efficiency of industrial processes. The introduction of membrane filtration and biological treatment technologies contributes to the sustainable development of water treatment systems. This approach allows for the rational use of water resources at the Shurtan Gas Chemical Complex.

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BO‘LAJAK MUTAXASSISLARNI MILLIY QADRIYATLAR ASOSIDA KASBIY FAOLIYATGA TAYYORLASH YO‘LLARI

Annotatsiya. *O‘zbekiston Respublikasining pedagogika yo‘nalishidagi professional ta’lim muassasalarida bo‘lajak mutaxassislarni tayyorlash bo‘yicha o‘ziga xos tajribalar to‘plangan, fan-texnikaning jadal taraqqiyoti, oliy ma’lumotli mutaxassislarni tayyorlashga yangicha talablar qo‘ymoqda, Davlat ta’lim standartining vazifalari.*

Kalit so’zlar. *Kasb-hunar kollejlari, kichik mutaxassislar, fan-texnika,transport, morfologik faoliyat, bilish faoliyati.*

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WAYS OF PREPARING FUTURE SPECIALISTS FOR PROFESSIONAL ACTIVITY BASED ON NATIONAL VALUES

Annotation: *The professional educational institutions of the Republic of Uzbekistan in the field of pedagogy have accumulated unique experiences in training future specialists, the rapid development of science and technology sets new requirements for the training of highly educated specialists, the tasks of the State Education Standard.*

Key words. *Vocational colleges, junior specialists, science and technology, transport, morphological activity, cognitive activity.*

O‘zbekiston Respublikasining pedagogika yo‘nalishidagi professional ta’lim muassasalarida bo‘lajak mutaxassislarni tayyorlash bo‘yicha o‘ziga xos tajribalar to‘plangan bo‘lib, hozirgi davrda 3,2,1 yillik kasbiy ta’limdagi deyarli barcha o‘quv fanlarining mazkur bo‘g‘inida o‘rgatilishi uchun lozim bo‘lgan zaruriy (maksimal va minimal miqdorning o‘rtachasi) miqdorini ifodalaydigan davlat ta’lim standartlari (kelgusida DTS) va kasbiy ta’lim tarmoq standarti – TTSlar ishlab chiqildi va tajriba sinovlardan o‘tkazildi hamda amaliyotga joriy qilindi. Vazirlar Mahkamasining 2017 yil 6 apreldagi 187-son qarorida O‘rta maxsus, kasb-hunar ta’limi Davlat ta’lim standartining maqsadi o‘rta maxsus, kasb-hunar ta’limi tizimini mamlakatda amalga oshirilayotgan ijtimoiy-iqtisodiy islohotlar, rivojlangan xorijiy mamlakatlarning ilg‘or tajribalari hamda ilm-fan va zamonaviy axborot-kommunikatsiya texnologiyalariga asoslangan holda tashkil etish,

belgilangan talablarga javob beruvchi, ma’naviy barkamol, kasb mahoratiga ega bo‘lgan, mehnat va ta’lim xizmatlari bozorida raqobatbardosh kadrlar tayyorlashdan iborat.

Davlat ta’lim standartining vazifalari quyidagilardan iborat: o‘rta maxsus, kasb-hunar ta’limi mazmuni va sifatiga qo‘yiladigan talablarni belgilash; milliy, umuminsoniy va ma’naviy qadriyatlar asosida o‘quvchilarni tarbiyalashning samarali shakllari va usullarini joriy etish; o‘quv-tarbiya jarayoniga pedagogik va zamonaviy axborot-kommunikatsiya texnologiyalarini joriy etish, o‘rta maxsus, kasb-hunar ta’limi muassa-salarining o‘quvchilari va bitiruvchilarining malakasiga qo‘yiladigan talablarni belgilash; kadrlarni maqsadli va sifatli tayyorlash uchun ta’lim, fan va ishlab chiqarishning samarali integratsiyasini ta’minlash; ta’lim sifati va kadrlar tayyorlashga hamda ko‘rsatiladigan ta’lim xizmatlari turlariga nisbatan qo‘yiladigan maqbul talablarni belgilash; o‘rta maxsus, kasb-hunar ta’limiga va uning pirovard natijalariga, o‘quvchilarning bilimi va kasbiy malaka darajasini baholash tartibiga, shuningdek, ta’lim faoliyati sifati ustidan nazorat qilishga nisbatan qo‘yiladigan talablarning huquqiy asoslarini takomillashtirish; davlat ta’lim standartlari talablarining ta’lim sifati va kadrlar tayyorlashga qo‘yiladigan xalqaro talablarga muvofiqligini ta’minlash deb ko‘rsatilgan. Kuzatishlarning ko‘rsatishicha, professional ta’lim muassasalariga qabul davrida o‘quvchilarning nomutanosib taqsimlangan holda hujjat topshirishlari sabablaridan biri kasb-hunar ta’lim muassasasi bilan ota-onalar, hududdagi umumta’lim maktablari, mahalla-jamoatchilik va ishlab chiqarish (davlat va xususiy) korxonalari jamoalari o‘rtasida mustahkam, tizimli doimiy ravishdagi aloqalarning rejali ravishda muntazam o‘rnatilmaganligidadir. Tadqiqotchi Ro‘ziev I.E. ”Kasb-hunar kollejlarida kichik mutaxassislar tayyorlash muammolari ustida to‘xtalib, o‘qitishda ichki me’yorlashtirilgan tizimni emas, jahonning standartlariga mosligining muhimligini ta’kidlaydi. “Fanlarni o‘qitishni takomillashtirish uchun innovatsion uslublarni yaratish va joriy etishning metodologik asoslari” bloklar faoliyatidan samarali foydalanish e’tiborga olinadi.

Pedagogik amaliyotlari blokiga (turli amaliyotlarda, masalan, uzluksiz, o‘quv, diplom oldi va b.) o‘quvchilarning nazariy olgan bilimlarini amaliy faoliyatda qo‘llash vositalari, omillari, shakllari va uslublarining hayotiyligini asoslash vazifasi qo‘yiladi. Bu vazifani hal etishda ta’limiy milliy-moddiy qadriyatlardan va ularning integratsiyalashgan turlaridan foydalanish maqsadga muvofiq bo‘ladi. Bunda ko‘proq bo‘lajak mutaxassisda shakllanadigan shaxsiy-ma’naviy va kasbiy-ma’naviy sifatlarni tarkib topishiga e’tibor qaratiladi.

Pedagogika yo‘nalishidagi texnikumlarida mutaxassislarni tayyorlash jarayonida ilg‘or ta’lim, axborot va ishlab chiqarish texnologiyalarining samarali namunala-rini qo‘llash ham muhim muammolardan hisoblanadi. Professional ta’lim muassasalarida o‘rganiladigan barcha fanlarni, jumladan, umumkasbiy va maxsus fanlarni milliy qadriyatlardan foydalangan holda o‘qitishda ilg‘or texnologiyalarga, xususan, kompyuter dasturlaridan foydalanishga to‘liq o‘tilgan emas. Ma’lumki, ishlab chiqarishning barcha sohalariga yangi texnikalar va ilg‘or texnologiyalar kirib keldi. Masalan, gazlamalarga ishlov berish, tikuvchilik, to‘quvchilikda

Rossiya bilan bir qatorda Kanada, Yaponiya, Koreya, Germaniyadan keltirilgan turli jihozlar, qurilmalar va texnologiyalar amalda qo‘llanilmoqda. Ammo, ko‘pgina texniekmlarga berilgan bunday jihozlar ba’zi xollarda mutaxassislar yetishmasligi sababli yetarlicha samara beradigan darajada ishlatilmasdan, ko‘proq ko‘rgazmali qurol sifatida foydalanilmoqda.

“Tarbiyaviy tadbirlar turli xil moddiy va ma’naviy ehtiyojlarga javob beruvchi, tarbiyaviy maqsadlarning yagona majmuasiga bo‘ysundirilgan, bir-biri bilan o‘zaro hamkorlik qiluvchi, o‘zida bir butun ta’limni ko‘zda tutgan tarbiyaviy ta’sir majmuidir”. Shu sababli ta’lim muassasalari tarbiyaviy jarayonni tashkil kilish va muvaffaqiyatli davom ettirish uchun zarur bo‘lgan tarbiyaviy ishlar uslublari, bilimlar, malaka va mahoratlar tizimi, zamonaviy pedagogik texnologiyalar va ularni tarbiyavii ishlar amaliyotida qo‘llash masalalari pedagogik jamoalariing eng muhim muammosi bo‘lib qolmoqda. Ta’lim muassasalarida o‘quvchilar bilan olib boriladigan tarbiyaviy ishlarning samaradorligini oshirish tarbiyaviy ishlar texnologiyasini to‘g‘ri tashkil kilish va qo‘llashga bog‘liq.

Yakuniy davlat attestatsiyasi blokiga bo‘lajak mutaxassislarning o‘z kasbiga oid fanlarni (o‘z kasbiga oid muayyan muammoni) nechog‘lik puxta o‘zlashtirganini va kasbiy faoliyatga tayyorgarlik darajalarini baholash vazifasi qo‘yiladi. Bu vazifani bajarish barobarida bo‘lajak mutaxassis- ning kasbiy faoliyatga tayyorgarligi haqida ham xulosa shakllantiriladi. Bunda bitiruvchining oliy o‘quv yurtiga yoki kasbiy faoliyatlarga tavsiya berishga ko‘proq e’tibor qaratiladi. Bo‘lajak mutaxassislarni kasbiy faoliyatga tayyorlashga bo‘lgan bunday integrativ yondashuv bo‘lajak mutaxassislarni kasbiy ma’naviy yetuk, raqobatbardosh zamonaviy mutaxassis bo‘lib shakllanishida mustahkam metodologik asos bo‘la oladi. Pedagog olim Sh.Mardonov ta’lim-tarbiyaning oliy qadriyat ekanligini ta’kidlab, ”Pedagogik ta’lim tizimida ta’limiy qadriyatlardan foydalanish” nomli maqolasida bu haqda shunday yozadi: ”Ta’limiy qadriyatlar- shaxs tomonidan individual qimmatining to‘g‘ri baholanishi, tan olinishi, shaxs sifatida namoyon bo‘lishi, shuningdek, o‘ziga xoslikning saqlanib qolishini ta’minlovchi sharoitni yaratishni nazarda tutadi”.

Pedagog olim ta’limiy qadriyatlardan uzluksiz ta’lim tizimida, shuningdek, o‘qituvchi-kadrlarni tayyorlash va malakasini oshirish bosqichida amalda foydalanish texnologiyasini ishlab chiqadi va mazkur qadriyatlarning asosini quyidagilar tashkil etishini ko‘rsatib o‘tadi: “ta’limning zamonaviy metodologiyasi; milliy va umuminsoniy qadriyatlar, milliy va umumbashariy madaniyat; xalq an’analari, urf-odatlari; xalq pedagogikasi g‘oyalari; pedagogik gumanizm; shaxsga yo‘naltirilgan pedagogika; pedagogik madaniyat; talabalarning individual qiziqishlari asosida shakllantirilgan hamkorlik, o‘zaro aloqalar va bir-birini tushunish, ishonch, o‘zaro yordam, munosabatlarni uyg‘unlashtirish pedagogikasi; innovatsion pedagogik texnologiyalar - ta’limiy qadriyatlar sifatida; innovatsion ta’lim, ijodiy fikrlash, analitik qobiliyatlar. Sh. Mardonov xalq pedagogikasiga, xalqning urf-odatlariga asoslangan ta’limiy qadriyatlarni qo‘llashni zamonaviy ta’lim texnologiyalari, innovatsion va axborot texnologiyalari bilan uyg‘unlashtirib olib borishni ko‘rsatib beradi.

Qachonki o‘zi biror kasb-hunarni egallasa, shu orqali faoliyat olib borsa, kishilar mehnatini his qiladi. Shu sabab yoshlarni kasb bilan birga hunar o‘rganishiga ham imkon beruvchi shart-sharoitlarni yaratish lozimdir. Ushbu fikrlardan faqat milliy-ma’naviy qadriyatlarni asrab-avaylashgina emas, balki ularni tiklash, yangilarini yaratish, takomillash-tirish va kelgusi avlodlarga yetkazish choralarini ko‘rish, avvalo ziyolilarni, qolaversa, jamiyatdagi barcha kishilarning muqaddas burchi ekanligi kelib chiqadi.

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BO‘LAJAK MUTAXASSISLARNI MILLIY QADRIYATLARDAN FOYDALANGAN HOLDA KASBIY FAOLIYATGA TAYYORLASH

Annotatsiya. *Jamiyatimiz rivojining hozirgi bosqichi, unda yuz berayotgan ijtimoiy-iqtisodiy o‘zgarishlar, fan-texnikaning jadal taraqqiyoti, oliy ma’lumotli mutaxassislarni tayyorlashga yangicha talablar qo‘ymoqda.*

Kalit so’zlar. *Psixologiyada faoliyat, fan-texnika, transport, morfologik faoliyat, bilish faoliyati, konsepsiya, mutaxassisning irodasi.*

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TRAINING FUTURE SPECIALISTS FOR PROFESSIONAL ACTIVITY USING NATIONAL VALUES

Annotation: *The current stage of the development of our society, the socio-economic changes taking place in it, the rapid development of science and technology, put new demands on the training of highly educated specialists.*

Key words. *Activity in psychology, science and technology, transport, morphological activity, cognitive activity, concept, specialist's will.*

Mamlakatimizda professional ta’lim muassasalarida ham kasb-hunarlar o‘rganish uchun shart-sharoitlar yaratilishi munosabati bilan mazkur jarayonni samarali tashkil etish uchun unda yuzaga kelishi mumkin bo‘lgan muammolar yechimini topishni taqozo etmoqda.

Ushbu maqsadda ro‘y berishi mumkin bo‘lgan muammolarni shartli ravishda quyidagi bosqichlarga ajratish mumkin:

1-bosqich. Umumiy o‘rta ta’lim maktablari 9-sinflar bitiruvchilarini boshlang‘ich professional ta’lim muassasalari kasbiy ta’lim yo‘nalishlariga yo‘llash va qabul qilinishigacha bo‘lgan davrda uchraydigan muammolar.

2-bosqich. Professional ta’lim muassasalari va ular negizida tashkil etiladigan 10-11-sinf o‘quvchilariga kasbiy ta’lim berishga ixtisoslashgan o‘rta professional o‘quv muassasasida mutaxassislarni tayyorlashda ishlab chiqarish tadbirlari, o‘quvchilar ijodkorlik uyushmalari, turli amaliyotla-rini tashkil etish bilan bog‘liq muammolar ham mavjud.

3-bosqich. Yoshlarning professional ta’lim muassasalarni bitirgach, oliy ta’limga kirishlari, ishga joylashishlari va kasbiy mahoratlarini

takomillashtirishlari, ya’ni, ularni qayta tayyorlash va kasbiy mahoratlarini, malakalarini oshirish bo‘yicha muammolar.Respublikadagi 10 mingdan ziyod umumta’lim maktablarining 9-10-11-sinflarini bitirgan yoshlarning asosiy qismi kasb-hunar va boshqa kasbiy ta’lim muassasalarining 1-kurslariga hujjat topshirishlarida aynan pedagogik yo‘nalishdagi o‘quv muassasasini ongli ravishda tanlashlari uchun yetarli darajada targ‘ibot-tashviqot ishlari olib borilishi, ularning ongli ravishda xilma-xil kasb-hunarlarni tanlashlarining asosli, mustaqil, turg‘un omillarini aniqlash, qiziqishlari va moyilliklarining sabablarini chuqur va har taraflama o‘rganish lozimligi tabiiy ehtiyojga aylanib bormoqda.

Professional ta’lim muassasalari va kasb-hunar maktablarida yuzaga kelayotgan muammolar jamiyat taraqqiyotining rivojlanishi bilan chambarchas bog‘liqdir. Shuning uchun ham o‘quvchi yoshlarning professional ta’lim muassasalarining u yoki bu mutaxassisliklariga hujjat topshirishlari (yoki topshirmasligi)ning asosiy sabablarini qidirib topish, o‘rganish va umumlashtirish, xulosalash lozim bo‘lmoqda.

Kuzatishlarning ko‘rsatishicha, professional ta’lim muassasalariga qabul davrida o‘quvchilarning nomutanosib taqsimlangan holda hujjat topshirishlari sabablaridan biri kasb-hunar ta’lim muassasasi bilan ota-onalar, hududdagi umumta’lim maktablari, mahalla-jamoatchilik va ishlab chiqarish (davlat va xususiy) korxonalari jamoalari o‘rtasida mustahkam, tizimli doimiy ravishdagi aloqalarning rejali ravishda muntazam o‘rnatilmaganligidadir. Tadqiqotchi Ro‘ziev I.E. ”Kasb-hunar kollejlarida kichik mutaxassislar tayyorlash muammolari ustida to‘xtalib, o‘qitishda ichki me’yorlashtirilgan tizimni emas, jahonning standartlariga mosligining muhimligini ta’kidlaydi. U o‘quvchilarning noyob bo‘lmagan mutaxassisliklarga hujjatlarni kam topshirilishining oldini olish muammociga quyidagi chora-tadbirlarni belgilashni taklif etadi:

- mahalliy hududda joylashgan asosiy ishlab chiqarish korxonalarining istiqboliga tayanib, mutaxassislar tayyorlashni rejalashtirish;
- o‘quvchilarning, kasbiy qiziqishi, qobiliyati, dunyoqarashi, ishlab chiqarishning ehtiyojini hisobga olgan holda maktabdan bevosita kasb-hunar kollejlariga yo‘llash;
- ta’lim muassasalarida mavjud ixtisosliklar bo‘yicha to‘liq ma’lumotlar bazasini yaratish».

Pedagogika yo‘nalishidagi texnikumlarida mutaxassislarni tayyorlash jarayonida ilg‘or ta’lim, axborot va ishlab chiqarish texnologiyalarining samarali namunala-rini qo‘llash ham muhim muammolardan hisoblanadi. Professional ta’lim muassasalarida o‘rganiladigan barcha fanlarni, jumladan, umumkasbiy va maxsus fanlarni milliy qadriyatlardan foydalangan holda o‘qitishda ilg‘or texnologiyalarga, xususan, kompyuter dasturlaridan foydalanishga to‘liq o‘tilgan emas. Ma’lumki, ishlab chiqarishning barcha sohalariga yangi texnikalar va ilg‘or texnologiyalar kirib keldi. Masalan, gazlamalarga ishlov berish, tikuvchilik, to‘quvchilikda Rossiya bilan bir qatorda Kanada, Yaponiya, Koreya, Germaniyadan keltirilgan turli jihozlar, qurilmalar va texnologiyalar amalda qo‘llanilmoqda. Ammo, ko‘pgina texniekmlarga berilgan bunday jihozlar ba’zi xollarda mutaxassislar yetishmasligi

sababli yetarlicha samara beradigan darajada ishlatilmasdan, ko‘proq ko‘rgazmali qurol sifatida foydalanilmoqda.

“Tarbiyaviy tadbirlar turli xil moddiy va ma’naviy ehtiyojlarga javob beruvchi, tarbiyaviy maqsadlarning yagona majmuasiga bo‘ysundirilgan, bir-biri bilan o‘zaro hamkorlik qiluvchi, o‘zida bir butun ta’limni ko‘zda tutgan tarbiyaviy ta’sir majmuidir”. Shu sababli ta’lim muassasalari tarbiyaviy jarayonni tashkil kilish va muvaffaqiyatli davom ettirish uchun zarur bo‘lgan tarbiyaviy ishlar uslublari, bilimlar, malaka va mahoratlar tizimi, zamonaviy pedagogik texnologiyalar va ularni tarbiyavii ishlar amaliyotida qo‘llash masalalari pedagogik jamoalariing eng muhim muammosi bo‘lib qolmoqda. Ta’lim muassasalarida o‘quvchilar bilan olib boriladigan tarbiyaviy ishlarning samaradorligini oshirish tarbiyaviy ishlar texnologiyasini to‘g‘ri tashkil kilish va qo‘llashga bog‘liq.

Bu esa, o‘z navbatida ta’lim muassasalari uchun tarbiyaviy ishlarni amalga oshirish uslubiyoti zamonaviy pedagogik texnologiyalar ishlanmalari asosida yaratishni talab etadi. Fikrimizcha, ta’lim muassasalarining tarbiyaviy ishlar texnologiyasi ijodiy faollik, mustaqil fikrlash va mohirona harakatlarga yo‘naltirilgan bo‘lishi va tarbiyachi hamda o‘quvchilar tomonidan minimal kuch sarflagan holda tarbiyaviy ishlar bo‘yicha qo‘yilgan maqsadlarni egallashda eng faol shakl, usul va uslublardan foydalanish, tarbiyaviy jarayonni muvaffaqiyatli tashkil etuvchilarning doimiy va majmuaviy faoliyatining asosiy qismidan iborat bo‘lishi kerak”. Demak, o‘qituvchi-pedagoglarning faoliyatida ilmiy-ijodiy ishlarni ma’naviy, ma’rifiy, madaniy tadbirlarni o‘tkazishlarida qatnashishlariga yanada ko‘proq erishish lozim, chunki, bu hol bir tomondan ularning kasbiy mahoratlarining takomillashuviga olib kelsa, ikkinchi tomondan ularning ma’naviy dunyoqarashining rivojlanishiga olib keladi, uchinchidan esa, ma’naviy boyliklarini, milliy qadriyatlarni tiklash va rivojlantirishga olib keladi. Bu haqda O‘zbekiston Respulikasi Prezidenti o‘z so‘zida: “Mamlakatimizda milliy hunarmandchilik, xalq badiiy va amaliy san’atini rivojlantirish, bu orqali xalqimizning boy madaniy merosi va tarixiy an’analarini to‘liq saqlab qolish, band bo‘lmagan aholini, ayniqsa yoshlar, ayollar va kam ta’minlangan oilalarni hunarmandchilikka keng jalb etish orqali ularning ish bilan bandligini ta’minlash maqsadida respublikamiz hududlarida faoliyat yurituvchi hunarmandlar mahsulotlarini chet elda namoyish etish va sotishda ham har tomonlama amaliy yordam ko‘rsatilishini ta’kidladi.

Ushbu fikrlardan kelib chiqib bo‘lajak mutaxassislarni milliy qadriyatlardan foydalangan holda kasbiy faoliyatga tayyorlashda quyidagi vazifalarni qo‘yadi: birinchidan, professional ta’lim muassasalarida o‘qiyotgan o‘quvchilarning ma’naviy bilim doirasini aniqlash; ikkinchidan, o‘quvchilarni birinchi bosqichdanoq ma’naviy bilim doirasini yuksaltirish mexanizmini ishlab chiqish; uchinchidan, o‘quvchilarning milliy-ma’naviy qadriyatlar to‘g‘risidagi bilimlar hajmi va qamrovini aniqlash; to‘rtinchidan, kasbiy ta’lim mazmuniga milliy-ma’naviy qadriyatlar xalq hunarmandchiligi turlarini integratsiyalash misolida ma’lumotlarni singdirish metodikasini ishlab chiqish; beshinchidan, o‘quvchilarning milliy-ma’naviy qadriyatlar to‘g‘risidagi shakllangan bilimlarini

aniqlash mezonini ishlab chiqish; oltinchidan, o‘quvchilarning milliy-ma’naviy qadriyatlar to‘g‘risidagi bilimlarining amaliy, kasbiy ko‘nikmaga aylanganligini aniqlash; yettinchidan, o‘quvchilarning egallagan milliy-ma’naviy qadriyatlarga oid ko‘nikmalarini kasbiy ko‘nikmalar va malakalar bilan integratsiyalay olishni amalga oshirish; sakkizinchidan, egallangan ma’naviy va kasbiy ko‘nikmalarni o‘quvchilar ongi va qalbiga singdirishning innovatsion uslublari va texnologiyalarini yaratish.

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BUXORO VILOYATINING TABIIY GEOGRAFIK KOMPLEKSLARI VA ULARDAN QISHLOQ XO‘JALIGIDA FOYDALANISHNING ISTIQBOLLARI

Annotatsiya: *Mazkur ishda Buxoro viloyatining tabiiy geografik komplekslari, ularning shakllanish xususiyatlari hamda qishloq xo‘jaligida foydalanish istiqbollari keng yoritilgan. Tadqiqotda viloyatning relyefi, iqlimi, tuproq turlari, o‘simlik va hayvonot dunyosi, suv resurslari hamda tabiiy hududiy komplekslarning o‘zaro bog‘liqligi ilmiy asosda tahlil qilingan. Shuningdek, cho‘l, voha, daryo vodiylari va o‘rta cho‘l vohalarining qishloq xo‘jaligidagi roli, melioratsiya tizimlarini modernizatsiya qilish, suv tejovchi texnologiyalarni joriy etish, sho‘r yerlarni rekultivatsiya qilish, chorvachilikni rivojlantirish hamda ekologik toza mahsulotlar ishlab chiqarish bo‘yicha istiqbolli yo‘nalishlar yoritilgan. Ish natijalari Buxoro viloyatining tabiiy resurslaridan oqilona foydalanish, qishloq xo‘jaligi samaradorligini oshirish va barqaror rivojlanishni ta’minlashga xizmat qiladi.*

Kalit so‘zlar: *Buxoro viloyati, tabiiy geografik kompleks, cho‘l, voha, daryo, vodiy, tuproq, dehqonchilik, melioratsiya, sho‘rlanish, suv tejovchi texnologiyalar, rekultivatsiya, chorvachilik, ekologiya, mahsulot, qishloq xo‘jaligi, barqaror rivojlanish.*

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NATURAL GEOGRAPHICAL COMPLEXES OF THE BUKHARA REGION AND PROSPECTS FOR THEIR USE IN AGRICULTURE

Abstract: *This work extensively covers the natural geographical complexes of the Bukhara region, their formation features and prospects for use in agriculture. The study analyzed the region's relief, climate, soil types, flora and fauna, water resources and the interrelationship of natural territorial complexes on a scientific basis. It also covers the role of deserts, oases, river valleys and central desert oases*

in agriculture, promising areas for the modernization of land reclamation systems, the introduction of water-saving technologies, the reclamation of saline lands, the development of livestock breeding and the production of environmentally friendly products. The results of the work will serve to rationally use the natural resources of the Bukhara region, increase agricultural efficiency and ensure sustainable development.

Keywords: *Bukhara region, natural geographical complex, desert, oasis, river, valley, soil, farming, land reclamation, salinization, water-saving technologies, reclamation, livestock breeding, ecology, products, agriculture, sustainable development*

Buxoro viloyati O‘zbekistonning janubi-g‘arbiy qismida, Amudaryo va Qizilqum cho‘li oralig‘ida joylashgan. Viloyatning katta qismi pasttekislik hududlardan iborat bo‘lib, dengiz sathidan balandligi o‘rtacha 150–300 metr atrofida. Hudud asosan cho‘l mintaqasiga kiradi va quruq iqlim sharoiti bilan ajralib turadi. Viloyat relyefi tekisliklardan iborat bo‘lib, janubi-sharqda Qizilqum qumliklari, shimoli-g‘arbda esa Amudaryo pasttekisligi joylashgan. Ayrim joylarda qadimiy daryo vodiylari, o‘zansiz botiqlar va qum barxanlari uchraydi. Tuproqlarning asosiy turlari: bo‘z tuproqlar, sho‘rlangan tuproqlar va qumli yerlardir. Iqlimi keskin kontinental, yoz issiq va quruq, qish sovuq. O‘rtacha yillik harorat: +14–15°C, iyulda +35–40°C, yanvarda –1–2°C. Yillik yog‘in miqdori atigi 100–150 mm, bu esa sug‘orishga asoslangan dehqonchilikni talab qiladi.

Buxoro viloyati yillik yog‘in miqdori va haroratning o‘zgarishi

Oy	1	2	3	4	5	6	7	8	9	10	11	12
O‘rtacha harorat (°C)	2	5	12	18	25	31	33	32	26	18	10	4
Yog‘in miqdori (mm)	15	18	23	14	8	2	0	0	2	6	10	12

Asosiy suv manbai-Amudaryo. Amu-Buxoro mashina kanali, Qorako‘l va Shofirkon tumanlarida keng sug‘orish tarmoqlari mavjud.Yer osti suvlarining sathi ba’zi joylarda yuza joylashgan, bu esa sho‘rlanish muammosini keltirib chiqaradi. Cho‘l o‘simliklaridan saksovul, yantoq, qandim, sho‘ra, chiy kabi o‘simliklar tarqalgan. Hayvonot dunyosiga qarasak, yumronqoziq, qum sichqoni, jayron, qum iloni, qum toshbaqasi va boshqalarni ko‘rishimiz mumkin. So‘nggi yillarda yashil zonalar barpo etish va meliorativ o‘rmonzorlar yaratish ishlari olib borilmoqda.

1-jadval

Buxoro viloyatida qishloq xo‘jaligi yerlarining taqsimoti

1.	Yaylov va cho‘l yerlari	48%
2.	Sug‘oriladigan yerlar	42%
3.	Bo‘sh (foydalanilmayotgan yerlar)	10%

Asosan sug‘oriladigan dehqonchilik rivojlangan.Yetakchi ekinlar: paxta, g‘alla, beda, sabzavot, poliz. Qorako‘l, Vobkent, Romitan va G‘ijduvon tumanlarida issiqxona xo‘jaliklari tez rivojlanmoqda.

2-jadval

Asosiy ekin turlari ulushi

T/r	Ekin turi	Ulushi (%)
1.	G‘alla	30%
2.	Paxta	40%
3.	Sabzavot	20%
4.	Yem-xashak	10%

Qorako‘l qo‘ylari yetishtirish-tarixiy an’anaviy tarmoq. Cho‘l hududlarida yaylov chorvachiligi (tuya, qo‘y, echki boqish) keng tarqalgan. Suv resurslarini tejovchi yaylovlarni sug‘orish tizimlari joriy etilmoqda.

3-jadval

T/r	Kompleks turi	Joylashuv hududi	Asosiy xususiyatlari	Qishloq xo'jaligida roli
1.	Cho‘l kompleksi (Qizilqum)	Viloyatning shimoli va g‘arbi	Quruq iqlim, sho‘r tuproqlar, past tog‘ tepaliklari	Yirik yaylovlar, chorvachilik, tuya va qo‘y boqish
2.	Voha kompleksi (Buxoro vohasi)	Zarafshon daryosi bo‘ylab	Sug‘oriladigan yerlar, unumdor tuproqlar, suv resurslari mavjud	Paxtachilik, sabzavot va polizchilik
3.	Daryo vodiy kompleksi	Zarafshon daryosi atrofida	Oqava suv tarmoqlari, to‘qaylar, allyuvial tuproqlar	Guruch, sabzavot, yem-xashak ekinlari
4.	O‘rta cho‘l vohalari	G‘ijduvon, Romitan, Peshku	Qisman sug‘oriladigan maydonlar	Bug‘doy, arpa, yem-xashak o‘simliklari

Buxoro viloyati tabiiy geografik komplekslari

1. **Suv tejovchi texnologiya**

Xorijiy bozorlar bilan bevosita shartnomalar tuzish; Qadoqlash va eksport infratuzilmasini yaratishlarni joriy etish. Buxoro viloyatida suv resurslari cheklangan, iqlimi esa juda quruq. Shu sababli tomchilatib sug‘orish, purkagich orqali sug‘orish kabi suvni tejaydigan texnologiyalarni keng tatbiq etish muhim ahamiyatga ega. Bu texnologiyalar yordamida sug‘orish samaradorligi 40-50% gacha oshadi. Yerning sho‘rlanish darajasi kamayadi. Hosildorlik va suv resurslaridan foydalanish koeffitsienti yaxshilanadi. Masalan, G‘ijduvon va Romitan tumanlarida tomchilatib sug‘orish orqali paxta hosildorligi 1,5 barobar oshgan.

2. Melioratsiya tizimlarini modernizatsiya qilish

Viloyatda sho‘rlangan va suv chiqmaydigan yerlar ko‘p bo‘lib, bu hosildorlikni pasaytiradi. Shu sababli melioratsiya tizimlarini — ya’ni drenaj kanallari, suv chiqarish quvurlari, nasos stansiyalarini zamonaviylashtirish zarur. Modernizatsiyadan kutilayotgan natijalar. Sho‘rlanish darajasining kamayishi; Sug‘oriladigan maydonlarning kengayishi; Hosildorlikning barqaror o‘sishi; Yer resurslarining uzoq muddatli saqlanishi. Masalan, Jondor va Olot tumanlarida yangi drenaj quvurlari o‘rnatilishi natijasida 2024-yilda 5 ming gektar yer qayta foydalanishga kiritilgan.

3. Sho‘r yerlarni rekultivatsiya qilish

Sho‘r yerlarni foydali holatga keltirish-bu viloyatning eng dolzarb muammolaridan biridir. Rekultivatsiya ishlariga organik o‘g‘itlar qo‘llash, tuzlarni yuvish, maxsus o‘simliklar (masalan, beda, sho‘rga chidamli don ekinlari) ekish kiradi. Natijada: Sho‘rlanish kamayadi; Tuproqning biologik faoliyati tiklanadi; Sug‘oriladigan yerlar hajmi ortadi. Bu orqali Buxoro viloyatida har yili o'rtacha 3-4 ming gektar sho‘r yer qishloq xo‘jaligiga qaytarilishi mumkin.

4. Chorvachilikni modernizatsiya va ko‘paytirish

Viloyatda keng cho‘l va yaylovlar mavjudligi chorvachilikni rivojlantirish uchun qulay sharoit yaratadi. Ammo bu sohada texnika, ozuqa bazasi va naslchilikni yangilash zarur. Modernizatsiya yo‘nalishlari: Naslli qoramollar va qo‘ylarni ko‘paytirish; Sun’iy urug‘lantirish va genetik seleksiya usullarini joriy etish; Chorvachilik mahsulotlarini qayta ishlovchi kichik korxonalarni tashkil etish. Natijada go‘sht, sut va jun ishlab chiqarish hajmi ortadi, eksport imkoniyatlari kengayadi. Masalan, Qorako‘l tumanida yaratilgan “Qorako‘l naslli qo‘ylar markazi” bunga yorqin misoldir.

5. Ekologik toza mahsulotlar ishlab chiqarish va eksport salohiyatini oshirish

So‘nggi yillarda jahon bozorida organik (ekologik toza) mahsulotlarga talab oshmoqda. Buxoro viloyatida iqlimning quruqligi, kimyoviy o‘g‘itlardan kam foydalanish imkoniyati bu yo‘nalishda katta afzallik beradi. Rivojlantirish yo‘nalishlari: Organik sertifikatli mahsulotlar (paxta, sabzavot, meva) yetishtirish; Xorijiy bozorlar bilan bevosita shartnomalar tuzish; Qadoqlash va eksport infratuzilmasini yaratish.

Xulosa

Yuqoridagi tahlillar shuni ko‘rsatadiki, Buxoro viloyati tabiiy geografik komplekslari o‘zining iqlim, relyef, suv resurslari, tuproq va o‘simlik qoplami bilan o‘ziga xos ekotizimni tashkil etadi. Viloyatning cho‘l, voha va daryo vodiylari tabiiy sharoitlari bir-biridan farq qilsa-da, ular qishloq xo‘jaligi uchun muhim resurs bazasini yaratadi. Ayniqsa, sug‘oriladigan dehqonchilikni rivojlantirish, melioratsiya tizimlarini modernizatsiya qilish va suv tejovchi texnologiyalarni keng joriy etish natijasida yer unumdorligini oshirish imkoniyati mavjud. Sho‘rlangan yerlarda rekultivatsiya ishlari, chorvachilikni modernizatsiya qilish, hamda ekologik toza mahsulotlar ishlab chiqarish yo‘nalishlarini kuchaytirish orqali Buxoro viloyati qishloq xo‘jaligi barqaror rivojlanishga erishadi. Shuningdek, tabiiy resurslardan oqilona foydalanish, ekologik muvozanatni saqlash va iqtisodiy samaradorlikni oshirish bu hududning kelajakdagi asosiy ustuvor yo‘nalishlari bo‘lib qoladi.Umuman olganda, Buxoro viloyatining tabiiy geografik komplekslaridan oqilona va ilmiy asosda foydalanish, mavjud tabiiy imkoniyatlarni ekologik barqarorlik bilan uyg‘unlashtirish viloyat iqtisodiyotini yanada rivojlantirish va xalq farovonligini oshirishga xizmat qiladi.

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ANATOMO-TOPOGRAPHIC FEATURES OF LYMPH NODES OF THE SIGMOID COLON IN CHILDREN

Abstract: *The article investigates the topography of lymphatic vessels and nodes of the sigmoid colon in children under 3 years of age using the method of injecting Gerota's dye into the lumen of lymphatic vessels. From lymph nodes of various locations on the anterior and posterior surfaces of the sigmoid colon, 1–3 (most often 1–2) efferent lymphatic vessels emerge, with lengths varying from 3 to 5 mm and diameters ranging from 0.14 to 0.17 mm. In 95% of cases, the number of afferent lymphatic vessels entering the nodes on the anterior and posterior surfaces of the organ exceeded the number of efferent vessels, while in 5% of cases their numbers were equal.*

Keywords: *children, sigmoid colon, lymphatic vessels, lymph nodes, topography, anatomy*

Introduction. In the structure of oncological morbidity, colon cancer steadily occupies one of the leading places after lung cancer and breast cancer [1,2]. The question of the technical feasibility, safety, and oncological effectiveness of laparoscopic mesocolonectomy with D3 lymph node dissection in the treatment of cancer of the left half of the colon requires study using evidence-based medicine methods [3,4]. To date, neoadjuvant therapy in patients with rectal cancer is considered a standard treatment method. It is very important to affect the regional lymph nodes [5,6]. There is no doubt that metabolites secreted by tumor cells have an irritating effect on lymphoid tissue and cause a response reaction in it. Structural and functional disorders of regional lymph nodes precede the appearance of new metastases [7].

Study Objective. To study the anatomo-topographic features of the lymph nodes of the sigmoid colon in children.

Materials and methods. The study was conducted on 30 specimens of the sigmoid colon excised from cadavers of newborns (10), infants (10), and young children (10) of both sexes who died from diseases not related to lesions of the digestive organs or the lymphatic system. Using the method of interstitial injection of oil-based dye prepared according to the type of Gerota's mass, introduced into the thickness of the subserosal layer of the intestine, the anatomy and topography of the lymphatic vessels and nodes of the sigmoid colon were studied.

Results. The studies showed that the lymph nodes of the sigmoid colon are located in front of the organ (on its anterior surface) and behind the organ (on its posterior surface) and are grouped near the free muscular taenia in the thickness of

the omental appendices; between the free muscular taenia and the mesenteric border of the intestine, as well as near the mesenteric border of the intestine. Lymph nodes of the sigmoid colon located on the anterior surface (near the free muscular taenia) were found in newborns in only 1 case; in infants in 4 cases, and in young children in 9 cases. Lymph nodes lying between the free muscular taenia and the mesenteric border of the intestine were found in newborns in 1 specimen, in infants in 3 cases, and in all 10 studied specimens in young children. In newborns, lymph nodes between the free muscular taenia and the mesenteric border were not found at all; in infants – in 3 cases, and in young children – in 9 cases. Lymph nodes located near the mesenteric border of the intestine were present in newborns in 8 cases, in infants – in all examined specimens, and in young children – in 6 cases. The number of lymph nodes lying near the free muscular taenia on the anterior surface of the intestine was 5 in newborns; in infants ranged from 3 to 8 (in 60% – 4–6), and in young children from 1 to 3 (in 52% – 2–3). The number of nodes between the free muscular taenia and the mesenteric border was 3 in newborns; in infants ranged from 2 to 5 (in 55% – 3–4), and in young children from 1 to 5 (in 64% – 2–4). The number of lymph nodes localized near the mesenteric border varied: in newborns from 1 to 7 (in 70% – 3–5), in infants from 1 to 5 (in 59% – 2–4), and in young children from 1 to 6 (in 54% – 2–5). The number of lymph nodes on the posterior surface of the sigmoid colon located near the free muscular taenia was 2 in newborns; in infants from 3 to 9 (in 64% – 4–7), and in young children from 3 to 6 (in 55% – 4–5). Nodes lying between the free muscular taenia and the mesenteric border were not detected in newborns at all. In infants, the number of nodes in this location ranged from 2 to 3; in young children from 1 to 5 (in 57% – 2–4). The number of lymph nodes near the mesenteric border varied: in newborns from 1 to 5 (in 57% – 3–4), in infants from 1 to 7 (in 66% – 3–4), and in young children from 4 to 6 (in 68% – 3–5). On the anterior and posterior surfaces of the organ, the number of detected lymphatic vessels in newborns ranged from 2 to 12 (most often 4–8), in infants from 2 to 10 (most often 3–7), and in young children from 2 to 8 (most often 3–6). Their diameter varied from 0.12 mm (newborns) to 0.17 mm (young children). Lymphatic vessels of the anterior and posterior surfaces of the organ equally drained into nodes lying near the free muscular taenia (15%), into nodes between the free muscular taenia and the mesenteric border (35%), and into nodes near the mesenteric border (50%). Accordingly, the length of the lymphatic vessels varied (from 3 to 10 mm).

Conclusion. From lymph nodes of various locations on the anterior and posterior surfaces of the sigmoid colon, 1–3 (most often 1–2) efferent lymphatic vessels emerge, with lengths ranging from 3 to 5 mm (in 72% – 3–4 mm) and diameters from 0.14 to 0.17 mm. In 95% of cases, the number of afferent lymphatic vessels to the nodes of the anterior and posterior surfaces of the organ exceeded the number of efferent vessels, while in 5% of cases their numbers were equal.

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IMPROVING THE EFFICIENCY OF MEDICAL SERVICE INSTITUTIONS THROUGH DIGITAL TECHNOLOGIES

Abstract: *The rapid advancement of digital technologies has fundamentally transformed the functioning of medical service institutions. The integration of digital solutions such as electronic health records (EHR), telemedicine platforms, cloud-based data management, and artificial intelligence-driven decision support systems has significantly improved the quality, accessibility, and efficiency of healthcare services. This study explores the role of digital transformation in optimizing administrative processes, enhancing diagnostic accuracy, and reducing operational costs in medical institutions. Through a comprehensive analysis of technological implementation and performance indicators, the paper identifies key success factors and challenges faced during digitalization. The findings highlight that the effective use of digital tools not only increases institutional productivity but also contributes to patient satisfaction and sustainable healthcare delivery.*

Keywords: *Digital technologies; healthcare management; medical institutions; efficiency improvement; electronic health records (EHR); telemedicine; artificial intelligence; digital transformation; health informatics; patient satisfaction.*

Introduction

In the modern era, digital transformation has become one of the most significant drivers of progress in healthcare systems around the world. The integration of digital technologies into medical service institutions has redefined the way healthcare organizations operate, manage data, and deliver services to patients. Digitalization not only modernizes the administrative processes of healthcare facilities but also enhances clinical performance, data accessibility, and patient safety. Through the adoption of technologies such as electronic health records (EHR), telemedicine, artificial intelligence (AI), cloud computing, and big data analytics, medical institutions are able to optimize resources, minimize medical errors, and ensure faster and more accurate diagnostics.

The importance of digital transformation became particularly evident during global health crises such as the COVID-19 pandemic, which accelerated the implementation of remote medical services and digital communication platforms. Telemedicine, for example, emerged as an effective tool to provide consultations, monitor chronic conditions, and deliver medical support to patients in remote or quarantined areas. Furthermore, the utilization of AI-driven systems in diagnostic imaging, data analysis, and predictive modeling has drastically improved the speed and precision of clinical decision-making.

Despite these achievements, many healthcare institutions face numerous barriers to full digital integration. Issues such as insufficient funding, inadequate infrastructure, lack of digital literacy among healthcare personnel, and cybersecurity threats hinder the complete digital transformation process. Nevertheless, ongoing investments in digital infrastructure and professional training programs have shown that digital technologies can lead to significant improvements in operational efficiency, patient satisfaction, and institutional competitiveness.

In this context, the present study examines the potential of digital technologies to improve the efficiency of medical service institutions. The research focuses on identifying the main technological tools used in healthcare management, analyzing their impact on service quality and productivity, and discussing the challenges and strategies for successful digital implementation.

Discussion

The efficiency of medical service institutions is determined by their ability to deliver high-quality care using optimal time, resources, and technology. The adoption of digital technologies contributes to this goal by streamlining clinical workflows, automating administrative procedures, and improving communication among healthcare professionals. One of the most impactful innovations is the use of **Electronic Health Records (EHR)**, which allows for the centralized storage and easy retrieval of patient information. This system reduces redundant testing, improves data accuracy, and ensures better continuity of care between departments and specialists.

Telemedicine has also played a vital role in increasing efficiency by extending healthcare access to rural and underserved populations. Through digital consultations and remote monitoring systems, physicians can diagnose and treat patients without physical contact, saving time for both medical personnel and patients. The integration of **wearable devices and Internet of Things (IoT)** technologies enables real-time monitoring of vital signs, allowing early detection of abnormalities and timely medical interventions.

In addition, **Artificial Intelligence (AI)** and **Machine Learning (ML)** algorithms have become essential tools for enhancing diagnostic accuracy and predicting disease outcomes. AI-based systems can analyze large volumes of medical data, detect patterns invisible to the human eye, and assist clinicians in making evidence-based decisions. For example, AI models are successfully used in radiology, cardiology, and oncology for image recognition and early-stage disease

detection. These technologies not only reduce diagnostic errors but also optimize the use of medical resources and improve treatment efficiency.

From a management perspective, digital technologies facilitate **data-driven decision-making** and performance evaluation. Health informatics systems help administrators monitor resource utilization, staff productivity, and patient flow in real time. This enables more effective allocation of financial and human resources, ultimately improving institutional performance. Moreover, digital platforms enhance transparency and accountability in healthcare service delivery, ensuring better compliance with clinical standards and regulations.

However, successful digital transformation requires a comprehensive strategy that addresses both technological and human factors. Training medical staff in digital competencies is crucial for ensuring smooth adoption and effective use of new systems. Cybersecurity must also be prioritized, as medical institutions handle sensitive patient data that require high levels of protection. Another important aspect is the interoperability of digital systems — the ability of different platforms and databases to exchange and process information seamlessly. Without proper integration, the efficiency gains of digital tools may be limited.

In conclusion, digital technologies play a transformative role in the modernization and efficiency of medical service institutions. Their effective implementation fosters innovation, enhances patient outcomes, and promotes sustainable healthcare systems. Nevertheless, to achieve full potential, healthcare organizations must invest in technological infrastructure, ensure proper staff training, and establish regulatory frameworks that support digital development while safeguarding data privacy and ethical standards.

Conclusion

The digitalization of healthcare services has become a key factor in transforming the operational, clinical, and administrative dimensions of medical institutions. This research emphasizes that the effective use of digital technologies significantly enhances institutional efficiency by streamlining workflows, improving diagnostic precision, and strengthening patient-centered care. The integration of electronic health records (EHR), telemedicine, artificial intelligence (AI), and health informatics has created new opportunities for improving data management, reducing costs, and increasing the overall quality of medical services.

Digital tools not only simplify internal operations but also reshape the relationship between patients and healthcare providers. They enable more personalized and preventive approaches to medicine through continuous data monitoring and analysis. Moreover, the automation of routine tasks allows medical personnel to devote more time to complex and patient-oriented processes, ultimately increasing both productivity and satisfaction levels.

However, the study also highlights that the success of digital transformation depends on several critical factors: the readiness of healthcare organizations to adopt innovation, the digital literacy of medical staff, and the establishment of reliable cybersecurity and data protection measures. Without proper strategic planning and investment in infrastructure, digital solutions may fail to deliver their

full benefits. Therefore, a holistic approach — combining technological innovation, human resource development, and strong regulatory governance — is essential to achieve sustainable digital progress in the healthcare sector.

In conclusion, digital technologies are not merely supportive tools but rather strategic assets that redefine the future of healthcare management. By embracing digital transformation, medical service institutions can enhance efficiency, reduce errors, and deliver high-quality, accessible, and equitable healthcare. Continued research and policy development in this field will further contribute to building resilient, data-driven, and patient-focused healthcare systems for the future.

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JONDOR TUMANI TOPONIMLARI VA ULARNI O‘RGANISHNING GEOGRAFIK JIHATLARI

Annotatsiya: *Mazkur maqolada Jondor tumani toponimlari va ularni o‘rganishning geografik jihatlari hamda tumanga tegishli ayrim joy nomlarining izohi batafsil yoritgan.*

Kalit so‘zlar: *Toponimika, oykonim, gidronim, oronim, etnotoponim, neotoponim, etimologiya.*

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TOPONYMS OF JONDOR DISTRICT AND GEOGRAPHICAL ASPECTS OF THEIR STUDY

Annotation: *This article provides a detailed description of the toponyms of Jondor district and the geographical aspects of their study, as well as an explanation of some place names belonging to the district.*

Keywords: *Toponymy, oikonym, hydronym, oronym, ethnotoponym, neotoponym, etymology.*

Geografik joy nomlari (toponimlar)ni o‘rganish bugungi kunning eng zaruriy masalalaridan biri hisoblanadi. Sababi, har bir joy nomi shu hududning tabiatini, tarixini, madaniyatini, shu hududda yashovchi xalqlarning urf-odati va an’analarini o‘zida aks ettiradi. Toponimika ayniqsa, geografiya uchun katta ahamiyatga ega. Toponim - geografik obyektning aniq manzilidir. Nomlar joyning geografik tushunchalarni ifoda etish uchun ham zarur. Geografik xaritada keltirilgan boy va xilma-xil axborotlar orasida nomlar alohida o‘rin tutadi[4]. Zamonaviy toponimika fanining yutuqlarini aslida bundan oldingi davrlarda tarix, tilshunoslik, geografiya fanlari qo‘lga kiritgan katta-katta muvaffaqiyat mahsuli deb qaramoq kerak. Ana shu fanlarsiz toponimikani tasavvur etish qiyin, albatta. Geografik nomlar geografiyaning asosiy tarkibiy qismi hisoblanadi. Ulardan geografiyada beriladigan ma’lumotlarni hududiy bog‘lashda foydalaniladi.

Umuman, geografiyada joy yoki geografik obyekt nomi bilan bog‘lanmasdan bilim berish mumkin emas. Ikki joy tabiatini qiyoslash uchun ham joylar nomini bilish kerak. Geografik nomlarni chuqur tushunishga mahaliy geografik terminlarni (atamalarni) o‘rganish yordam beradi. Mahalliy geografik terminlarni tushunish atrof-muhitni ongli bilib olishga, o‘z o‘lkasiga, vataniga bo‘lgan muhabbatini oshirishga, yordam beradi[2].

Jondor tumani Buxoro viloyatining qadimiy maskanlaridan biri bo‘lib, uning tarixiy-geografik jihatdan shakllanishi va rivojlanib borishi Zarafshon daryosi bilan bog`liqdir.Jondor tumani viloyatimizning ana shunday o‘ziga xos xususiyatga ega bo‘lgan hududlardan biridir. Tuman hududi qadimdan aholi manzilgohi sifatida muhim ahamiyat kasb etib kelgan. Jondor tumani hududidagi toponimlarning asosiy qismini oykonimlar tashkil etadi va gidronimlar, oronimlar salmog‘i kamroq.

Quyida Jondor tuman hududidagi joy nomlari izohi bilan tanishamiz:

Torob – qishloq. Tarixiy manbalarda Torob qishlog‘i Buxorodan ham oldin paydo bo‘lganligi qayd qilingan. Qishloq dastlab Narshaxiyning Buxoro tarixi asarida tilga olingan. Bu qishloq 1238-yilda dehqon va hunarmandlarning mo‘g‘ullarga va mahalliy mulkdorlarga qarshi ko‘targan qo‘zg‘oloni bilan mashhurdir; Torob – daryo bo‘yi demakdir.

Varaxsha - Buxorodan 30 km shimoli-g‘arbdagi qadimiy shahar xarobalari. Varaxsha Buxorodan ham qadimiy shahar bo‘lgan. X asrgacha Buxoro hokimligi-buxorxudotlar qarorgohi Varaxsha bo‘lgan. Varaxsho shahri Varaxsha arig‘i bo‘yida edi. Shahar nomi Afraxsha, Baraxsha, Faraxsha shaklida ham uchraydi. Etimalogiyasi ma’lum emas.

Tobagar so‘zi forscha so‘zidan olingan bo‘lib, hunarmandlar qishlog‘i degan ma’noni anglatadi.

Chorzona so‘zi forschadan olingan bo‘lib “Chor Zana” ya’ni “to‘rtta ayol” degan ma’noni bildiradi.

Yobusxo‘r – Yovlar urish qilib kelgan vaqtda yarador bo‘lganlarini shu joyda qoldirib, o‘z rizqingni o‘zing topib egin deb tashlab ketilgan. Shu sababli Yobusxo‘r deb nomlangan.

Xo‘jalar – Tarixiy manbalarda aniqlanishicha bu qishloqning joyi jangalzorlardan iborat tashlandiq bo‘lgan. Besh oltita xo‘jalar oilalari kelib shu yerdan qo‘nim topgan va hozirgi kungacha Xo‘jalar qishlog‘i deb yuritilmoqda.

Jo‘yimo‘min – Bu qishloq taxminan XIII-XIV asrlar tashkil topgan bo‘lib qishloq aholisi dehqonchilik qilishlari uchun suvni etishmasligidan judayam qiynalishgan. Qishloq oqsoqollari va aholisi to‘planib qishloqga suv keltirish uchun yangi ariq chiqarishgan. Bu ariqni chiqarilishiga Mo‘min ismli fuqaro bosh bo‘lganligi sababli qishloq nomini ham Jo‘yimo‘min deb atashgan.

Paxtakor – Qishloqning asl tarixiy nomi Maxsumlar bo‘lib shu joyda yashab o‘tgan aqlli, vijdonli, oqil uch amakivachcha, ya’ni Qudrat Maxsum, Murod Maxsum va Hikmat Maxsumlarni nomiga Maxsumlar qishlog‘i deb yuritilgan. Keyinchalik qishloqga Paxtakor nomi berilib hozirgi kungacha shu nomda yuritilayapti.

Zandavois – Bu qishloq tarixi taxminan XVII-asrning oxirlari XVIII-asrga bog‘liq bo‘lib, qishlog‘da ziyoli, oqila ayollar ko‘proq bo‘lganligi sababli Zandavois ya’ni xotinlar kengashi yoki ayollar maslahati degan ma’noni bildirar ekan.

Shamshirgaron - Taxminan XVIII-XIX asrlarda tashkil topgan bu qishloqda asosan hunarmand usto misgarlar yashashgan. Ko‘pchilik hunarmandlar esa shamshir va pichoqsozlik bilan shug`ullanishgan. Shu sababli qishloq Shamshirgaron nomi bilan yuritilmoqda.

Yuqori Luqmon va Quyi Luqmon - Quyi Luqmon eski qishloq bo‘lib Luqmoni hakim tabib o‘tganlar, tabib dunyodan o‘tganlaridan so‘ng qishloq shu kishini nomlariga qo‘yilgan. Qishloq aholisi ko‘payganidan so‘ng qishloq ikkiga bo‘lingan Yuqori Luqmon va Quyi Luqmonga ajralgan.

Buxorcha - bu qishloq oldin G‘uborcha bo‘lgan, keyinchalik Buxorcha deb nomlangan.

Beklar - Ko‘salar degan joy bo‘lgan u joyda 3 nafar oila ko‘chib kelib shu yerda yashagan. Shu qishloqda Husen bobo degan hunarmand usto bo‘lgan, Husen boboni taxalluslari bek bo‘lgan. Shundan kelib chiqib Beklar degan nom berilgan.

Aminobod – Amin qishloq oqsoqoli bo‘lib, shu lavozimdagi shaxs tomonidan bunyod etilganligini anglatadi.

Qulonchi – 1) “ovchi” degan ma’noni bildiradi. 2) Qulonchi – urug‘ nomi.

Asbobsoz – Asbgardon avliyoga shu yerni atrofidan doimiy otlar aylangan. Shu yerni o‘zida otlarga egar, nal, nuxta soxtik yasaganlar, juvoz yog‘i, tort pishiriqlar, halvo, qand pishirganlar. Avliyo atrofida to‘rt xonadon yashab, keyinchalik ko‘payib “Asbobsoz” nomi berganlar.

Yangi yer qishlog‘i yangidan yerlarni o‘zlashtirish natijasida tashkil topgan qishloq.

Obod – Yangidan ochilgan obod qilingan qishloq ma’nosini anglatadi.

Arablar – etnotoponim. Arab qabilasiga mansub qabilalar shu qishloqda joylashganligi sababli shunday nomlangan.

Mirzayon – kasb-kor bilan bog‘liq bo‘lgan toponim. O‘qimishli, ziyoli xalq ko‘p bo‘lganligi sababli shunday nomlangan.

To‘prez – Amirni to‘pchilari shu yerdan bo‘lganligi sababli shunday nomlangan.

Rahimobod – antropotoponim. Yosh oilalardan tashkil topgan yangi qishloq Rahimobod qishlog`i vaqti zamonda cho‘l bo‘lgan, Rahim ismli inson bu yerlarni obod qilganligi sababli Rahimobod deb nomlangan.

Qaraxumori – Qarashga xumor qiladigan ma’noni bildiradi. Izoh tushunarsiz.

Hojikanda – Shu qishloq o‘rtasidan o‘tgan kanal bo‘lgan, bundan bir necha yillar muqaddam Hoji ismli bir kishi o‘sha kanalni qo‘lida qazib o‘tgan, shundan keyin shunday nomlangan. Gidrooykonim.

Bahoriston – neotoponim. Urganji va Hojikanda qishloq yoshlari oilalaridan tashkil topib ya’ni yoshlik Bahoriston deb yuritilgan.

Chorg‘uli – 1909-yil to‘rt kishi ko‘chib kelgan, shu sababli Chorg‘uli deyilgan. Izoh uncha tushunarli emas.

Mang‘it – etnooykonim. Mang‘it urug‘iga mansub kishilar yashagan joy. Mang‘itiylar sulolasi bo‘lgan Amudaryo yoqasida xalq yashagan bo‘lib, chorvachilik bilan shug`ullangan 320 yillarda Buxoroda Mangitiylar Xorazim, Amu daryo chegarasida hukumdorlik qilgan. Mang‘itiylar yashagan shu bilan Mang‘it deb atalgan. O‘zbek millati tarkibiga kirgan qabila[5].

Qorovul – 1. Amirlik davrida qaravullik tashkil qilingan bo‘lib o‘sha davrda bir mehmon kelgan u kim deb so‘ragan, shunda u mexmonga u kishi qaravul degan. Shu bilan qishloq nomi Qaravul qishloq bo‘lib qolgan. 2. Kasb – hunar nomi bilan bog‘liq.

Navrabot – “Nav” qishlog‘idan olingan bo‘lib, “Yangi” qishloq degan ma’noni bildiradi.

Yuqori Moxoncho‘l – 1950 yilda tashkil topgan bo‘lib, Moxoncho‘l – kenglik yaylov ma’nolarini bildiradi.

Urganjiyon – urug‘ nomi. Amirlar davrida Urganjilar har qayerda tarqoq bo‘lib yashagan keyinchalik bir-birini topib bitta qishloq bo‘lib birlashib Urgajiyon tashkil qilganlar.

Tuman toponimlarining tahlili shuni ko‘rsatadiki, Buxoro viloyat toponimiyasining asosiy xususiyati – joy nomlari tarkibida etnotoponimlar va kasb-hunariga qarab nom berilgan oykonimlarning ko‘p qayd qilinishi o‘rganilayotgan hudud uchun ham xos. Shu bilan birga tuman joy nomlari orasida neotoponimlar ko‘p uchrashi uning o‘ziga xos xususiyatidir. Bu tumanda yaqin o‘tmishda o‘zlashtirilgan hududlarning mavjudligi bilan izohlanadi[3].

Xulosa qilib aytganda, kelajakda maktab ta’limida geografiya darslarida toponimlarni o‘rganishga, bilishga oid mavzular kiritilsa yoki har bir tumanning toponimiyasi bo‘yicha kitoblar nashr etilsa, dars jarayonida o‘rganilayotgan mavzularda uchraydigan joy nomlari haqida o‘quv qo‘llanmalar chop etilsa maqsadga muvofiq bo‘lar edi.

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IQTISODIY SOHALARIDA AXBOROT KOMPLEKSLARI O‘RTASIDAGI O‘ZARO INTEGRATSIYASI

Annotatsiya: *Maqolada axborotlashgan jamiyatning paydo bo‘lishi, avtomatlashtirilgan axborot tizimlarining (AAT) konseptual va funksional modellari, ularning tarkibiy qismlari va integratsiyalashuv darajalari tahsil qilinadi. Shuningdek, axborot infratuzilmasi, axborot texnologiyalari va ularning iqtisodiyotdagi ahamiyati yoritilgan. Axborot tizimlarini integratsiyalashuv darajasi bo‘yicha 5 sinfga ajratish taklif etilgan va avtomatlashtirilgan ofis tizimlarining xususiyatlari ko‘rib chiqilgan.*

Kalit so‘zlar: *Axborot tizimlari integratsiyasi, Avtomatlashtirilgan axborot tizimi, (AAT), Axborotlashgan jamiyat, Axborot infratuzilmasi, Ma'lumotlar bazasi, Axborot texnologiyalari, Funksional model, Konseptual model, Avtomatlashtirilgan ofis tizimi*

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MUTUAL INTEGRATION OF INFORMATION COMPLEXES IN ECONOMIC SPHERES

Annotation: *The article examines the emergence of the information society, conceptual and functional models of automated information systems (AIS), their components and integration levels. The information infrastructure, information technologies and their importance in the economy are also highlighted. A classification of information systems into 5 classes according to the level of integration is proposed, and the features of automated office systems are considered.*

Key words: *Information systems integration, Automated information system (AIS), Information society, Information infrastructure, Database, Information technologies, Functional model, Conceptual model, Automated office system*

Hozirgi zamonaviy sivilizatsiya taraqqiyoti bosqichi–axborotlashgan jamiyatga o’tish bosqichidir. Axborotlashgan jamiyat tushunchasi 1960-yillarning ikkinchi yarmida postindustrial jamiyat konsepsiyasini takomillashtirish doirasida paydo bo’ldi. Hozirgi ko’pchilik rivojlangan davlatlarga xos bo’lgan postindustrial jamiyat iqtisodyotida tovarlar ishlab chiqarishga qaraganda xizmatlar ko’rsatishga urg’u berilmoqda. Axborotlashgan jamiyat axborot va bilimlar roli o‘sishi, axborot kommunikatsiya, axborot mahsuloti va xizmatlarining yalpi ichki mahsulotdagi ulushi ortishi, insonlarning axborot orqali samarali aloqada o‘zaro ishlashini

ta’minlovchi global axborot makonining yaratilishi, ularning jahon axborot resurslaridan foydalanishi hamda axborot mahsulotlari va xizmatlariga bo‘lgan ijtimoiy hamda shaxsiy ehtiyojlarini qondirishni ta’minlash darajasi bilan tavsiflanadi. Mazkur tizim birgalikda harakat qiluvchi kompyuterlar va telekommunikatsiyalar, kompyuter axborot mahsulotlarini ishlab chiqish va qarorlar qabul qilishni qo‘llab – quvvatlash uchun mo‘ljallangan.

Shuni qayd etish lozimki, axborot almashuv jarayoni insonning eshitish, ko‘rish, anglash a’zolari orqali qabul qiladigan nutq, ma’lumot yoki tasvirlar bilan boshlanadi va tugaydi. Keladigan – chiqadigan bu elementlar o‘rtasida kompyuterlashgan axborot tizimida turli darajadagi elektron mahsulotlar bo‘ladi. Bular – operatsion tizimlar, ma’lumotlar bazalarini bio‘qarish tizimi, amaliy dasturiy ta’minot va axborotning o‘zidir. Ushbu axborot va dasturiy vositalar hamda komponentlardan ko‘-pincha aynan bir paytda va o‘sha vaqtda foydalanib bo‘lmaydi. Shuning uchun ham bunday axborot tizimlarining o‘ziga xos tomoni shundaki, ma’lumotlarni qayta ishlash jarayoni vaqtida ular aralashib ketadi.

AATning konseptual modeli. Axborot tizimi foydalanuvchilarning talabiga muvofiq axborotlarni yig‘ish, qayd etish, uzatish, saqlash, tuplash, qayta ishlash, tayyorlash va taqdim etishga mo‘ljallangan. Konseptual nuqtai nazardan qaraganda, axborot tizimi – bu operatsiyani bajaruvchi tizim va boshqaruvchi tizim o‘rtasidagi vositachi sanaladi.

Axborot texnologiyasi axborot tizimi ichidagi texnologiya sanaladi. Axborot tizimi tizimdagi ma’lumotlar, axborotlar bilan operatsiyani amal-ga oshiradi. Axborot tegishli muammoga qaratilgan bo‘lib qarorlar qabul qilish uchun asos bo‘lib xizmat qiladi. Axborot hal etilishi lozim bo‘lgan vazifaga muvofiq va ushbu vazifani hal etuvchi xodimning qobiliyatiga muvofiq qayta ishlanadi.

Axborot tizimining funksional modeli. Axborot tizimining funksional modelini quyidagicha tasavvur etish mumkin (1.16-rasm).

Mazkur modeldan kurinib turibdiki, axborot tizimining sohasi axborot obektlari majmuidan iborat axborot makonini ifodalaydi. Umuman olganda axborot makoni bir xilda emas, chunki unda axborotning yuzaga kelishi, tashkil etilishi va joylashtirilishi jihatidan farqlanuvchi axborot ob’ektlarini o‘zida saqlaydi.

Tizim orqali barcha axborotlarning yuzaga kelishini quyidagi asosiy pro-tseduralarga ajratish mumkin: saqlash, qidirish, qayta ishlash, kiritish va chiqa-rish. Birinchi uchtasi ichki bosqich sanaladi to‘rtinchi va beshinchilari esa maz-kur tizim bilan axborot manbai va tashqi muhit o‘rtasidagi aloqani ta’minlaydi.

1 – axborotni tashkil etish, saqlash va taqdim etish tizimi;

2 – axborotni kiritish, yangilash va tuzatish tizimi;

3 – axborotni iste’mol qilish tizimi.

Axborot muhiti o‘zaro bog‘langan uchta tarkibiy qismni o‘z ichiga oladi. Bular: foydalanuvchining axborot tuzilmasi, axborot texnologiyasi, boshqaruvning ishtirok etuvchi ob’ektlari.

Axborot infratuzilmasi axborotdan o‘z maqsadlariga erishish uchun foydalanadi. Axborot texnologiyalari foydalanuvchilarni zarur texnologiya-lar bilan ta’minlash vositasi sanaladi.

Axborot infratuzilmasi doirasida axborot texnologiyalari foydalanuv-chilari ham o‘zaro harakatlanuvchi o‘ziga xos muhit sifatida ko‘rib chiqiladi.

Foydalanuvchi kerakli axborotni olish uchun rasmiy (formal) va norasmiy axborot tizimlari yordamida uning manbaiga murojaat qilishi lozim. Tashqi manbaga rasmiy tizim orqali kirib boriladi. Bu tizim axborotni raqam va matnli ma’lumot (statistik hisobotlar, kitob, jurnal, xabar va hokazo) ko‘rinishida taqdim etadi. Ichki manbaga murojaat qilish axborot texnologiyalari komponentlari – kompyuterlar, tizimli va amaliy dasturiy ta’minot hamda zarur hollarda kommunikatsiya vositalari yordamida amalga oshiriladi. Ichki manbalar norasmiy tizim vositasida ma’lumotlar bazasidan so‘rovga javob tariqasida foydalanuvchini axborot bilan ta’minlaydi. Foydalanuvchi rasmiy va norasmiy tizimga suyanib ijtimoiy faoliyat, korxona va tashkilot ishini tavsiflovchi axborotni oladi.

An’anaviy axborot texnologiyasi rivojlanishi ikki an’anaviy segment ma’lumot va matndan tashqari, yana qo‘shimcha ikkita segment-tasvir va nutqni qayta ishlashni ta’minlaydi.

Axborot muhiti axborotni qayta ishlash, qabul qilish, o‘tkazish va qidirish qobiliyatiga ko‘ra qismlarga bo‘linadi. O‘z navbatida, qayta ishlash qobiliyati insonning axborotni qabul qilish imkoniyatiga ko‘ra aniqlanadi. Ayrim hollarda axborot shakl, hajm va hokazo belgilar bo‘yicha tarkiblashtirishni talab qiladi.

Qayd etish lozimki, foydalanuvchi axborot manbaiga muhtoj bo‘ladi. Chunki u axborotni uyg‘unlashtirishga qancha ko‘p vaqt va kuch sarflasa, samaradorlik ham shuncha kam bo‘ladi. Foydalanuvchining faoliyat samarador-ligini oshirish uchun axborotni integrallash jarayonini turli yo‘llar bilan amalga oshirish mumkin. Integrallash jarayonining darajasini belgilashni yangi axborot texnologiyalari SHK, MBBTlar ta’minlaydi. Asosiy urg’u turli xildagi axborot-ni qayta ishlash imkonini beradigan va o‘z ichiga integrallashgan ma’lumotlarni qayta ishlash vositalari, ma’lumotlar bazalarini boshqarish tizimi, aloqa vosita-lari va matnli protsessorlarni oluvchi amaliy dasturiy ta’minotga qaratiladi.

Axborot tizimining namunaviy tarkibi. Avtomatlashtirilgan axborot tizimiga quyidagilar kiradi: odam-(xodim), texnik vositalar va dasturiy ta’minot. Ular birgalikda boshqaruv usullari uchun ma’lumotlarni qayta ishlaydi

Axborot tizimlarini integratsvyalashuv darajasi bo‘yicha sinflanishi Integratsvyalashuv darajasiga ko‘ra barcha axborot tizimlarini beshta sinfga ajratish mumkin:

1-sinf – vazifali axborot tizimlaridan iborat bo‘lib, unda bir-biri bilan bog‘liq bo‘lmagan vazifalar avtomatlashtiriladi. Odatda bunday tizimlar o‘zaro na ish, na axborot jihatidan bog‘liq bo‘ladi. Har bir vazifa uchun ma’lumotlar tashkil etiladi va yig‘iladi.

2-sinf – O‘zaro bog‘liq vazifalarni avtomatlashtirish bilan ajralib turadi. Ular ayrim tamoyillarga ko‘ra ajratilib kenja tizimlarda guruhlanadi. Kenja tizimlarning ish qobiliyatini ta’minlash uchun lokal ma’lumotlar bazasi yoki o‘zaro bog‘langan lokal fayllar tashkil etiladi.

3-sinf – yagona ma’lumotlar banki asosida kenja tizimlar o‘rtasida o‘zaro aloqani amalga oshirgan tizimlardan iborat. Ayni paytda kenja tizimlar yanada

yirikroq konstruksiyaga (masalan, «hisobot», «tahlil», «boshqarish», «rejalashtirish» bloklari va hokazo) birlashadi. Birlashuv nomigagina amalga oshirilmagan. Tizim ichidagi integratsiyalashuv funksional va model darajasida amalga oshiriladi. Ayni paytda axborot maqsadi, modeli, mezon va cheklovlar, axborotni tashkil etish, axborot texnologiyasi har bir daraja, har bir blok doirasida o‘zaro bog‘liq bo‘ladi.

4-sinf – bloklarni yagona axborot banki va yagona axborot texnologiyasi bilan yagona tizimga qo‘shib yuborish orqali amalga oshiriladigan axborot tizimlaridir.

5-sinf – intefallashgan tizimlar. Ularga turli tip va maqsadli axborot tizimlari birlashib, ishlab chiqarish hamda boshqaruv kompleks tarzda avtomatlashtiriladi.

Avtomatlashtirilgan ofis tizimi

Avtomatlashtirilgan ofis tizimi (Office Information Systems – OIS) firma boshqaruvining barcha darajadagi menejerlari uchun faqat xodimlar ichki firma aloqasini qo‘llab-quvvatlash uchungina emas, balki ularga tashqi muhit bilan yangi kommunikatsiya vositalarini taqdim etishi jixatdan ham diqqatni o‘ziga tortadi. Avtomatlashtirilgan ofisning axborot texnologiyasi kommunikatsiya jarayonlarini ham tashkilot ichida, ham tashqi muhit bilan axborot uzatish va u bilan ishlashning kompyuter tarmoqlari va zamonaviy vositalar negizida tashkil etish va qo‘llab quvvatlashdir. Hozirgi paytda ofisni avtomatlashtirish texnologiyasini ta’minlovchi kompyuter va nokompyuter texnik vositalar uchun bir necha unlab dasturiy mahsulotlar ma’lum: matnli protsessor, jadvalli protsessor, elektron pochta, elektron kalendar, audiopochta, kompyuterli va telekonferensiyalar, shuningdek boshqaruv faoliyatining maxsus dasturlari kiradi.

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DIGITAL DEVELOPMENT STRATEGY IN AGRICULTURE

Abstract. *The article analyzes the relevance of introducing digital technologies in agriculture, issues of increasing production efficiency and rational use of resources with the help of these technologies. The possibilities of digital solutions, including smart monitoring systems, analytical platforms based on artificial intelligence and automated management tools, are widely covered. The article also substantiates the advantages and impact on results of using econometric approaches in the formation of a digital development strategy in agricultural enterprises. Ways to increase productivity, reduce costs and ensure environmental sustainability through the use of innovative technologies are indicated. At the end of the article, practical recommendations are developed for agricultural enterprises and proposals are made to accelerate the digital transformation process.*

Keywords: *agriculture, digital technologies, digital transformation, smart agriculture, econometric model, digital development strategy, efficiency improvement, innovative solutions, resource management, environmental sustainability.*

Introduction. Nowadays, digital technologies are bringing about fundamental changes in all economic sectors, including agriculture. Agriculture plays an important role in ensuring economic stability, strengthening food security and improving the living standards of the population. At the same time, issues such as limited efficiency of traditional production methods, economic use of resources and environmental problems require new approaches.

Digital technologies, in particular artificial intelligence, IoT (Internet of Things), big data and automation systems, allow optimizing processes in agriculture, efficient use of resources and increasing productivity. In addition, digital development opens up new opportunities for farms and agro-clusters, increasing their adaptability to market demands and climatic conditions.

Literature review. Recent scientific studies on the implementation of digital technologies in agriculture show that the digitalization process is one of the main factors in increasing production efficiency and efficient use of resources. For example, studies by Deichmann et al. (2016) noted a significant increase in agricultural production and productivity in regions with developed digital infrastructure.

Also, FAO (Food and Agriculture Organization of the United Nations) reports have extensively analyzed the possibilities of digital technologies for managing land and water resources, pest control, market information systems and optimizing

logistics. According to FAO (2019), with the help of smart technologies and IoT devices, farmers can monitor in real time and make effective decisions.

In Uzbekistan, a number of measures are being implemented at the state level to digitize the agricultural sector. In particular, in accordance with the Presidential Decrees, consistent work is being carried out on the digitization of agrotechnical services, the development of electronic logistics systems, and the provision of farms with information and communication technologies (Resolution No. RP-4996, 2021).

In the scientific literature, digital technologies are indicated as an important tool for increasing climate change adaptation in agriculture, increasing labor productivity, and reducing costs (Sundmaeker et al., 2016). In addition, with the help of digital marketing tools, producers have the opportunity to communicate directly with consumers, creating the opportunity to quickly respond to market demands (Klerkx & Rose, 2020).

In general, the existing literature shows the high potential for the introduction of digital technologies in agriculture and justifies the possibility of sustainable development, innovative approaches, and increased competitiveness through their implementation. Therefore, the development and implementation of scientifically based strategies in this area is recognized as an urgent task.

Research methodology. This study used a comprehensive methodological approach to assess the effectiveness of the introduction of digital technologies in the agricultural sector and develop a development strategy. Scientific and theoretical analysis, statistical and economic analysis, questionnaires and interviews, econometric models were used, and strategic recommendations were developed.

Analysis and results. A number of measures are being implemented in our country to digitize the agricultural sector. In this context, the development and implementation of a digital development strategy in agriculture is considered an urgent issue. This article highlights the main directions of the digital development strategy in agriculture, the advantages and practical mechanisms for introducing modern technologies.

Fundamental changes in the field of informatization of agriculture began with the arrival of large capital, ready to invest in the economy - significant funds from technical and technological modernization - the growth and development of proven innovative solutions, ensuring - increasing the efficiency of agricultural production, the formation of sustainable competitive advantages, including those associated with the use of information technologies.

It is worth noting that the development of the main integration relations in the processes of milk processing, at the same time - taking into account the sharp increase in the level of concentration of production, the complexity of organizational processes. The national structure of agro-industrial structures and management systems has effectively increased the demand for effective (RT) solutions for farmers. Sensing the growth of demand, large (RT) companies have intensified their activities, began to promote new tools for the development of agriculture and solving problems - traditional tasks of management of agricultural

production and information of separate production processes, but in the absence of a single strategy, reflecting the set of priorities for the informatization of agriculture, which is typical for the industry and the functionality of individual information - by technologies, integrated platform solutions, the information needs of agricultural producers of individual categories, so far such and not proposed.

Similar problems are inherent in the public sector system. The main processes of dairy products. At the beginning of the realization of the lag in the field of informatization, the processes of managing the development of the agro-food complex in Uzbekistan for decades began to form their own ideas - information technologies, which determine the composition, structure and means of government management information systems.

In addition, each region, based on its own understanding of the strategic goals of informatization, their financial capabilities, the level of qualification of managers, the development of informatization of agriculture and industry, decides on the development of informatization. The absence of a common ideology of informatization, a single design of office informatization systems for agricultural production, the definition of standard rules for the development and use of information technologies, according to:

a) digitization of product production;

b) delivery of products to the consumer through a digital system;

c) provision of electronic information about food products.

in the public sphere, which has led to the fact that agricultural management, information management, has developed its own - the creation of a single information space for the agro-food industry, significantly complicating the process of formation of the country's complex and reducing the efficiency of agricultural management processes.

According to the Center for Forecasting Monitoring of the Scientific and Technological Development of the Agro-Industrial Complex of the Samarkand Region, only 789 economic entities in 2022 - 35 regions used various elements of technologies for livestock farming in specific farms and livestock complexes.

The basis of an optional subject is its subject. The subject of a subject shows what this subject studies, and the method - how it studies, that is, what methods are used in studying this subject of research.

Economic analysis as a science reflects a system of special knowledge related to:

- study of interconnected economic processes that occur under the influence of objective economic laws and subjective factors;
- scientific substantiation of business plans and objective assessment of their implementation;
- identification of positive and negative factors and quantitative measurement of their impact;
- clarification of trends and proportions of economic development, identification of unused domestic economic reserves;
- generalization of best practices, making optimal decisions.

Economic analysis is an important part of economic science, which consists of economic work in enterprises. It has its own subject, object, and methods of studying economic processes, phenomena, and situations.

An enterprise using precision livestock farming technologies in Samarkand region region formed 4 590.9 Purpose., by Bashkortostan - 1402.8 Purpose., by – Tashkent region - 1822.3 goals, which shows a significant difference - give up regions by level concentration of shares cattle.

– Scientists group existing definitions of the subject of economic analysis, which are frequently found in the literature and more or less consistent with its essence, as follows:

- economic activities of enterprises;
- economic processes and events.

It should be noted that the rating compilers apparently made a mistake, since the first, which took second place, rating in general no.

Official statistical monitoring of information use - mation and telecommunications technologies, in 2024, in the study of ICT processes by economic types Agricultural activities were not separately identified, which led to a realistic assessment of the level of informatization of economic entities. agricultural products based on objective statistical data turned out to be impossible.

Information on the use of telecommunications technologies.

In general, only. Available for organizations in Uzbekistan The increase in the number of personal computers per 100 employees and Along with the expansion of access to the Internet, qualitative changes in it are associated with the use of new information technologies - The hyena is practically not observed. except for the implementation electrical systems - flow of throne documents.

Observed enough significant distinction regions by their level of computerization. Thus, among the regions of the Central Asian region leader positions by share organizations, use personal computers.

Uzbekistan can develop digital platforms to improve its economy by providing it with new technologies and analyze the new principle in more depth using complex formulas. These formulas provide a more accurate representation of platform processes and allow for analysis and statistical indicators. First, let's look at the data collection process.

It is collected from many sources on the new platform and it is important to integrate them. The following formula can be used to express this process:

We can introduce variables in our study in the following forms:

lnx1 = dairy products

lnx2= volume of services

lnx3= melon products

Correlation analysis results

	lny	*lnx2*	*lnx3*	*lnx4*
lny	*1*			
lnx1	*0.95781*	*1*		
lnx2	*0.98673*	*0.737646*	*1*	
lnx3	*0.986612*	*0.666589*	*0.777358*	*1*

Correlational analysis to the results according to our model exogenous indicators gross territorial to the product strong connected is . In addition, there is no strong correlation between the model variables. From this we can conclude that we can build a regression model with these variables .

Results of the regression model of agricultural products in Samarkand region

	Coefficients	Standard error	t-statistic	P-value
ln y	-2.972458891	2.618161906	-1.135322795	0.028037254
lnx 1	1.105957861	0.713354455	1.55036231	0.014933088
lnx2	0.463161164	0.153572874	3.015904771	0.01174132
lnx 3	0.531230438	0.634558384	2.837165581	0.042031591

From the results in this table, we developed the following model.

$$ln\ y = 1.1*lnx1 + 0.46*lnx2 + 0.53*lnx3$$

According to our analysis , a 1% increase in dairy products, other variables remaining the same, leads to a 1.1% increase in the gross regional product of Samarkand region. A 1% increase in the volume of services in the region, other variables remaining the same, leads to a 0.46% increase in the gross regional product. For a 0.53% increase in the gross regional product of Samarkand region, 1% more melon products need to be produced.

According to the results of our study , 98% of the changes in the model are explained by the variables in the model. The standard error in our model is small at 0.12. All variables participating in the model are statistically significant. In addition, the t-statistics of the variables in our model are larger than the table value. All factorials participating in our analysis are statistically significant. For example, the p-value of lny is 0.02, the p-values of lnx1 and lnx2 are 0.01, and the p-value of lnx4 is 0.04. From this, we can conclude that all our variables are statistically significant at the 5% significance level.

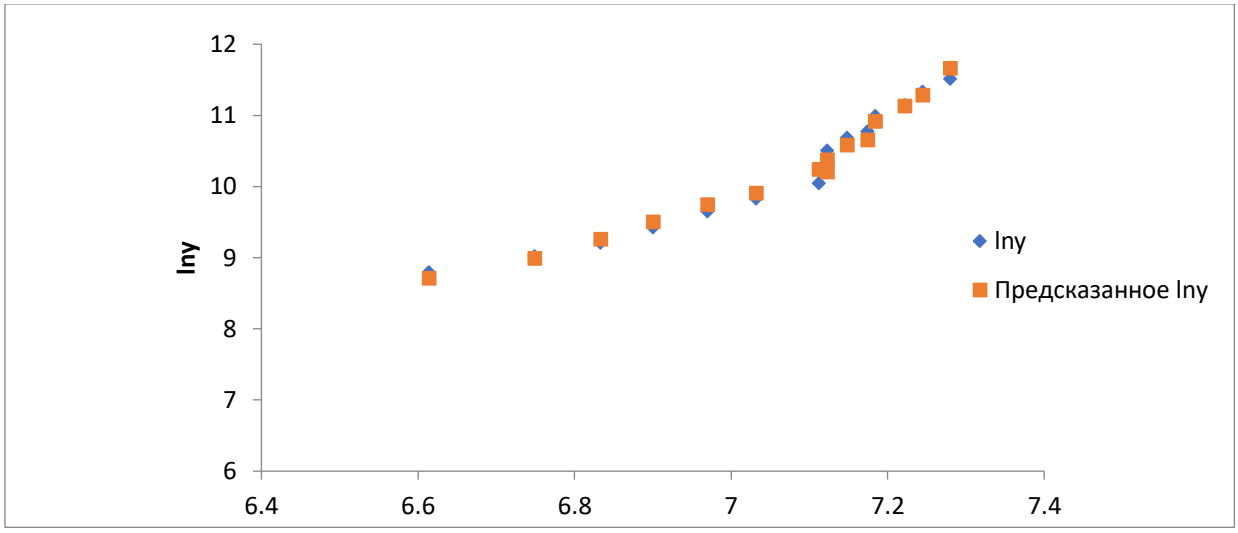


Figure 2.10. Trend between regression model and table values

The approximation error was 0.6%. The fact that the model's actual values are very close to the table values indicates that the approximation error is small.

The goal of this platform is to create a powerful tool that can adapt to different needs and provide high-resolution data to support decision-making at the country level. To ensure consistency, accuracy, and efficiency in the digital platform of the statistical system, it is necessary to establish clear and standardized protocols for data collection, storage, and analysis.

Table 2.6

Q Analysis of data to assess the level of development of digital technologies in the agricultural sector in 2015–2024

In the case of [11]Samarkand region

No.	Years	Products being produced	Transportation process	Consumers
1	2014	4 7 450.7	1302.5	4315.5
2	2015	4 9 384.2	1372.6	4652.7
3	2016	533 51.9	1292.9	5058.0
4	2017	5 1 0 45 .0	1271.4	6442.1
5	2018	5 4 318.3	1235.9	6060.3
6	2019	5 6 057.8	1191.1	10891.9
7	2020	581 07.7	1207.9	11449.3
8	2021	61 072.2	1191.5	11667.3
9	2022	64 329.6	1214.4	12194.1
10	2023	66 736.7	1225.3	12045.8
11	2024	67 986.5	1194.3	12222.5

[11] Developed by the author

	Forecast of food processing processes in Samarkand region			
12	2025	69 368.6	1166.3	12548.7
13	2026	73 605.2	1165.9	11195.7
14	2027	75 180.8	1222.2	12779.8
15	2028	77 502.8	1474.6	13593.8
16	2029	78 844.0	2115.0	13478.8
17	2030	81 021.1	1058.0	15549.5
	Total	1010219.3	18728.8	147117.5

2.6 shows the main processes of products manufactured in the Samarkand region, which will help increase the ability of enterprises to operate on the basis of digital technologies.

Promote data governance: It is essential to implement data governance practices to ensure data quality, integrity, and security throughout the entire lifecycle of data.

Fair value is aimed at reflecting the true value of the Agromir enterprise, which allows it to reflect the current price.

This is a theoretical concept that summarizes all related data and forecast indicators and is based on fundamental factors such as growth prospects, risk profile, and dairy product flows.

In this case, fair value is considered as the discounted value of future cash flows associated with all types of products. The fair value formula (based on the Gordon model) [12]reflects the main factors of value creation. This indicator meets the requirements of the leading principles of integrated reporting, such as information coherence, strategic focus and future orientation.

Conclusion

The results of the study showed that the introduction of digital technologies in the agricultural sector is important not only for increasing production efficiency, but also for rational use of resources, increasing labor productivity and reducing costs. Based on scientific literature and practical analysis, it was determined that digitalization processes are creating opportunities for high-precision monitoring, remote control, automation and decision-making based on artificial intelligence.

The results of a survey among industry experts and producers showed that agricultural enterprises are highly interested in digital solutions, but there are infrastructural and financial constraints. Therefore, it is recommended to strengthen state support mechanisms for technological modernization, expand training and educational programs based on international experience.

The econometric model developed during the study clearly demonstrated the economic efficiency of implementing digital technologies. The model results

[12] Novozhilova Yu.V. Model of information-analytical obespecheniya integrirovannoy otchetnosti s position istinnoy stoimosti kompanii / Yu.V. Novozhilova // Mejdunarodnyi bukhgaltersky uchet. - 2017. - No. 15 (429). - t. 20. - S. 880-896. DOI : https://doi.org/10.24891/ia.20.15.880.

proved that each investment in digitalization has a significant positive impact on productivity and profitability indicators.

In conclusion, comprehensive approaches such as continuous strategic planning, introduction of innovative technologies, staff training, and development of public-private partnerships were recognized as important factors for the consistent implementation of digital development in agriculture.

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INSON EVOLUTSIYASI VA BIOTEXNOLOGIK ARALASHUV

Annotatsiya: *Ushbu maqola inson evolutsiyasi va zamonaviy biotexnologik aralashuv mavzusini keng qamrovda o‘rganadi. Inson evolutsiyasi — millionlab yillar davomida genetik, morfologik va madaniy o‘zgarishlar natijasida zamonaviy odamga aylanib borish jarayonidir. Ushbu jarayonda avloddan-avlodga o‘tgan genetik modifikatsiyalar, tabiiy tanlanish, iqlim va atrof-muhit sharoitlari inson organizmining shakllanishiga katta ta’sir ko‘rsatgan.*

Kalit so‘z: *Inson evolutsiyasi,genetik o‘zgarishlar,tabiiy tanlanish,morfologik o‘zgarishlar,biotexnalogiya,gen muharrirligi(CRISPR),klonlash,gen terapiyasi.*

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HUMAN EVOLUTION AND BIOTECHNOLOGICAL INTERACTION

Abstract: *This article examines the topic of human evolution and modern biotechnological interventions in a comprehensive manner. Human evolution is the process of becoming modern humans as a result of genetic, morphological and cultural changes over millions of years. In this process, genetic modifications passed down from generation to generation, natural selection, climatic and environmental conditions have had a significant impact on the formation of the human organism.*

Keywords: *Human evolution, genetic changes, natural selection, morphological changes, biotechnology, gene editing (CRISPR), cloning, gene therapy.*

Kirish: Inson evolutsiyasi Yer yuzida yuz millionlab yillar davomida shakllangan tabiiy biologik jarayon bo‘lib, bu insonning biologik va genetik taraqqiyoti, ya'ni odamzodning qadimiy ajdodlardan (masalan, maymunsimon ajdodsifat turlardan) hozirgi zamonaviy Homo sapiens holatiga kelgunicha bosib o‘tgan uzoq muddatli o‘zgarishlar jarayonidir. Bu jarayonni tabiiy tanlanish, genetik mutatsiyalar, irsiyat va atrof-muhit omillari boshqarib kelgan. Ammo XXI asrda biologiya, genetika va bioinformatika sohalaridagi yuksalishlar tufayli bu jarayonga inson o‘zi ongli ravishda aralashmoqda[2]. Biotexnologik aralashuv — bu inson

organizmiga yoki boshqa tirik organizmlarga texnologik vositalar yordamida faol aralashish jarayoni bo‘lib, biologik imkoniyatlarni kengaytirish, yaxshilash yoki o‘zgartirish maqsadida amalga oshiriladi. Ayniqsa, gen muhandisligi, sun’iy intellekt, biotexnologiya va neyrobiologiya orqali inson organizmini tahrirlash — butun evolyutsion tizimga ta’sir ko‘rsata boshladi[4]. Ushbu maqolada inson evolyutsiyasining tabiiy yo‘li, biotexnologik aralashuv shakllari, bu aralashuvning ilmiy, ijtimoiy va etik jihatlari tahlil qilinadi.

Asosiy qism: Evolutsiyaning asosiy mexanizmlari.

Inson evolutsiyasi:

Tabiiy tanlanish — eng moslashgan organizmlarning yashab qolishi

Mutatsiya — genetik o‘zgarishlar

Genetik rekombinatsiya — irsiy ma’lumotning aralashuvi

Migratsiya va gen oqimi — populyatsiyalar o‘rtasida genlar almashinuvi

Bular orqali Homo sapiens hozirgi zamonaviy ko‘rinishiga yetib kelgan. Inson miyasi, nutqi, fikrlashi va ijtimoiy xulq-atvori ham biologik asoslar orqali rivojlangan[7].

Biotexnalogik aralashuv shakllari.

Biotexnologik aralashuv inson biologik tabiatini ongli ravishda o‘zgartirishni nazarda tutadi. Asosiy shakllariga gen tahriri (CRISPR-Cas9 texnologiyasi)-DNKdagi xatolarini tuzatish yoki ma’lum genlarni olib tashlash orqali irsiy kasalliklarni yo‘q qilish. 2018-yilda Xitoyda genetik jihatdan modifikatsiyalangan egizaklar yaratilgani katta global yetuk muhokamalarga sabab bo‘lgan.

Klonlash va sun’iy embrionlar-inson hujayralaridan yangi organizm yaratish texnalogiyalari. ’’Dolli’’ qo‘yi klonlangach, insonni klonlash imkoniyati ham ochildi, ammo bu yetuk va huquqiy jihatdan qat’iy nazorat ostida turibdi[4]. Neyrobiotexnologiyalar sun’iy aql bilan inson miyasini integratsiya qilish yo‘lga qo‘yildi. Masalan: Elon Musk’ning Neyralink loyihasi. Miya-kompyuter interfeysi orqali nogironlarga protezlarni boshqarish imkoniyati berilmoqda. Transgumanizm va kiborglashtirish inson tanasida texnologik elementlarni entegratsiya qilish: bionik ko‘zlar, eshitish moslamalari, exoskeletlar. Bu esa insonning tabiiy imkoniyatlarini orttirishga qaratilgan[6]. Gen va hujayra injeneriyasi biotexnologiyasi genetik injeneriya hamda hujayra injeneriyasining sintezidan vujudga keldi. Biotexnologiyaning bu soxasi yordamida mavjudotning maqsadga muvofiq foydali xossaga ega mikrob shtammlari, hujayra xillari, o‘simlik navlari va hayvon zotlarini yaratish mumkin. Gen va hujayra injeneriyasi biotexnologiyasi injenerlik usuli bilan tirik mavjudotlarning o‘zgartirilgan irsiyati molekulyar genetikasini mukammal o‘rganish, foydali genlarni izlab topish va kerakli miqdorda ajratib olish, begona genlarni hujayra ichiga kiritib, irsiyatga ulash, ulangan genlarni yangi irsiyatda aktiv faoliyatini ta’minlab beruvchi vektor molekula yaratish, irsiyati o‘zgartirilgan hujayradan dori darmon, ozuqa moddalar, diagnostik vositalar ajratib olish yoki o‘simlik navlarini yaratish maqsadida irsiyati o‘zgartirilgan hujayradan mukammal o‘simlik formasini olish, har xil irsiy belgilarga ega va tabiiy sharoitda changlanmaydigan o‘simlik hujayralari protoplastlarini elektr impulsi yoki polivinilpirrolidon (K30 PVP. Bu yaxshi eruvchanlikka ega past viskoziteli

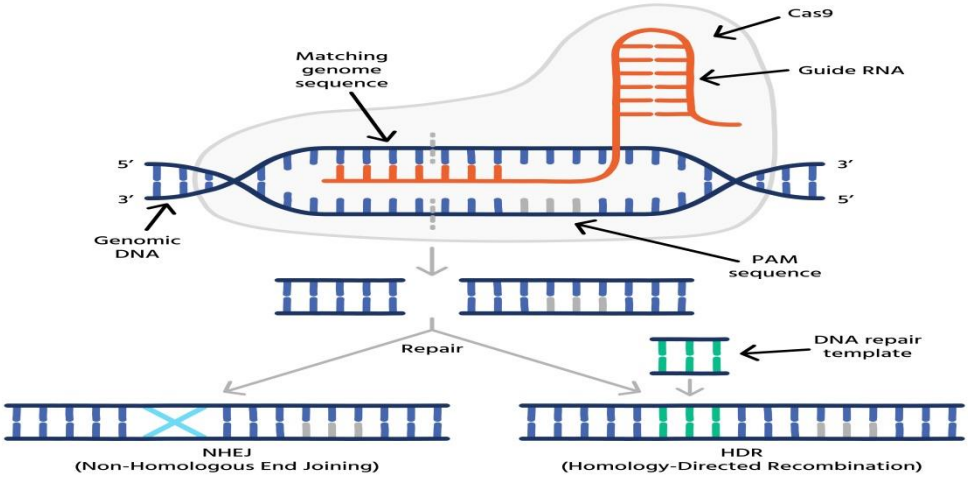
PVP. U deyarli hamma narsani eritishi mumkin: suv, mineral moylar, organik yog'lar, kislotalar, oqsillar, yog'lar va boshqalar. U farmatsevtika sanoatida faol moddalarning chiqarilishini tartibga solish uchun ishlatiladi) ishtirokida biriktirib, har ikkala o‘simlikning foydali xususiyatlariga ega mukammal o‘simlik yetishtirish bo‘yicha talaygina muvaffaqiyatlarga erishdi[4].

Biotexnalogik aralashuvning ijobiy jihatlari shundaki, genetik kasalliklarni oldini olish, personalizatsiyalshgan tibbiyot orqali individual davolash usullari, immunoterapiya, onkogen terapiya kabi davolash texnalogiyalarini qo‘llash hamda, nogironlik va qarish bilan kurash, sun’iy protezlar, miyaga ulanadigan qurilmalar, antiagin (Intensiv ampulalar zudlik bilan ko'tarish effekti bilan charchoq belgilari bilan kurashadi. Qarish belgilarini har tomonlama kamaytiring va ajinlar va nozik chiziqlar ko'rinishini sezilarli darajada kamaytiring, terini yanada elastik va mustahkam qiladi) texnalogiyalarini yaratish. Inson imkoniyatlarini kengaytirish, yuqori intellektual va jismoniy salohiyatga ega “takomillashgan odamlar” yaratish[3].

Xavflar va noaniq oqibatlar. Tabiiy evolutsiyaning buzilishida inson DNKsiga to‘liq aralashish odatiy holga aylansa, ’’sun’iy tanlanish’’ davri boshlanishi mumkin. Bu uzoq muddatga genetik muvozanat buzilishiga olib keladi. Yetuk va ijtimoiy muommolar ’’genetik elita’’ Elita Genetika bu kelajakni qayta shakllantirmoqda. Ildiz hujayralarini saqlash sohasidagi yutuqlar tufayli ular egalariga uy hayvonlarining noyob regenerativ salohiyatini qo'lga kiritish va saqlash imkonini beradi - ular eng zarur bo'lganda kelajakdagi davolanish uchun asos yaratadi. Ildiz hujayralari bo'yicha tadqiqotlar jadal rivojlanib borayotgani sababli, Elita buyrak kasalligi, son-son displazi, ko'rlik va saraton kabi kasalliklarni kelajakdagi davolash usullariga yo'l ochishga yordam beradi va ‘‘oddiy insonlar’’ o‘rtasida yangi tabaqalanish xavfi paydo bo‘ladi. Bola tug‘ilmasidan oldin uning jinsi, intellektualligi, tashqi belgilari tanlanishi mumkin bo‘lib qoladi[3,5,7].

Xulosa:

Insoniyat bugun o‘z evolutsiyasiga ongli ravishda aralasha boshlagan ilk davrda turibdi. Biotexnalogiyalar inson salomatligi va turmush sifatini yaxshilashda katta imkoniyatlar ochmoqda. Biroq bu texnalogiyalar ehtiyotkorlik bilan qat’iy biotik tamoyillar asosida qo‘llanilishi zarur. Agar bu yondashuv noto‘g’ri yo‘lga kirsa, insoniyat o‘zining tabiiy tanlanish yo‘lidan chetga chiqishi, hattoki o‘zining biologik mavjudligini xavf ostiga qo‘yishi mumkin. Biotexnalogik aralashuvlar ilmiy aniqlik, ijtimoiy mas’uliyat va etik qadriyatlar asosida boshqarilishi kerak. Shu bois, genetik muvozanatni saqlash ya’ni, CRISPR



CRISPR

kabi gen tahrirlash texnalogiyalaridan faqat kasalliklarni oldini olish yoki hayot sifatini yaxshilash uchun foydalanish, evolutsiyaning yangi bosqichiga o‘tishda inson tabiiy tuzilmasini to‘liq o‘zgartirmasdan, to‘ldiruvchi texnologiyalarini joriy qilish usullarini ko‘rib chiqish kerak.

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THE IMPACT OF REGIONAL POLICY ON PERFECTING THE TOURIST ENVIRONMENT

Abstract. *The article analyzes the importance of regional policy in bringing the tourism environment of the region to a new level, as well as assessing the opportunities of tourist-attractive objects in accelerating the flow of tourists. Based on the example of Namangan region, the study presents practical measures, necessary recommendations, and directions for improving tourism development.*

Key words: *tourism, recreation, tourist opportunities, cultural heritage monuments, tourists flow.*

Introduction. In the period of the current market economy, the demand for service sectors is increasing. In particular, recreation and tourism have become among the most important and popular areas. Tourism, alongside foreign exchange earnings, contributes to economic and geographical processes and plays a key role in strengthening the service sector.

Tourists participate in tourism to gain spiritual enrichment from historical monuments, revive spiritually in the picturesque natural environment, and expand their worldview by observing various historical and cultural sites. In many regions of the world, cultural and natural attractions are abundant; however, geopolitical instability, lack of infrastructure, and insufficient promotion restrict tourism development in certain areas. Developing countries often face this issue due to their limited ability to use tourism potential effectively.

Tourism Development Policy in Uzbekistan. In Uzbekistan, unlike some developing countries, services — particularly tourism — have been given special attention. Within administrative and natural units, systematic work is being carried out to identify, study, evaluate, and develop tourism and ecotourism opportunities. These activities form part of regional tourism policies.

A significant example of such efforts is the Presidential Decree No. PD-5611 (January 5, 2019) “On additional measures for the rapid development of tourism in the Republic of Uzbekistan.” This decree aims to expand tourism infrastructure, improve the quality of services, increase the number of tourism facilities, and enhance regional tourism competitiveness.

Tourism Potential of Namangan Region. Effective work is being carried out to accelerate tourism flow to Namangan region, along with other regions of the country. Although the region has significant tourism opportunities, they are not fully utilized yet. Therefore, measures are planned to improve tourism infrastructure and renovate existing facilities. Large-scale projects include:

1. The historical monument of **Akhsikent**, located in Turakurgan district, was once a large flourishing city in the X–XI centuries. Although destroyed in the 1620–

1629 earthquake, around 60 hectares of ruins remain today — the largest archaeological site in the Fergana Valley. Following the President's instruction in 2017, extensive conservation and research efforts began, including the establishment of a specialized directorate for Akhsikent. Restoration continues, and parts of the site are being transformed into an archaeological museum and open-air cultural center.

2. The **"Valley of Legends"** complex being constructed in Namangan city represents one of the major investment initiatives aimed at bringing the region's tourism infrastructure to a qualitatively new level. With a total project cost of USD 171 million and an overall area of 110 hectares, the complex is designed as a multifunctional leisure, cultural, and educational destination. The project includes a 16-story four-star hotel with 250 rooms, indoor and outdoor swimming pools, an 18,000 m² aquapark, sports and entertainment facilities, an ice palace, 50,000 m² of shopping and entertainment centers, as well as a 22,000 m² library and artisan center. In addition, a large mosque is planned to be constructed within the territory of the complex.

Upon completion, the "Valley of Legends" is expected to serve approximately 100,000 visitors annually, thereby enhancing Namangan city's competitiveness in both domestic and international tourism markets. The complex is projected to create more than 1,500 new jobs, contributing to employment growth and increasing local income sources. Overall, this project is anticipated to play a significant role in efficiently utilizing recreational resources, strengthening the tourism potential of Namangan, and advancing entrepreneurship and service infrastructure in the region.

3. Uzbekistan–Netherlands joint venture **Chartak Resort LLC** is developing a modern sanatorium and wellness center in Chartak district. The project covers 15.2 hectares and plans to serve up to 6,000 visitors a year, including 2,300 foreign tourists.

Conclusion. In conclusion, correctly oriented regional policy for the tourism climate of Namangan region brings effective results. The following measures are necessary to further enhance tourism:

- ensure infrastructure meets modern tourism standards,
- increase the number of hotels and guest houses,
- attract more foreign tourists and improve service quality,
- create popular tourist routes and maps,
- control health and sanitation standards in tourist zones.

Tourism opportunities in the region are sufficient — systematic management and proper utilization of resources will accelerate tourism development and increase tourist flow.

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YANGICHA YONDASHUV ASOSIDA KASBIY KOMPETENTLIKNI OSHIRUVCHI OMILLARI

Annotatsiya. *Ushbu maqolada zamonaviy mehnat bozori talablaridan kelib chiqib kasbiy kompeтeнmlikni rivojlantirishning yangicha yondashuvlari tahlil qilingan. Raqamli transformatsiya, soft skills, uzluksiz ta’lim, innovatsion fikrlash, amaliy tajribani oshirish va motivatsion omillar kompetensiya tarkibining asosiy komponentlari sifatida o‘rganiladi. Tadqiqotda kasbiy kompetentlikning tarkibiy qismlari, uni shakllantirish mexanizmlari va zamonaviy ta’lim tizimi oldiga qo‘yiladigan talablar ilmiy asosda yoritilgan.*

Kalit so‘zlar: *kasbiy kompetentlik, yangicha yondashuv, raqamli transformatsiya, soft skills, innovatsiya, uzluksiz ta’lim, professional rivojlanish.*

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FACTORS THAT INCREASE PROFESSIONAL COMPETENCE BASED ON A NEW APPROACH

Annatation: *This article analyzes new approaches to the development of professional competence based on the requirements of the modern labor market. Digital transformation, soft skills, continuous education, innovative thinking, increasing practical experience, and motivational factors are studied as the main components of the competence structure. The study covers the components of professional competence, the mechanisms for its formation, and the requirements for the modern education system on a scientific basis.*

Key words: *professional competence, new approach, digital transformation, soft skills, innovation, continuous education, professional development.*

Kirish: Globallashuv va ilm-fan taraqqiyoti natijasida mehnat bozori mutaxassislardan keng ko‘lamli bilim va ko‘nikmalarni talab qilmoqda. Raqamli

iqtisodiyot sharoitida kompetentlik tushunchasi avvalgidan ham kengroq ma’no kasb etib, shaxsning nafaqat kasbiy bilimlari, balki kreativ fikrlashi, texnologiyalarni qo‘llay olishi, jamoada ishlashi, kommunikativ qobiliyati va moslashuvchanligini ham o‘z ichiga oladi. Shu bois, kasbiy kompetentlikni yangicha yondashuvlar asosida rivojlantirish bugungi ta’lim tizimi oldidagi ustuvor vazifalardan biridir. kasbiy tayyorgarlik – mehnat faoliyati yoki kasb sohasining aniq turini tanlash bilan bog’liq, aniq va ongli ravishda qabul qilinadigan qarorning ifodalanishi bo‘lib, talabalar bilan amalga oshiriladigan maqsadga yo‘naltirilgan ishlar bilan bevosita bog’liq bo‘ladi. Shunday qilib, kasbiy moslashtirish bo‘lajak mutaxassisda pedagogik faoliyatga bo‘lgan ehtiyojni rivojlantiruvchi, unga nisbatan mas’uliyatli hamda ijodiy yondashuvni, ijtimoiy qadriyatlar motivatsiyasini tarbiyalovchi hamda shaxsga qaratilgan yo‘nalish kasb etuvchi jarayonlar alohida tarkibiy qismlarining o‘zaro integratsiyasi sifatida qarash mumkin. Kadrlarni kasbiy moslashtirishning pedagogik - psixologik jihatlari Tadqiqot muammosini nazariy jihatdan o‘rganish, tahlil etish va ijtimoiy dolzarbligini asoslashda mavzu doirasidagi ahamiyatli tushunchalar, kategoriyalar mazmunini yoritish maqsadga muvofiq hisoblanadi. Shu bois, ilmiy izlanishlar davomida kasbiy moslashtirishning pedagogik - psixologik aspektlarini: motiv, kasb tanlash motivlari, kasbiy yo‘nalganlik, pedagogik kasbga yo‘nalganlik, pedagogik faoliyat, kasbiy bilim, ko‘nikma va malakalar, kompetentlik kabi tushunchalarning mohiyati aniqlashtirish orqali yoritishga harakat qildik. Maqolaning maqsadi – zamonaviy kompetentlik tushunchasini tahlil qilish va uni oshirishga xizmat qiluvchi omillarni ilmiy asoslashdir.

Kasbiy kompetentlik – bu mutaxassisning kasbiy faoliyatni samarali bajarish uchun zarur bo‘lgan bilim, ko‘nikma, malaka va shaxsiy sifatlarning integratsiyalashgan majmuasidir. Zamonaviy ilmiy adabiyotlarda kompetentlik quyidagi tarkibiy qismlar orqali izohlanadi:

- **Kasbiy bilimlar (professional knowledge)** – nazariy va amaliy bilimlar tizimi;
- **Kasbiy ko‘nikma va malakalar (skills)** – kasbiy vazifalarni bajarish qobiliyati;
- **Soft skills** – muloqot, muammoni hal qilish, liderlik, moslashuvchanlik;
- **Raqamli kompetensiya** – texnologiyalarni qo‘llash, axborotni qayta ishlash;
- **Emotsional-intellektual rivojlanganlik** – o‘zini boshqarish, stressga bardoshlik;
- **Kreativ va innovatsion tafakkur** – yangi g‘oyalarni ishlab chiqish qobiliyati.

Bu elementlarning uyg‘unligi mutaxassisning mehnat bozorida raqobatbardoshligini belgilaydi.

Kasbiy kompetentlikni oshirishning yangicha omillari – bu uzluksizlik ta’limidir (lifelong learning). XXI asrda bilimlar tez yangilanishi natijasida mutaxassislar malakasini muntazam oshirib borishi tabiiy ehtiyojga aylandi. Uzluksiz ta’lim quyidagilarni o‘z ichiga oladi: onlayn kurslar va masofaviy ta’lim;

mustaqil o‘qish va o‘zini rivojlantirish; malaka oshirish dasturlari; professional guruhlar va hamjamiyatlarda ishtirok etish kabilardir. Bu talim tizimi faollikni oshiradi, talabada kaskiy kompetentlik qobiliyatini oshiruvchi hisoblanadi, bundan tashqari ijodiy, kreativ, innovatsion, fikrlash qobiliyatiga layoqatlilikni oshirishga undaydi.

Yana bir ta’lim tizimi raqamli transformatsiya va digital kompetensiyalardir. Bunda Raqamli texnologiyalar kasbiy faoliyatning deyarli barcha sohalarini qamrab olgani sababli mutaxassis quyidagi ko‘nikmalarni egallashi zarur:

-kompyuter savodxonligi bu kompyuter va raqamli texnologiyalardan ongli, samarali, xavfsiz va maqsadga muvofiq foydalanish ko‘nikmasidir.

-ma’lumotlar bilan ishlash bu bu shaxsning ma’lumotlarni izlash, to‘plash, tahlil qilish, talqin qilish, baholash va qaror qabul qilish jarayonida samarali qo‘llay olish qobiliyatidir. Boshqacha aytganda, ma’lumotlar bilan ishlash savodxonligi — bu raqamli muhitda mavjud bo‘lgan turli formatdagi ma’lumotlarni (sonli, matnli, grafik, statistik va boshqalar) to‘g‘ri tushunish, ularning sifatini aniqlash, ular asosida xulosalar chiqarish hamda natijalarni boshqalarga aniq va tushunarli tarzda yetkazish kompetensiyasidir.

- raqamli kommunikatsiya bu raqamli muhitda (internet, ijtimoiy tarmoqlar, messenjerlar, elektron pochta va boshqa onlayn platformalarda) samarali, xavfsiz, madaniyatli va maqsadga yo‘naltirilgan tarzda muloqot qilish kompetensiyasidir.

Yangicha yondashuv asosida kasbiy kompetentlikni oshirish omillarga quyidagicha ishchi ta’rif berish mumkin — bu mutaxassisning zamonaviy mehnat bozori talablariga mos ravishda professional bilim, ko‘nikma va shaxsiy sifatlarini rivojlantirishga xizmat qiluvchi, raqamli texnologiyalar, innovatsion fikrlash, soft skills, uzluksiz ta’lim, amaliy tajriba va o‘zini-o‘zi rivojlantirishga asoslangan kompleks pedagogik, tashkiliy va motivatsion jarayonlar majmuasidir.

Yoki bu ishchi ta’rifga quyidagicha alternativ ishchi ta’rif keltirishimiz mumkin. Misol ucuhun mutaxassisning kasbiy faoliyatda yuqori natijaga erishishi uchun raqamli transformatsiya, innovatsion fikrlash, soft skills, uzluksiz ta’lim va amaliy tajribani uyg‘unlashtirishga qaratilgan zamonaviy pedagogik va tashkiliy mexanizmlar tizimidir, yoki mutaxassisning o‘z kasbini samarali bajarishi uchun texnologiyalarni qo‘llash, kreativ fikrlash, jamoaviy ishlash, doimiy o‘qish va amaliy tajriba orttirish kabi zamonaviy ko‘nikmalarni shakllantiruvchi shartlar to‘plamidir deyish ham to‘g‘ri hisoblanadi. Yana boshqacha qilib aytganda mehnat bozoridagi o‘zgarishlarga moslashuvchan bo‘lishni ta’minlaydigan, innovatsion ta’lim texnologiyalari, raqamli kompetensiyalar, shaxsiy rivojlanish strategiyalari va professional tajribaning uzluksiz yangilanib borishiga asoslangan rivojlanish omillaridir.

Xulosa qilib aytganda tadqiqot natijalari shuni ko‘rsatadiki, yangicha yondashuv asosida kasbiy kompetentlikni oshirish ko‘p omilli va kompleks jarayon bo‘lib, uning markazida shaxsning o‘zini rivojlantirishga bo‘lgan intilishi turadi. Raqamli transformatsiya, innovatsion fikrlash, soft skills va uzluksiz ta’lim bo‘yicha kompetensiyalar zamonaviy mutaxassisning raqobatbardoshligini ta’minlovchi asosiy omillar hisoblanadi. Shuning uchun ta’lim tizimi, ishlab

chiqarish korxonalari va mutaxassislarning o‘zlari kompetentlikni muntazam rivojlantirish bo‘yicha samarali strategiyalarni ishlab chiqishlari zarur.

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OPTIMIZATION OF THE PARAMETERS OF A DEVICE FOR CUTTING MELON INTO RING SLICES

Annotation. *The article states that the mechanization of the process of cutting peeled melons into ring-shaped pieces has not been fully studied, for which purpose three-factor experimental studies were conducted according to the Hartley 3 plan to determine the distance between the cutting discs, the sharpening angle of the disc and the number of revolutions of the disc knife.The evaluation criteria were the completeness of the cut, the compression during cutting and the loss of fruit pulp during the cutting process. It is emphasized that the results obtained in multifactorial experiments were processed using the "regression analysis" program developed by the experimental testing department of KHMITI. The Cochrane test was used to assess the degree of homogeneity of variance, the Student's t-test was used to assess the regression coefficients, and the Fisher test was used to assess the adequacy of regression models.*

After processing the results of experimental studies, regression equations were obtained that adequately describe the process, and as a result it was determined that in order to ensure maximum cutting completeness and to minimize losses and compaction of the pulp when cutting the melon into ring-shaped parts, the distance between the disks should be 18 mm, the sharpening angle of the disks should be 12°, and the number of revolutions of the disk knife should be 200 rpm.

Key words: *melon, ring, process, disk, sharpening angle, knife, Hartley, factor, experiment, fruit pulp, regression, coefficient, criterion, model, adequate.*

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QOVUN ETINI HALQASIMON BO‘LAKLARGA KESISH UCHUN QURILMANING PARAMETRLARINI MAQBULLASHTIRISH

Annotatsiya. *Maqolada tozalangan qovun mevalarini halqasimon bo‘laklarga bo‘lish jarayonni mexanizatsiyalashtirish to‘liq o‘rganilmaganligi va kesuvchi disklar orasidagi masofa, diskning o‘tkirlanish burchagi va diskli*

pichoqning aylanishlar sonini aniqlash maqsadida Hartli 3 rejasi bo‘yicha uch omilli eksperiment tadqiqotlar amalga oshirilganligi keltirilgan. Bunda baholash mezonlari sifatida kesish to‘liqligi, kesishda siqilish va kesish jarayonida meva etining yo‘qotilishi qabul qilingan. Ko‘p omilli eksperimentlarda olingan natijalarga QXMITI ning eksperimental-sinov bo‘limi tomonidan ishlab chiqilgan “regressiya tahlili” dasturi yordamida qayta ishlov berilganligi takidlangan. Dispersiyaning bir xillik darajasini baholash uchun Koxren kriteriyasi, regressiya koeffitsiyentlarini baholash uchun Styudent kriteriyasi va regressiya modellari mosligini baholash uchun Fisher kriteriyasi qo‘llanilgan.

Eksperimental tadqiqotlar natijalari qayta ishlangandan keyin, jarayonni adekvat ifodalaydigan regressiya tenglamalari olingan va natijada qovunni halqasimon bo‘laklarga bo‘lish jarayonida kesishning maksimal to‘liqligini ta’minlash hamda meva etining minimal yo‘qotilishi hamda siqilishini kamaytirish uchun disklar orasidagi masofa 18 mm, diskning o‘tkirlanish burchagi 12° va diskli pichoqning aylanishlar soni 200 r/min bo‘lishi kerak ekanligi takidlangan.

Kalit so'zlar: *qovun, halqa, jarayon, disk, o‘tkirlanish burchagi, pichoq, Hartli, omil, eksperiment, meva eti, regressiya, koeffitsiyent, kriteriya, model, adekvat.*

Kirish. Mavzuning ahamiyati. Ma’lumki, **t**ajribalarni matematik rejalash - oldindan ishlab chiqilgan matematik sxema bo‘yicha eksperimentlarni o‘тказиш usuli bo‘lib, u minimal miqdordagi tajribalar bilan maksimal ma'lumotni olish imkonini beradi. Bu tajribalarni tashkil qilishning ilmiy yondashuvi bo‘lib, u optimal sharoitlarni tanlash, omillar va ularning intervallarini aniqlash, natijalarni tahlil qilish va jarayonni optimallashtirish uchun matematik modellarni qurishni o‘z ichiga oladi. Eksperimental rejalashtirishning asosiy vazifalaridan biri o‘rganilayotgan o‘zgaruvchilar o‘rtasidagi bog’liklarni o‘rnatish uchun zarur bo'lgan tajribalar sonini aniqlashdir. Tajriba jarayonida o‘zgartiriladigan o‘zgaruvchilar omillar, o‘rganilayotgan yoki optimallashtirilgan parametrlar esa tizimning natijalari yoki javoblari deb ataladi [1-2].

Eksperimentni rejalashtirishning eng oddiy usuli - turli xil omillar kombinatsiyasi bilan tajribalarni o'tkazishdir (hisoblash usuli); ammo, hatto ikki karralik tajriba bilan ham, to'liq natijani olish uchun ko‘p sonli sinovlarni o‘tkazish kerak bo‘ladi. Boshqa usulda esa faqat bitta omil o‘zgartiriladi (qolganlari doimiy bo‘lib qoladi), bu omil uchun qisman ekstremum topiladi va keyin protsedura boshqa omillar bilan takrorlanadi. Ushbu yondashuv tajribalar sonini sezilarli darajada kamaytiradi, lekin har doim ham maqbul bo‘lmasligi mumkin. Shuning uchun, omillar va chiqish parametrii o'rtasida qandaydir analitik bog'liqlik mavjud deb taxmin qilinadigan matematik eksperimental rejalashlashtirish usullari qo‘llaniladi, va optimal parametr qiymatlari sohasini topishga imkon beradigan eksperimental tajribalarning minimal sonini tanlash kerak bo‘ladi. Yoki boshqacha qilib aytganda, chiqish parametrining omillarga taxminiy bog'liqligini topiladi [3-4].

Tadqiqot maqsadi: Tozalangan qovun mevalarini halqasimon bo‘laklarga bo‘lish uchun disklar orasidagi masofa, diskning o‘tkirlanish burchagi va diskli pichoqning aylanishlar sonini aniqlash.

Tadqiqot metodlari. Ma’lumki, qovun mevasini halqa shaklida kesishning texnologik jarayonini mexanizatsiyalash masalasini hal qilish o‘zbek poliz ekinlarining fizik-mexanik va texnologik xususiyatlarini hisobga olgan holda yangi mashina konstruksiyasini yaratish orqali mumkin bo‘ladi.

Guliston davlat universitetining “Qishloq xo‘jaligi mahsulotlarini qayta ishlash texnologiyasi” kafedrasida bir necha yillar davomida poliz ekinlarni chiqindisiz qayta ishlash bo‘yicha ilmiy-tadqiqot ishlari olib borilmoqda. Kafedraning olimlari tomonidan qovun mevalarini mexanik qayta ishlash uchun ayrim texnik vositalarning pilot modellari ishlab chiqilgan. Tozalangan qovun mevalarini halqasimon bo‘laklarga bo‘lish jarayoni to‘liq o‘rganilgan bo‘lib, bu bo‘laklar yog‘och o‘hlovlarga osib quritish uchun qulay va keyinchalik uni quritish kamerali konvektiv qurilmada amalga oshiriladi [5-6]. Qishloq xo‘jaligi mahsulotlarini qayta ishlash texnologiyasi” kafedrasi tomondan ishlab chiqilgan qovun mevasini halqasimon bo‘laklarga kesish uchun mo‘ljallangan mashinanaig pichoqlar paketining ayrim parametrlarini asoslash uchun tajribalarni matematik rejalashtirish metodlaridan foydalanamiz va nazariy tadqiqot natijalari bilan mosligini tekshiramiz.

Disklar orasidagi masofa, diskning o‘tkirlanish burchagi va diskli pichoqning aylanishlar sonini moslashtirish uchun mos kombinatsiyalarni aniqlash maqsadida Hartli 3 rejasi bo‘yicha uch omilli eksperiment tadqiqotlar amalga oshirildi [7-10]. Bunda baholash mezonlari sifatida quyidagilar qabul qilindi: kesish to‘liqligi, kesishda siqilish va kesish jarayonida meva etining yo‘qolishi. 1-jadvalda yuqorida o‘tkazilgan nazariy tadqiqotlar va bir omilli eksperimentlar asosida aniqlangan omillar, ularning o‘zgarish chegaralari oraliqlari keltirilgan. Har bir omilning o‘zgarish oralig‘ini tanlashda, uning maqbul qiymatining o‘zgarish oralig‘i doirasida bo‘lishiga intilildi. Shuningdek, barcha omillar o‘zaro mos bo‘lishi kerak, ya’ni matriksning barcha variantlarini amalga oshirish imkoniyati mavjud bo‘lishi zarur.

Ko‘p omilli eksperimentlarda olingan natijalarda QXMITI ning eksperimental-sinov bo‘limi tomonidan ishlab chiqilgan “regressiya tahlili” dasturi yordamida qayta ishlov berildi [3]. Bunda dispersiyaning bir xillik darajasini baholash uchun Koxren kriteriyasi, regressiya koeffitsiyentlarini baholash uchun Styudent kriteriyasi va regressiya modellari mosligini baholash uchun Fisher kriteriyasi qo‘llanildi.

1-jadval

Omillar, ularning o‘zgarish chegaralari va oraliqlari

№	Omillar	O‘lchov birligi	Omillar-ning kodlangan ifodasi	O‘zga-rish oralig‘i	Omillarning o‘zgarish chegaralari		
					Pastki (-1)	Asosiy (0)	Yuqori (+1)
1	Disklar orasidagi masofa	mm	X_1	3	15	18	21
2	Diskning o‘tkir-lanish burchagi	grad.	X_2	2	10	12	14
3	Diskli pichoqning aylanishlar soni	r/min	X_3	20	180	200	220

Tadqiqot natijalari. Eksperimental tadqiqotlar natijalari qayta ishlagandan keyin, jarayonni adekvat ifodalaydigan quyidagi regressiya tenglamalari olindi[11-13]:

- Kesish to‘liqligi bo‘yicha

$$Y_1 = 99{,}1188 + 0{,}9500X_1 + 0{,}4500X_2 + 0{,}4166X_3 - 4{,}8652X_1^2 - 1{,}1583X_1X_3 - 1{,}0652X_2^2 - 1{,}1583X_2X_3 - 0{,}9818X_3^2, \% \quad (1)$$

- kesish jarayonida meva etining yo‘qolishi bo‘yicha

$$Y_2 = 4{,}3824 - 0{,}6667X_2 + 1{,}5772X_1^2 + 0{,}2333X_1X_2 + 0{,}7666X_1X_3 - 0{,}4000X_2X_3 + 0{,}9438X_3^2, \% \quad (2)$$

- kesish jarayonida siqilish bo‘yicha

$$Y_3 = 4{,}9420 - 0{,}6166X_2 - 0{,}1500X_3 + 1{,}6225X_1^2 + 0{,}3833X_1X_2 + 0{,}5833X_1X_3 + 0{,}1557X_2^2 - 0{,}4666X_2X_3 + 1{,}0891X_3^2, \% . \quad (3)$$

Statistik tahlil va tenglamalar mosligini tekshirish natijalari shuni ko‘rsatdiki, jarayon takrorlanadigan bo‘lib, (1), (2) va (3) regressiya tenglamalar jarayonni 95 foiz ishonchli ehtimollik bilan to‘g‘ri tavsifladi, chunki, haqiqiy (hisoblangan) qiymat Fisher kriteriyasining jadvaldagi qiymatidan kichik:

$$F_{hiso.} = 1{,}88 < F_{jadv.} = 3{,}44 \text{ (1) tenglama uchun}$$
$$F_{hiso.} = 2{,}06 < F_{jadv.} = 2{,}82 \text{ (2) tenglama uchun}$$
$$F_{hiso.} = 3{,}00 < F_{jadv.} = 3{,}44 \text{ (3) tenglama uchun}$$

Natijalni muhokama qilish. (1)–(3) regressiya tenglamalarini va ular asosida qurilgan grafik bog‘liqliklarni (1-3-rasmlar) tahlil qilish shuni ko‘rsatadiki, barcha omillar baholash mezonlariga sezilarli ta’sir ko‘rsatgan.

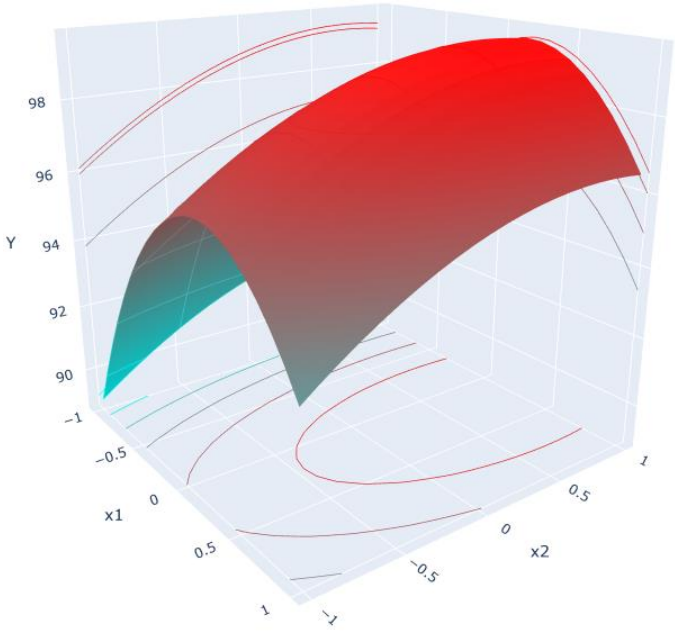
Disklar orasidagi masofa o‘zgarganda, ya'ni X_1 omil oshishi bilan Y_{PR}, Y_{PM} va Y_{RAZ} mezonlari, ya’ni kesishning to‘liqligi, kesishda meva etining yo‘qolishi va kesish jarayonida siqilish, burama parabola bo‘yicha oshdi.

Diskning o‘tkirlanish burchagi o‘zgarganda, ya'ni X_2 omil oshishi bilan Y_1 mezon, ya’ni kesishni to‘liqligi, ichki parabola bo‘yicha o‘zgardi va aksincha, Y_2

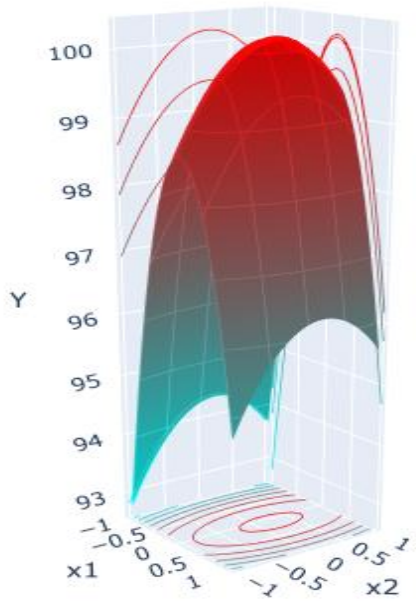
va Y_3 mezon, ya’ni kesish jarayonida meva etining yo‘qolishi va kesish jarayonida siqilish deyarli to‘g‘ri chiziq bo‘yicha kamaydi.

Maqbul parametr qiymatlari kombinatsiyasini aniqlash uchun (1)–(3) tenglamalar quyidagi shartlar asosida yechildi $Y_1 \rightarrow$ max, $Y_2 < 5$ foiz va $Y_3 < 6$ foiz.

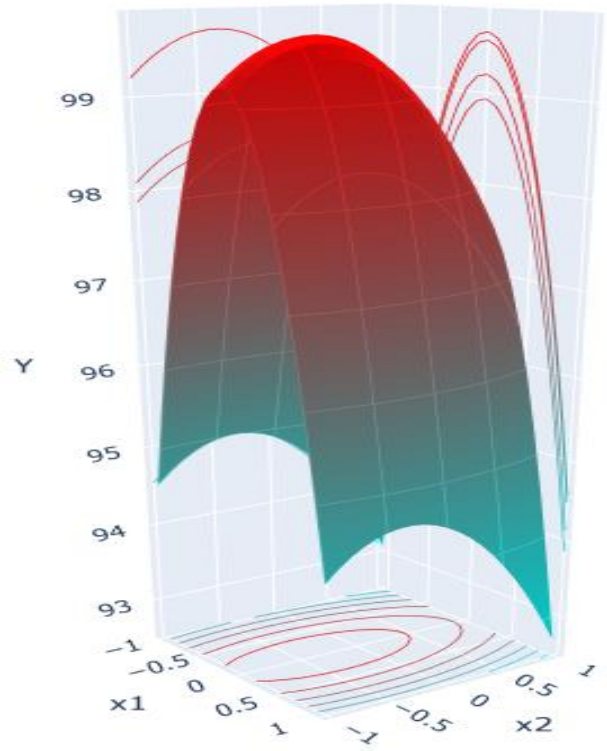
Natijalar 2-jadvalda keltirilgan.



a)



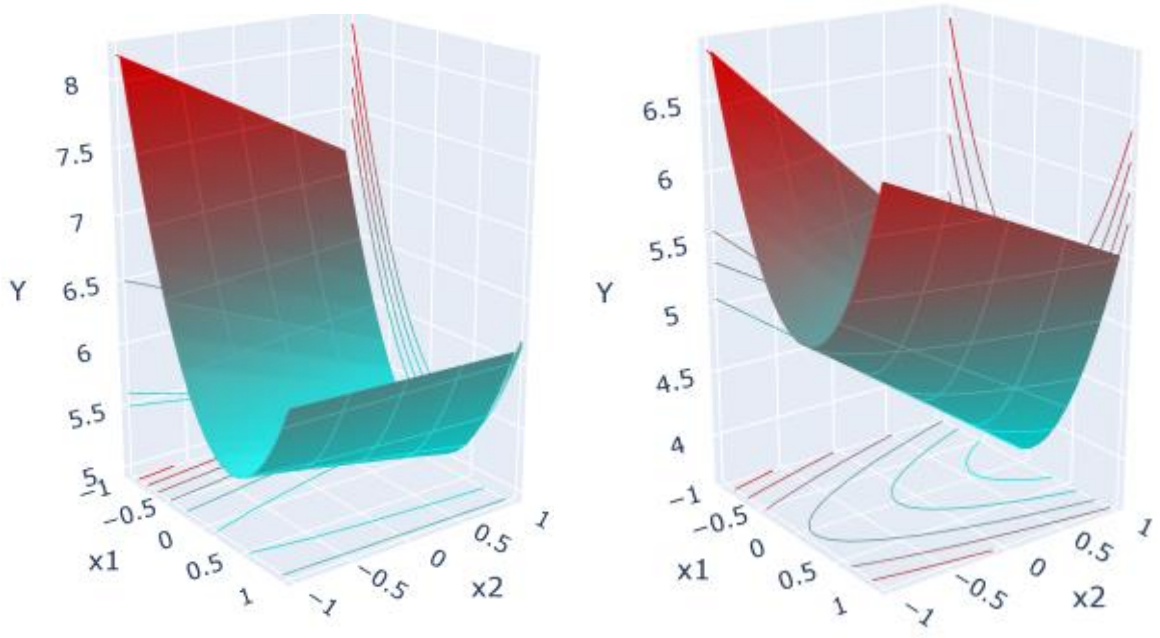
b)



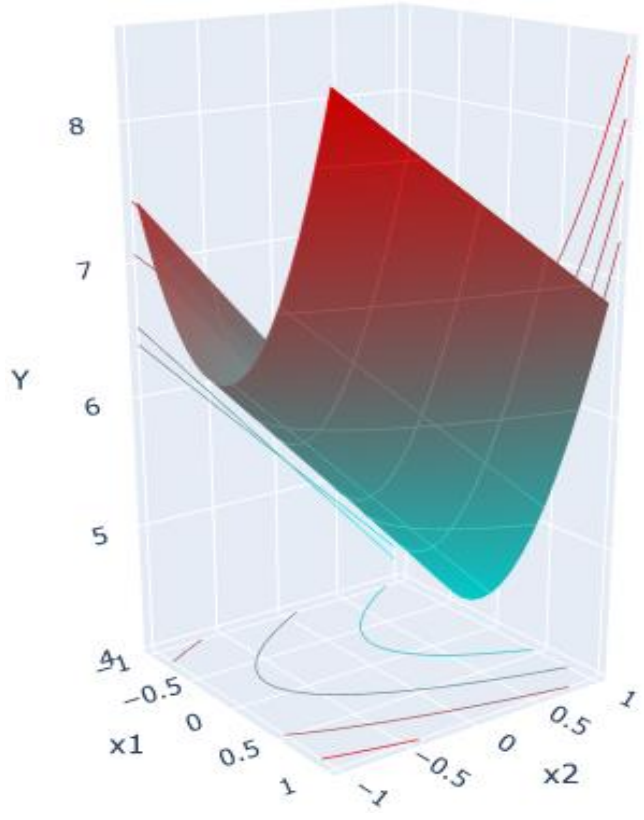
v)

a), b) va v), mos ravishda, X_1 -1; 0; +1;

1-rasm. Y_1 mezonini X_1 va X_2 omillarga bog‘liqligi



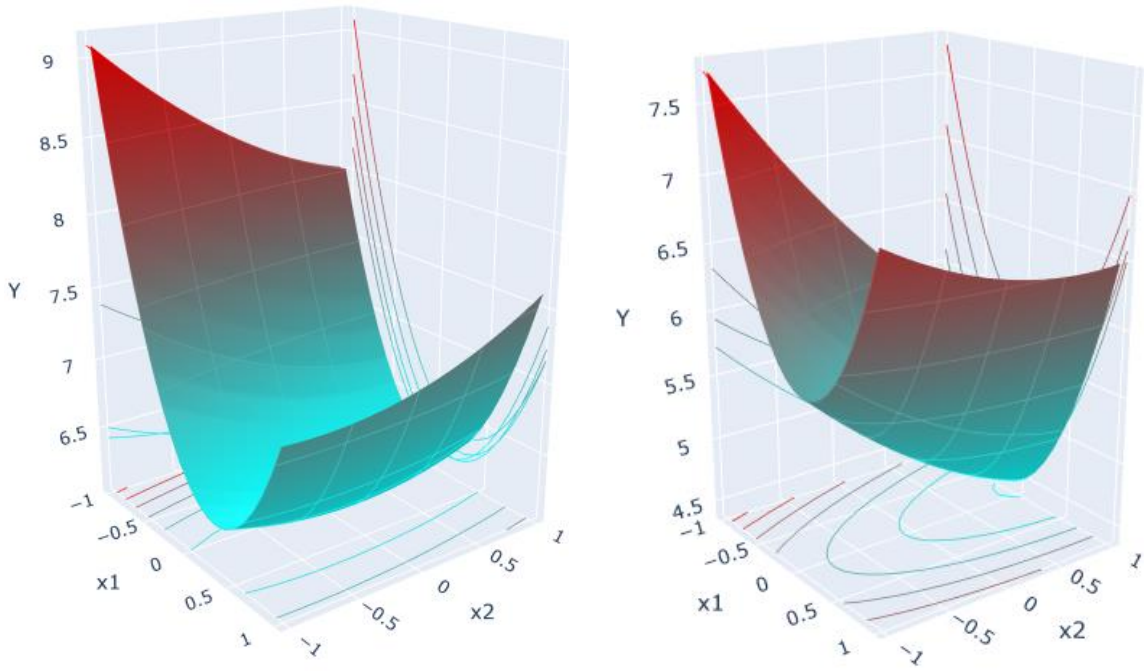
a) *b)*



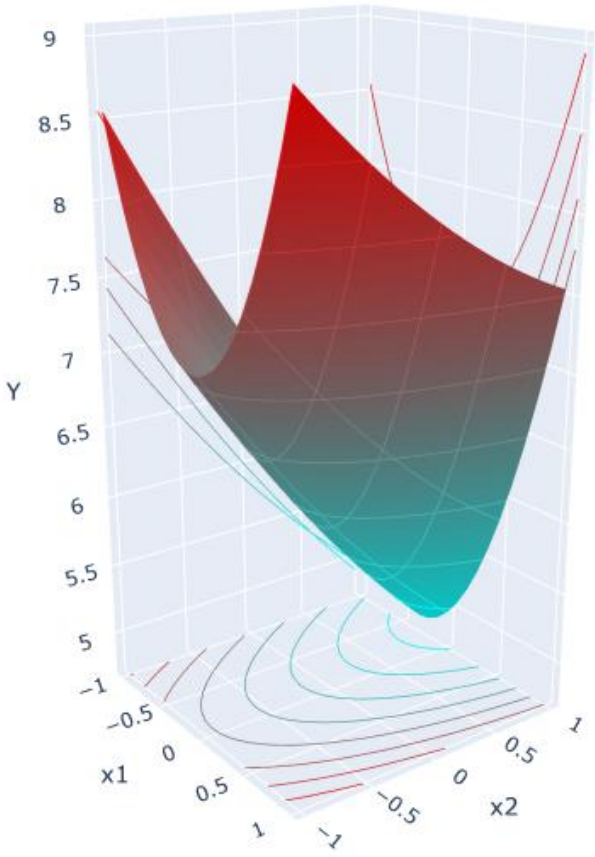
v)

a), b) va v), mos ravishda, X_2 -1; 0; +1;

2-rasm. Y_2 mezonini X_1 va X_2 omillarga bog‘liqligi



a) *b)*



v)

a), b) va v), mos ravishda ,X_3 -1; 0; +1;

3-rasm. Y_3 mezonini X_1 va X_2 omillarga bog‘liqligi

2-jadval

Omillarning maqbul qiymatlari

Belgilar	Omillarning qiymatlari		
	X_1 (l), mm	X_2 (β),daraja	X3 (n_d), r/min
Kodlangan	0,091769	0,184446	0,049251
Haqiqiy	18,27531	12,36889	200,985
Yaxlitlangan	18	12	200

Ushbu aniqlangan omillar qiymatlari uchun Y_1, Y_2 va Y_3 mezonlar mos ravishda 99,2 foiz, 4,28 foiz va 4,85 foizni tashkil etdi[14].

Xulosalar. Shunday qilib, qovunni halqasimon bo‘laklarga bo‘lish jarayonida kesishning maksimal to‘liqligini ta’minlash hamda meva etining minimal yo‘qotilishi va siqilishini kamaytirish uchun disklar orasidagi masofa 18 mm, diskning o‘tkirlanish burchagi 12° va diskli pichoqning aylanishlar soni 200 r/min bo‘lishi kerak ekan.

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AYOLLAR REPRODUKTIV TIZIMI: TUXUMDON TO'QIMALARINING MIKROSKOPIK O'ZIGA XOSLIGI

Annotatsiya: *Mazkur maqolada ayollar reproduktiv tizimining asosiy a'zosi bo'lgan tuxumdon to'qimasining gistologik tuzilishi va mikroskopik xususiyatlari yoritilgan. Tuxumdon ikkita asosiy funksiyani — endokrin (gormon ishlab chiqarish) va generativ (tuxum hujayra yetiltirish) vazifasini bajaradi. Tuxumdon to'qimasi germinal epiteliy, tunika albuginea, po'stloq (kortikal) va mag'iz (medullar) qismlardan tashkil topgan bo'lib, ularda turli rivojlanish bosqichidagi follikulalar joylashgan. Ushbu maqolada tuxumdon follikulalarining tuzilishi, hayz sikli davomida yuz beruvchi morfologik o'zgarishlar hamda hujayralararo o'zaro ta'sir mexanizmlari keng yoritilgan. Tuxumdon to'qimalarining mikroskopik o'ziga xosliklarini bilish ayollar reproduktiv fiziologiyasi va bepushtlikka olib keluvchi patologik jarayonlarni tushunishda muhim ahamiyatga ega.*

Kalit so'zlar: *Tuxumdon, tuxumdon follikulasi, oogenez, granulosa hujayralar, teka hujayralar, sariq tana, germinal epiteliy, follikulogenez, hayz sikli, estrogen, progesteron, reproduktiv gistologiya, stroma, oosit, gormon sekretsiyasi, atrez, ovulyatsiya, endokrin regulyatsiya.*

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HISTOLOGY OF THE FEMALE REPRODUCTIVE SYSTEM: MICROSCOPIC FEATURES OF OVARIAN TISSUE

Annotation: *This article explores the histological structure and microscopic characteristics of the ovarian tissue, a vital component of the female reproductive system. The ovary performs both endocrine and generative functions, producing sex hormones and gametes. The microscopic organization of the ovary includes the germinal epithelium, tunica albuginea, cortical and medullary regions, which*

contain follicles at various stages of development. This paper discusses the structural and functional features of ovarian follicles, the cyclic changes during the menstrual cycle, and the cellular interactions within ovarian tissue. Understanding these microscopic characteristics is essential for comprehending normal reproductive physiology and identifying pathological changes affecting fertility.

Keywords: *Ovary, ovarian follicles, oogenesis, granulosa cells, theca cells, corpus luteum, germinal epithelium, folliculogenesis, menstrual cycle, estrogen, progesterone, reproductive histology, stroma, oocyte, hormone secretion, atresia, ovulation, endocrine regulation.*

Mavzuning dolzarbligi: Ayollar reproduktiv tizimi insonning biologik ko‘payish jarayonida hal qiluvchi rol o‘ynaydi. Tuxumdonlarning sog‘lom faoliyati nafaqat farzand ko‘rish qobiliyatini, balki ayol organizmining umumiy gormonal muvozanatini ham belgilaydi. Bugungi kunda tuxumdon disfunksiyasi, polikistoz sindromi, bepushtlik kabi muammolar keng tarqalgan bo‘lib, ularning asosida ko‘pincha tuxumdon to‘qimasidagi mikroskopik o‘zgarishlar yotadi. Shu bois tuxumdonning gistologik tuzilishini chuqur o‘rganish reproduktiv salomatlikni saqlashda muhim ilmiy va amaliy ahamiyatga ega.

Tuxumdon to‘qimasining gistologik tuzilishi: Tuxumdon juft organ bo‘lib, shakli bodomga o‘xshash, tashqi tomondan germinal epiteliy bilan qoplangan. Uning ostida tunica albuginea — zich biriktiruvchi to‘qima qatlami joylashadi. Tuxumdonning asosiy qismini kortikal (po‘stloq) zona tashkil etadi, unda turli rivojlanish bosqichidagi follikulalar: primordial, birlamchi, ikkilamchi, Graaf pufakchasi joylashgan. Medullar (mag‘iz) zonada esa qon tomirlar, limfa tomirlari va nerv tolalari mavjud.

Follikulalar tuzilishi va rivojlanishi: Primordial follikula — oosit atrofida bir qavatli yassi granulosa hujayralar bilan o‘ralgan holatda bo‘ladi.Birlamchi follikulada granulosa hujayralar kub shaklini oladi, zona pellucida hosil bo‘la boshlaydi. Ikkilamchi follikulada hujayralar ko‘p qatlamli bo‘lib, antral bo‘shliq hosil bo‘ladi, atrofida teka interna va teka eksterna qatlamlari shakllanadi.Graaf pufakchasi (yetilgan follikula) ovulyatsiya jarayonida yorilib, oosit chiqariladi. Follikula yorilgach, o‘rnida sariq tana (corpus luteum) hosil bo‘ladi, u progesteron gormonini ishlab chiqaradi.

Hujayralararo o‘zaro ta’sir mexanizmlari: Granulosa va teka hujayralarining o‘zaro hamkorligi estrogen va progesteron sintezini ta’minlaydi. Oosit va granulosa hujayralari o‘rtasidagi gap-junction aloqa hujayralar metabolizmi va o‘sishini muvofiqlashtiradi. Bu mexanizmlar buzilganda tuxum yetilish jarayoni to‘xtaydi yoki follikula atreziga uchraydi.

Patologik holatlarda mikroskopik o‘zgarishlar: Tuxumdon kasalliklarida (masalan, polikistoz tuxumdon sindromi, ooforit, o‘sma jarayonlari) follikulalar tuzilishining buzilishi, stroma fibrozlanishi, gormon ishlab chiqarishning notekisligi kuzatiladi. Mikroskop ostida follikulalarning rivojlanishsizligi, atrofiya, kistoz o‘zgarishlar va yallig‘lanish infiltratlari aniqlanadi.

Xulosa: Tuxumdon to‘qimalarining mikroskopik tuzilishini chuqur o‘rganish ayollar reproduktiv salomatligini baholash va bepushtlik, gormonal buzilishlar, o‘sma jarayonlarini erta aniqlashda muhim ahamiyat kasb etadi. Har bir follikulaning tuzilishidagi o‘zgarishlar ayol organizmining fiziologik holati haqida muhim ma’lumot beradi. Shuning uchun tuxumdon gistologiyasining o‘rganilishi tibbiyot va biologiyada dolzarb ilmiy yo‘nalish hisoblanadi.

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IMPACT OF PIG AND FACTORY WASTE ON POPULATION CENTERS

Summary: *Poultry farms and large poultry enterprises around the world are engaged in the production of edible eggs and chicken meat. The health and environmental system has a primary task - to protect and strengthen the health of the population around poultry farms and factories. The level of mechanization of production processes in poultry farms is high. Egg-based poultry farms are considered to be more efficient and economical. When implementing such measures, this situation is achieved through the improvement of production technologies, the impact of environmental factors and the implementation of a set of hygienic measures.*

Keywords: *ecology, chemical factors, technological processes.*

Relevance: Poultry farming is one of the fastest-developing sectors of the agro-industrial complex, providing the population with biologically valuable and healthy food products. Modern poultry farming is a rapidly developing and economically effective branch of the agro-industrial economy. However, despite technological improvements, the introduction of new equipment, and the transition from floor-based to cage-based poultry breeding systems, many countries still face problems related to the organization and regulation of poultry enterprises.

Purpose of the Study: The aim of this study is to analyze the working conditions in poultry factories and farms, assess their impact on the lives of people living nearby, and develop hygienic recommendations aimed at improving and ensuring healthy working environments within these enterprises.

Materials and Methods: To develop hygienic recommendations for improving the working conditions of poultry farm and factory employees, we used hygienic, sanitary-chemical, physiological, and statistical research methods.

Object of the study: The study included 462 workers from the “Chinor Chorva” poultry factory in the Jondor district and 315 workers from the “Omad Savdo” poultry farm in the Gijduvon district of the Bukhara region.Currently, poultry farms and large poultry enterprises in our country are mainly engaged in the production of edible eggs and chicken meat. A poultry farm is a specialized industrial enterprise that produces poultry products on a mass-production basis. The level of mechanization in poultry farms is high. Egg-based poultry farms are more efficient and economical. This efficiency is achieved by improving production

technologies, reducing environmental impact, and implementing comprehensive hygienic measures.

Environmental Safety and Waste Classification: According to environmental legislation, poultry enterprises must develop an ecological safety system aimed at reducing the negative impact of their activities on the environment. If necessary, the first step is to assign the enterprise to a specific category that reflects its potential impact. The category determines the regulatory and licensing requirements, mandatory reporting, environmental payments, and the set of environmental protection measures required for sustainable development. Depending on the number of poultry, poultry farms belong to the first or second category of enterprises. In the first case, the company must apply the best available technologiesand develop an integrated environmental permit.

Environmental problems in poultry farming primarily include the following types of pollution:

1. Feed waste
2. Animal waste
3. Bird carcasses
4. Wastewater
5. Emissions into the atmosphere

To minimize the environmental impact of these pollutants, a sanitary protection zone must be established. Poultry farms are usually located outside or on the outskirts of cities. According to the sanitary classification of industrial facilities, poultry farms, depending on the number of birds, may may belong to the 1st to 3rd hazard class enterprises. The size of the sanitary protection zone should be 2000, 1500, 1000, or 500 meters respectively.

Within the enterprise area, there are usually poultry houses, slaughterhouses, meat and bone processing workshops, egg-laying facilities, feed storage, manure storage, laboratories, laundries, compressors, and grain warehouses. Typically, the enterprise also includes a transport and tractor park, carpentry workshop, boiler room, coal and slag storage, fuel station, car wash, and canteen.

Waste management must comply with waste management standards and include measures for proper disposal.

Ecological and Hygienic Issues: Various environmental protection measures are implemented at poultry farms to reduce waste-related pollution. The main type of waste from poultry farms is bird manure, which is classified as hazard class 3 or 4. Poultry feed mainly consists of corn and soybeans, though other legumes, root crops, and animal-origin components (such as dairy products or fish meal) can also be included.

Feeds are usually enriched with amino acids, enzymes, vitamins, and minerals, which may contain hormones, antibiotics,and heavy metals. Feed waste, especially when spilled during storage or transport, can cause additional pollution due to its organic content. During production, poultry farms generate large amounts of animal waste, primarily manure, which contains nitrogen, phosphorus, and other substances excreted by birds, such as hormones, antibiotics, and heavy metals found

in feed. These substances can lead to ammonia and other gas emissions, as well as contamination of surface and groundwater through runoff and infiltration.Manure also contains bacteria and other pathogenic microorganisms that may pollute soil, water, and food resources—especially if not properly treated before being used as fertilizer.

Results and Discussion: The rapid growth of poultry farming has created challenges for environmental protection. The negative environmental impact of poultry farms can lead to ecological problems affecting not only nearby residents but also neighboring territories, potentially causing damage to local flora and fauna. Almost all poultry farms face serious ecological conditions, as accumulated bird manure has become a major source of environmental pollution. Currently, most poultry farms lack adequate equipment forprocessing or utilizing such large volumes of waste. To achieve maximum production efficiency and minimize waste generation, the following measures are necessary:

- Implement environmental protection programs.
- Identify all sources of pollution.
- Ensure proper maintenance and operation of feed storage, transport, and feeding systems.
- Explore possibilities of mixing feed waste with recyclable materials for use asfertilizer.
- Apply control measures to minimize the migration of pollutants into surface water, groundwater, and the atmosphere.
- Construct facilities that prevent manure-related contamination of soil and water.
- Install mechanical systems for wastewater treatment.
- Install mechanical systems for cleaning dust and gas mixtures to protect atmospheric air.

If pollution sources are identified, harmful factors are analyzed, and environmentalprotection measures are implemented in accordance with established standards, the ecological safety system of a poultry farm can be considered sufficient.Conclusion

In conclusion, to achieve maximum production efficiency and minimize waste generation, the following measures should be taken:

✓ Implement comprehensive environmental protection programs.

✓ Identify and control all pollution sources.

✓ Maintain and operate feed storage, transport, and feeding systems properly.

✓ Explore possibilities for mixing feed waste with recyclable materials for later use as fertilizers.

✓ Apply control measures to minimize the migration of pollutants into surface andConstruct facilities that prevent contamination of surface and groundwater by manure.

✓ Install mechanical systems for the treatment of industrial wastewater.

✓ Install mechanical systems for cleaning dust and gas mixtures to protect atmospheric air.

If pollution sources are accurately identified, harmful factors analyzed, and environmental protection measures implemented in accordance with established standards, the ecological safety system of poultry farms can be considered adequate.

Practical Significance of the Study: Bird manure serves as a habitat for various pathogenic microorganisms, bacteria, staphylococci, and salmonella, the highest concentrations of which are found in fresh manure. Therefore, such manure belongs to the third class of hazardous waste. Its large-scale accumulation at poultry farms poses an ecological threat to the environment.

Undoubtedly, along with improving poultry meat and egg production practices, it is essential to enhance waste management culture, especially concerning the disposal of bird manure. The use of modern, eco-friendly technologies for processing manure into demanded and competitive products is of

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OG‘IR SHOK HOLATLARIDA KORTIZOL DINAMIKASI: KLINIK KUZATUV ASOSIDA TAHLIL

Annotatsiya:*Ushbu maqolada og‘ir shok holatlarida kortizol gormonining dinamikasi, uning kompensator mexanizmlardagi o‘rni va endokrin tizim faoliyatiga ta’siri o‘rganiladi. Kortizol stress gormoni sifatida organizmning hayotiy funksiyalarini saqlab qolishda muhim rol o‘ynaydi. Klinik kuzatuv asosida shok holatlarida kortizol darajasining o‘zgarishlari, ularning gemodinamik ko‘rsatkichlar bilan bog‘liqligi tahlil qilindi.*

Kalit so‘zlar: *kortizol, shok, giperkortizolizm, stress gormonlari, gipotalamo-gipofizar-o‘rta buyrak o‘qi, endokrin tizim, reanimatsiya.*

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CORTISOL DYNAMICS IN SEVERE SHOCK CONDITIONS: A CASE-BASED ANALYSIS

ABSTRACT: *This article analyzes the dynamics of cortisol levels in patients with severe shock, its role in the body’s compensatory mechanisms, and its impact on the endocrine system. As the primary stress hormone, cortisol plays a crucial role in maintaining vital functions under critical conditions. Based on clinical observations, this study evaluates cortisol fluctuations during shock states and their relationship with hemodynamic parameters.*

Keywords: *cortisol, shock, hypercortisolism, stress hormones, hypothalamic–pituitary–adrenal axis, endocrine system, intensive care.*

Kirish

Shok holatlari – bu organizmning og‘ir stress holati bo‘lib, u qon aylanish, nafas olish va metabolik jarayonlarning keskin buzilishi bilan kechadi. Shokda endokrin javobning eng muhim komponenti – bu **kortizol gormoni** hisoblanadi.

Kortizol buyrak usti bezlarining po‘stloq qismida ishlab chiqariladi va **gipotalamo-gipofizar-adrenal (GGA)** o‘qi tomonidan boshqariladi. U shok holatida hayotiy muhim jarayonlarni saqlab qolish uchun glukoneogenezni faollashtiradi, qon bosimini oshiradi, suv-tuz balansini me’yorga keltiradi hamda yallig‘lanishga qarshi ta’sir ko‘rsatadi.

Ammo og‘ir shok holatlarida GGA tizimining haddan tashqari faollashuvi yoki aksincha, disfunktsiyasi kuzatiladi. Bu esa **relativ buyrak usti yetishmovchiligi** yoki **kortizol javobining sustlashishi**ga olib keladi.

Klinik kuzatuv

Bemor: 48 yoshli erkak, politravma (ichki qon ketish, son suyagi sinishi) sababli og‘ir gemorragik shok bilan reanimatsiya bo‘limiga yotqizilgan.

Dastlabki ko‘rsatkichlar:

- arterial bosim – 70/40 mm Hg
- yurak urish tezligi – 128/min
- diurez – 10 ml/soat
- kortizol – 1-soatda 890 nmol/L (me’yorda 250–750 nmol/L)

24 soatdan so‘ng kortizol 620 nmol/L gacha pasaydi. 48 soatda esa – 410 nmol/L gacha tushgan. Bunda bemorda gipotenziya saqlanib turgan, ammo yurak faoliyati barqarorlasha boshlagan.

Tahlil:

Kortizol darajasi dastlab keskin oshgan bo‘lib, bu organizmning stressga birlamchi kompensator javobidir. Ammo 48 soat davomida uning pasayishi buyrak usti bezlarining charchashini va “relativ adrenal yetishmovchilik”ni ko‘rsatadi. Bu holat reanimatsion bemorlarda o‘z vaqtida kortikosteroid terapiyasi (masalan, gidrokortizon)ni ko‘rib chiqish zarurligini bildiradi.

Muhokama

Kortizolning fiziologik o‘zgarishlari shok patogenezida markaziy o‘rinni egallaydi. U stress paytida glyukoza sintezini kuchaytirib, qon tomir tonusini oshiradi va yallig‘lanishni kamaytiradi.

Shokning ilk bosqichida kortizol yuqori darajada bo‘ladi — bu **“giperkortizolemik faza”**, lekin vaqt o‘tishi bilan buyrak usti bezlari zahiralari kamayib, **“gipokortizolemik faza”** kuzatiladi. Bu jarayon gemodinamik barqarorlikka ta’sir qiladi.

Kortizol dinamikasini muntazam o‘lchab borish shokdagi bemorlarda davolash samaradorligini baholash uchun muhim klinik indikator hisoblanadi. Shuningdek, endokrinologik nuqtai nazardan, kortizolning bu o‘zgarishlari boshqa gormonlar — adrenalin, noradrenalin, va insulin bilan murakkab o‘zaro ta’sirda bo‘ladi.

Xulosa

Og‘ir shok holatlarida kortizol darajasining o‘zgarishlari organizmning hayotiy funksiyalarini saqlab qolishdagi markaziy mexanizmlardan biridir. Kortizolning yuqoriligi dastlab ijobiy javob bo‘lsa-da, uzoq davom etgan giperkortizolizm buyrak usti bezlarining charchashiga olib keladi.

Anesteziolog va endokrinologning hamkorlikdagi yondashuvi shok bemorlarini baholashda va kortikosteroid terapiyasini individual tanlashda muhim ahamiyatga ega.

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ASSESSMENT OF DUSTINESS OF A FLOUR MILL

Summary:*Exposure to flour dust can be found in the food industry and animal feed production. It may result in various adverse health outcomes from conjunctivitis to baker's asthma. In this paper, flour dust exposure in the above-mentioned occupational environments is characterized and its health effects are discussed. A peer-reviewed literature search was carried out and all available published materials were included if they provided information on the above-mentioned elements. The hitherto conducted studies show that different components of flour dust like enzymes, proteins and baker's additives can cause both non-allergic and allergic reactions among exposed workers. Moreover, the problem of exposure to cereal allergens present in flour dust can also be a concern for bakers' family members. Appreciating the importance of all these issues, the exposure assessment methods, hygienic standards and preventive measures are also addressed in this paper.*

Keywords: *flour dust; flour allergens; wheat proteins; baker's asthma; exposure assessmen*

1. **Introduction** The American Conference of Governmental Industrial Hygienists (ACGIH) defines 'flour' as a complex organic dust containing cereals like wheat (Triticum sp.), rye (Secale cereale), sorghum (Panicum miliaceum), bar ley (Hordeum vulgare), oats (Avena sativa), rice (Oryza sativa) or corn (maize) (Zea mays), or a combination of these, which have been processed by milling.[1] Whereas the term 'flour dust' refers to particles coming from finely milled cereal or non-cereal grains, 'grain dust' consists of particles produced during grain harvesting and han dling, excluding milling. Flour dust usually contains var ious components which play an important role in dough improvement, such as a variety of enzymes (α-amylase, cellulase, hemicellulase, malt enzymes, xylanase, pro tease, lipase, glucoamylase, glucose oxidase, lipoxyge nase), additives (baker's yeasts, egg powder, milk powder, sugar), flavorings, spices, chemical ingredients (preserva tives, antioxidants, bleaching agents) but may also com prise of storage-related contaminants, such as microbes or mites. Grain dust may contain dry plant particles (non grain plant matter) such as fungi (mainly from Fusarium, Aspergillus, Cladosporium and Alternaria genera) with their mycotoxins, bacteria with their fragments (including endotoxins) and excretions (proteolytic enzymes), mites,

insects, rodent excrements, sand and residues of pesticides. As grain dust has different health effects from flour dust, it will not be included in this paper.

2. **Biological and physical** characteristics of flour dust In terms of biological activity, cereals belonging to the family Poaceae are the most important. While particles derived from wheat (Triticum sp.), barley (Hordeum sp.), rye (Secale cereale) and oats (Avena sativa) have high allergenic potency, the flour dust coming from corn (Zea mays) is much less reactive.[2] Important flour dust sensi tizers, however, derive also from non-cereal grains such as soy (Glycine hispida), buckwheat (Fagopyrum escu lentum) and peas (Pisum sativum). The main cereal grain used in the bakery industry is wheat. The wheat seed is composed of endosperm (80–85%), husk and germ. Dur ing the milling process, the endosperm is separated from husk and germ and reduced to small (≤6 μm) particles.[3] Wheat flour contains starch and four groups of proteins: glutelins (glutenins), water-soluble albumins, prolamins (gliadins) and globulins. Glutenins and gliadins form com plexes called gluten. Albumins and globulins have shown the strongest allergic potency among wheat proteins, but allergic potency of globulins, prolamins and glutelins should be considered in occupational risk assessment as well.[4] According to Sander et al.,[5] wheat flour con tains 40 allergens at least, which can cause adverse health effects in exposed workers. Proteins with potential aller genic activities represent about 10–15% of wheat grain dry weight. Wheat protein allergens have a mass of about 12–17 kDa, but the mass of their major types belonging

Occupational exposures to flour dust Cereal flour is one of the basic materials used in the food industry and animal feed production. Taking into account the character of occupational activities in those branches, the most severe exposure to flour dust is usually observed in bakeries and grain mills. A significant exposure to flour dust occurs also in pasta factories, pizza bakeries, con fectionery (cake and cookie factories), restaurant kitchens, malt factories, animal feed plants and in agriculture. The level of exposure is conditioned by the size of the production enterprise and varied depending on the work ing area within the factory grounds. In baking and milling industries, the observed concentrations of total flour dust varied from a few up to more than 400 mg/m3 in the case of peak exposure.[34,50–54] According to Bachmann and Myers, average total dust concentrations among South African milling workers fluctuated from 1.3 mg/m3 for millers, through 3.5 mg/m3 for cleaners, sweepers and bag handlers, to 17.6 mg/m3 for shovel workers andgrain pack ers. Similar average concentration levels were obtained by Kakooei and Marioryad [55] among Iranian flour mill workers reaching 11.1, 12.6, 16, 11.4 and 9.5 mg/m3 of total dust for millers, packers, sweepers, sift and wash ing operators, respectively. Awad el Karim et al. [56] noticed average total dust concentrations of 1.4, 1.6, 2.2, 2.7, 3.5 and 3.6 mg/m3 in wheat store, packing, rollers, 244 A. Stobnicka and R.L. Górny wheat cleaning, sacks and plan sifter rooms, respectively. According to Talini et al.,[57] the highest total dust concen trations of 0.4, 5.8, 6.9 and 8.7 mg/m3 were noticed at flour mill, grain cleaning, packing and unloading areas, respec tively. However, the maximal concentrations of respirable dust at some

workplaces in flour mills can even reach 160 mg/m3.[53] In both small- and large-scale bakeries, exposure lev els have been found to be the highest during mixing and baking stages; however, in larger bakeries addition ally during receipt and opening of flour containers.[58] Elms et al. [59] studying work conditions in UK bak eries observed differences in the concentrations of inhal able dust exposure. The highest dustiness levels were observed in large size bakeries (with median dust concen trations of 7.6 mg/m3) followed by medium (5.2 mg/m3) and small–micro size plants (2.2–3 mg/m3). The same situation is true in the case of α-amylase for which expo sure in large industrialized bakeries was higher than in small traditional bakeries. The most severe condi tions are usually observed during dispensing, mixing or dough-making tasks. The concentrations for total dust and its inhalable fraction range from 0.4 to 86 mg/m3 and from 0.4 to 37.7 mg/m3, respectively.[8,11,13,18,50,60 67] The tasks performed by oven workers also involve risk of exposure to high concentrations of both inhalable (0.1–8.7 mg/m3) and total flour dust particles (0.1–37.6 mg/m3).[11,13,14,18,57,60,68] In a pasta manufacturing plant, the highest flour dust concentrations of 13, 3.1 and 0.2 mg/m3 for inhaled, thoracic and respirable frac tions, respectively, were observed during dough knead ing on the manual production line.[69] The concentra tions of α-amylase in the air of crisp bread bakeries can reach 229.3 ng/m3.[1] Airborne concentrations of cellu lose and xylanase in flour mills and crisp bread factories can approach 180 and 200 ng/m3, respectively; however, according to Vanhanen et al., such high concentrations of xylanase are associated with natural xylanase activity of wheat.[8,] Exposures to high concentrations of flour dust are fre quently observed; however, they usually have a short-term character and the duration of peak concentrations (2–6 peaks/h on average) usually takes from 30 s to 4 min. Lilienberg and Brisman [71] examined the occupational peak exposure for dough makers and bread formers. From among different activities, dough mixing as well as tip ping and manual handling of flour were the dustiest tasks. Cleaning the bins in bakeries and maintenance cleaning in mills have given peak values (total flour dust) of 390 and 458 mg/m3, respectively.[34] Meijster et al. [12] studying exposure to total dust in industrial and traditional bakeries, factories producing ingredients for the baking industry (i.e., pre-mixes based on flour or other bulk and special ized additive mixtures for bread or pastry) and flour mills recorded the maximal concentrations on the extremely high levels reaching 292, 318, 627 and even 1837 mg/m3, respectively. Mounier-Geyssant et al. [6] suggest that concentration of flour dust may depend on season being greater in winter than in summer. Average personal exposure of bakery and pastry apprentices to 2.5 μm particulate matter (PM2.5) were 0.71 and0.35 mg/m3 aswellas0.5and0.29 mg/m3 in winter as well as summer seasons, respectively. The same trend was noted for personal exposure of workers to PM10 (1.1 and 0.47 mg/m3 as well as 0.63 and 0.44 mg/m3 in winter as well as in summer, respectively). The risk of adverse health outcome occurrence is closely related to the flour dust exposure levels.[14] DeMers and Orris [74] showed that US bakers appeared to have markedly higher mortality rates than expected, suffering from the typical asthma-like symptoms, such as cough, wheezing and

shortness of breath. Such effects were observed among bakery workers exposed to flour dust concentrations between 2 and 5 mg/m3, but they may also occur at lower levels. According to the Dutch Expert Committee on Occupational Standards (DECOS),[8]an additional sensitization risk for wheat and other cereal f lours (expressed as 8-h time-weighted concentration) is equal to 0.1%, 1% and 10% for an occupational exposure to 0.012, 0.12 and 1.2 mg/m3 of inhalable dust, respec tively. The Swedish investigations carried out among bak ers showed significant relationships between the risk for asthma and rhinitis and dust concentrations (of 3 and 1 mg/m3, respectively).[33] Studies by Houba et al. [64,76] revealed that there is a statistically significant relationship between inhalable dust fraction and wheat allergen expo sures and the risk of sensitization among bakery workers. The increased risk of sensitization is visible at wheat flour dust concentration of 2 mg/m3. Sensitization is still preva lent when flour dust concentrations reached 1 mg/m3 and its reduction to the negligible level is achieved when the concentrations of inhalable dust and wheat allergens are reduced to 0.5 mg/m3 and 0.2 μg/m3, respectively. Arecent study by Tagiyeva et al. [9] showed that the problem of exposure to cereal allergens derived from flour dust concerns not only workers but their family members as well. In a situation of such para-occupational expo sure, family members are exposed to sensitizers, which are ‘taken home’ by bakers on contaminated skin and clothes. Ahigh exposure to WFA and FAAresulted in allergic sen sitization which was noticed when bakers wore, changed or cleaned working clothes and shoes inside their living places. It was also shown that wheezing symptoms and asthma were more prevalent among children whose fathers were occupationally exposed to flour dust. The study by Tagiyeva et al. included also the workplace evaluation as well as bakers’ vehicles and homes demonstrating that after routine hygiene measures bakers leave workplaces with WFA and FAA on their hands, forehead and shoes. All these allergens are also present in their cars, which International Journal of Occupational Safety and Ergonomics (JOSE) 245 prove that contaminants from work sources are transferred into the home environment and may be responsible for asthma episodes among family members. Potential sen sitization of bakers’ family members due to α-amylase associated clothes, shoes and other bakery textiles has been also reported by Vissers et al.[10]

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HYGIENIC ASSESSMENT OF WORKING CONDITIONS IN GREENHOUSES

Abstract. *This article presents an analysis of production factors in greenhouse farms and their impact on greenhouse workers' health.*

The study revealed the negative impact of occupational hazards on workers' health. The main occupational hazards in greenhouses include microclimate, chemical agents, air pollution, and pesticides. Furthermore, greenhouse workers' work is very stressful. As a result, an increase in respiratory and musculoskeletal diseases has been observed among female greenhouse workers.

Keywords: *greenhouse, microclimate, chemical factors, pesticides, diseases.*

Relevance Over the past decade, the number of enterprises engaged in indoor vegetable cultivation in Uzbekistan has increased, and the number of new technologies for cultivating vegetable crops is constantly growing. Despite the modernization of production, protecting the health of agricultural workers remains a pressing issue. Protecting and improving the health of the working population is a key public health issue. Prevention of occupational and work-related diseases occupies a leading place in the system of treatment and preventive measures. Considering only the isolated impact of individual production factors on workers' health, it is impossible to assess the impact of their combined effects. During periodic medical examinations of workers in the agro-industrial complex, there is a lack of interest in actively identifying risk groups for occupational and work-related pathologies, both on the part of employers and employees (N.F. Izmerov, I.V. Bukhtiyarov, L.V. Prokopenko 2014; T.A. Novikova, V.F. Spirin, N.A. Mikhailova, V.M. Taranova 2012; I.V. Bukhtiyarov 2016).

In recent years, sanitary inspection specialists have paid little attention to enterprises engaged in the production and cultivation of vegetables in greenhouses. Insufficient research has been conducted, and no connection has been established between sanitary, hygienic, epidemiological, and physiological factors of working conditions affecting the body of workers and their morbidity. Somatic pathologies of various etiologies are constantly being reported in greenhouse farms in the Bukhara region, despite ongoing management and preventive measures. The incidence of illness among workers in key greenhouse occupations in the Bukhara region is primarily due to exposure to environmental factors: unfavorable microclimate, dust, and physical strain resulting from significant manual labor.

Therefore, it is necessary to improve oversight during inspections, taking into account the impact of environmental factors on the primary professional group—greenhouse workers.Objective of the study: To conduct a hygienic assessment of working conditions and scientifically substantiate measures to reduce the risk of exposure to adverse work-related factors on the health of female workers in key greenhouse occupations.

Research Methodology and Methods: The study was conducted at two greenhouse fresh vegetable and mushroom growing facilities in the region: the Bukhara Agricultural Production Cooperative and the Umurbek Fayz Zamini greenhouse workshop in the Gijduvan District.

The study focused on working conditions (air pollution indicators, microclimate parameters, workload and intensity, etc.), as well as the health status of key occupational groups (greenhouse vegetable growers and greenhouse mushroom growers).

The study was conducted in accordance with current regulatory and methodological documents using a combination of modern hygienic, statistical, laboratory, and instrumental research methods.

The hygienic assessment of working conditions included an analysis of the impact of

chemical factors, physical factors (microclimate, noise, vibration,

electromagnetic fields, illumination), an assessment of the severity and intensity

of the work process, as well as a comprehensive assessment of factors affecting the work environment and

the work process of greenhouse workers.

The risk assessment of pesticide exposure on workers was conducted in accordance with the guidelines "Risk Assessment of Pesticide Exposure on Workers" No. 1.2.3017-12.

The hygienic assessment of microclimate, noise, vibration,

electromagnetic fields, and illumination parameters was carried out in accordance with SanPiN 1.2.3685-21 "Hygienic Standards and Requirements for Ensuring the Safety and (or) Harmlessness of Environmental Factors for Humans." An assessment of the severity and intensity of the work process, as well as a comprehensive assessment of working conditions, were conducted in accordance with R 2.2.2006-05

"Guidelines for the Hygienic Assessment of Factors in the Work Environment and Work Process. Criteria and Classification of Working Conditions."

To assess the health status of greenhouse vegetable growers and greenhouse mushroom growers, the group was divided into three subgroups by age and four subgroups by length of service.

To ensure the reliability of the results, a control group was studied, consisting of 108 female administrative and management staff (AMS) employees aged 24 to 54 years who had not previously participated in the production process.

Incidence of temporary disability was assessed based on the number of cases and days of disability per 100 workers, the average duration of one case, and the relative risk of morbidity. A quantitative assessment of the relative risk of morbidity leading to temporary disability among greenhouse vegetable and mushroom growers was conducted based on the calculation of odds ratios, relative risk, and etiologic proportions.

MAIN SUMMARY

1,158 workers, including 789 women, are employed in greenhouse farms in the Bukhara region, representing 72.7% of the total workforce. 427 workers work in hazardous conditions, 68% of whom are women. A hygienic assessment of working conditions in greenhouse farms in the Bukhara region revealed that workers are exposed to a range of adverse factors. Based on studies conducted between 2015 and 2019, of the 458 samples analyzed for harmful substances in the air of the working area, 1.3% of the samples exceeded the maximum permissible concentration of controlled pollutants. The proportion of test results showing exceedances of maximum permissible concentrations of harmful substances in the form of dust and aerosols over the same period was slightly higher, at 1.4%. Overall, the assessment of chemical exposure shows that the dynamics of harmful substance levels, such as acetic acid, carbon monoxide, chlorine, ammonia, sulfur dioxide, and suspended solids, in the air of work areas at closed-type enterprises over the past five years has tended to decrease the proportion of samples that do not meet hygiene standards.

Over the past five years, there has been a trend toward an increase in the proportion of workplaces that do not meet hygiene requirements for noise – from 2.8 to 3.8%, primarily among tractor drivers – and for microclimate – from 7.5 to 8.6% among greenhouse workers. The Bukhara Greenhouse Complex greenhouse complex has five workshop divisions, where the bulk of the research was conducted: Workshop 1 – cucumber cultivation, Workshop 2 – tomato cultivation, Workshop 3 – pepper cultivation, Workshop 4 – greens cultivation, and Workshop 5 – mushroom cultivation. The company employs 690 people, 352 of whom are directly involved in vegetable and mushroom cultivation, including 158 women. The new-generation Umurbek Fayz Zamini greenhouse complex, which produces fruit and vegetable products indoors using low-volume hydroponics on mineral wool, has two greenhouses with a total area of 6.2 hectares, where tomatoes and seedlings are grown.

CONCLUSIONS

1. The working conditions of vegetable growers working in greenhouses cultivating vegetables in soil are characterized by the combined adverse effects of environmental and work process factors: microclimate (high temperatures, relative humidity, especially in summer), and exposure to pesticides (overall working conditions rating: 3.2). Vegetable growers working in greenhouses using low-volume hydroponics have more favorable working conditions (overall working conditions rating: 3.1). The working conditions of mushroom growers are characterized by the combined effects of high humidity and low temperatures,

forced work postures, and exposure to pesticides (overall working conditions rating: 3.1). 2. Indoor use of cypermethrin- and bifenthrin-based pesticides, subject to compliance with application regulations and safety requirements, poses an acceptable risk to female greenhouse workers, both in terms of exposure levels of the total safety factor (TSF) of 0.038 and 0.2, and in terms of the absorbed dose of the inhalation and dermal safety factor (SDF) of 0.015 and 0.029, with a permissible value of 1. A safe period of entry into the greenhouse after pesticide treatment for manual work of 1 day has been justified.

3. The incidence rate of temporary disability among female greenhouse workers (per 100 workers) is 1.05 to 1.19 times higher than the average for the agricultural sector in the Voronezh Region; The relative risk of morbidity resulting in temporary disability is greater than 1: 1.38 for vegetable growers and 1.53 for mushroom growers. The etiological contribution of unfavorable work-related factors to morbidity is 27.72% and 34.44%, respectively (at $p<0.05$).

4. The leading causes of morbidity among greenhouse vegetable growers are acute respiratory viral infections (62.56%), respiratory diseases (13.66%), cardiovascular diseases (6.61%), musculoskeletal diseases (7.49%), and peripheral nervous system diseases (4.85%). Among greenhouse mushroom growers, the main nosologies remain acute respiratory viral infections (34.38%), respiratory diseases (18.75%), cardiovascular system diseases (9.38%), but the proportion of skin and subcutaneous fat diseases (12.5%), musculoskeletal system diseases (9.38%), and genitourinary system diseases (6.25%) increases in relation to the group of greenhouse vegetable growers.

5. Among greenhouse vegetable growers, the risk interval for developing chronic respiratory diseases and peripheral nervous system diseases is 6-9 years, and for diseases of the musculoskeletal system and cardiovascular system, 10-15 years; In greenhouse mushroom growers: chronic respiratory diseases and diseases of the skin and subcutaneous fat 6-9 years, diseases of the cardiovascular system, musculoskeletal system, genitourinary system - 10-15 years.

6. Evaluation of the functional state of the cardiovascular system of greenhouse workers in the dynamics of the work shift and taking into account the differences in the severity of work at the leading stages of vegetable crop cultivation revealed a reliable increase ($p < 0.05$) in the heart rate by the end of the work shift from 81.87 ± 2.78 to 88.18 ± 1.09 beats / min ($p = 0.035$), a change in systolic from 120.1 ± 2.38 to 136.13 ± 5.1 mm Hg. ($p=0.005$) and diastolic blood pressure increased, which were more pronounced in older groups with 10 or more years of experience and in older age groups, regardless of the technology used to cultivate vegetable crops in greenhouses.

7. A decrease in right-hand wrist endurance by the end of the work shift during harvesting and removal of plant residues from 5.22 ± 0.13 to 4.46 ± 0.19 sec ($p=0.001$) indicates the development of muscle fatigue, regardless of the technological features of growing crops in greenhouses.

8. A high prevalence of bad habits was found among the professional group compared to the comparison group ($p=0.00004$ for vegetable growers and $p=0.008$

for mushroom growers). 81.2% of respondents in the vegetable and mushroom grower groups had incomes below 8,000 rubles per family member. This, combined with unfavorable production factors, contributes to a more rapid deterioration in health.

9. A set of measures to reduce the risk of illness among greenhouse workers was developed and implemented. This measure is based on the results of an analysis of the impact of work-related factors and health assessment methods. This includes organizational, engineering, technical, and preventive measures to ensure compliance with sanitary and hygienic requirements and requirements for the conditions for growing vegetable crops in closed ground. This is aimed at maintaining the health of greenhouse workers and increasing their productivity.

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PREDICTION OF RECURRENCE IN BACTERIAL VAGINOSIS AND VULVOVAGINAL CANDIDIASIS IN REPRODUCTIVE AGE WOMEN

Abstract. *Recurrent bacterial vaginosis (RBV) and recurrent vulvovaginal candidiasis (RVVC) are common and challenging conditions among reproductive-age women, characterised by high rates of relapse, associated morbidity, and adverse psychosocial impact. This review examines key prognostic factors for recurrence in both RBV and RVVC, explores underlying microbiological and host mechanisms, and discusses strategies for prediction and prevention of recurrence. Understanding risk factors such as sexual behaviour, microbial biofilm formation, partner treatment, and host immune response may enable more effective personalised management of recurrence in reproductive-age women.*

Keywords: *bacterial vaginosis; vulvovaginal candidiasis; recurrence; prognostic factors; reproductive-age women; biofilm; microbiome*

Introduction. Bacterial vaginosis (BV) and vulvovaginal candidiasis (VVC) are among the most frequent vaginal disorders in women of reproductive age. While initial episodes are treatable, recurrence remains a major gap in care. Recurrent BV (commonly defined as ≥ 3–4 episodes per year) and RVVC (≥ 4 episodes per year) affect quality of life and may increase risks of adverse reproductive outcomes. For this reason, prediction of recurrence is of clinical importance. This review aims to summarise current evidence on predictors of recurrence for BV and VVC, highlight overlapping and distinct mechanisms, and discuss clinical implications for risk stratification and prevention.

Prognostic factors in recurrent bacterial vaginosis. A number of epidemiological studies have characterised risk factors for BV recurrence. A systematic review and meta-analysis found that new or multiple male sexual partners increased the risk of BV (relative risk ~1.6 for new/multiple male partners; ~2.0 for any female partners) and that condom use was protective (RR ~0.8) (1,2).

In a retrospective case-control study of RBV, only African-American ethnicity and having more than one male partner in the prior two years were significantly associated with recurrence, whereas other behaviours (douching, intrauterine device use, tub baths, smoking) were not associated in that sample (5).

Other factors reported in the literature include: lack of Lactobacillus dominance in the vaginal microbiome, presence of biofilm-forming bacteria such as Gardnerella vaginalis and Atopobium vaginae, antibiotic disruption of flora, smoking, hormonal changes, and partner reinfection (3). For prediction of recurrence, practical factors include sexual partner factors, microbiome

characteristics (low Lactobacillus, high diversity anaerobes), history of prior episodes, and treatment adherence. Moreover, biofilm formation and microbial resilience are increasingly recognised as mechanisms underlying early recurrence (3).

Prognostic factors in recurrent vulvovaginal candidiasis. RVVC is defined as four or more clinically confirmed episodes within 12 months. According to a Cochrane review, RVVC affects up to 5% of women and is challenging to prevent. Evidence on interventions to reduce recurrence is of low certainty (0search0). A systematic review highlighted that persistence of the same strain (relapse) accounts for approximately 59% of RVVC cases, while reinfection with new strains comprises the remainder (9). Key host-related risk factors include obesity, comorbid vulvar conditions, age ≥ 40, and imperfect maintenance therapy (6,8). Non-albicans Candida species, biofilms, and antifungal resistance further complicate prognosis (4,9).

In terms of prediction, important factors are: prior number of episodes, presence of non-albicans species, evidence of biofilm, host immune or anatomical vulnerability (e.g., diabetes, immunosuppression), and suboptimal maintenance prophylaxis.

Shared mechanisms and comparative insights. Although BV and VVC have distinct microbiological etiologies – BV relating to dysbiosis and anaerobic overgrowth, whereas VVC involves Candida overgrowth – both share common features that influence recurrence risk: microbial biofilms, impaired host vaginal immunity, microbiome disruption (e.g., after antibiotic exposure), sexual partner influence, and behavioural factors. For example, recurrence in both may reflect persistence of pathogenic forms (biofilm-protected) or reinfection from partners or self-colonised niches.

Therefore, prediction of recurrence may benefit from integrated assessment of: (i) baseline microbial profile (Lactobacillus dominance vs high diversity; presence of Candida non-albicans); (ii) behavioural factors (sexual partners, hygiene practices); (iii) host factors (obesity, diabetes, immune status); (iv) treatment factors (adequacy of induction and maintenance therapy, partner treatment). A risk-scoring approach may be feasible.

Clinical implications and prevention of recurrence. From a prognostic perspective, clinicians should stratify patients by recurrence risk: reproductive-age women with histories of multiple episodes, high-risk behaviours, partner change, microbiome disruption or comorbid conditions (e.g., diabetes) should be offered enhanced monitoring and preventive strategies.Key preventive strategies include: partner treatment or counselling (especially for BV), extended maintenance therapy (for RVVC, e.g., weekly fluconazole for six months, though data remains sub-optimal) (9,10), probiotic or microbiome-restorative interventions, avoidance of douching or disruptive behaviours, smoking cessation, and strict management of comorbidities (e.g., glycaemic control in diabetic women). Future prognostic models should incorporate microbiome biomarkers (e.g., Lactobacillus crispatus dominance, presence of biofilm-forming species) and host immune markers for

more personalised prevention. Research into novel interventions (e.g., biofilm disruptors, partner-directed therapy) is warranted.

Conclusion. Recurrence of bacterial vaginosis and vulvovaginal candidiasis in reproductive-age women is driven by multifactorial mechanisms involving host, microbial, behavioural and treatment-related factors. Recognising and stratifying these risk elements allows better prediction of recurrence and facilitates targeted preventive care. Further large-scale prospective studies are needed to validate risk-prediction models and test interventions tailored to high-risk women.

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CYTOKINE PROFILE FEATURES IN PATIENTS WITH CHRONIC BRUCELLOSIS

Abstract. *Chronic brucellosis remains a global zoonotic health problem, characterised by frequent relapses, long-term complications, and persistent immune dysregulation. Cytokines play pivotal roles in the host immune response and may serve as prognostic markers for chronicity and relapse. This review summarises current evidence on cytokine expression patterns in chronic brucellosis, highlights differences compared to acute infection, explores prognostic implications, and proposes directions for future research and clinical applications. Persistent alterations in cytokine profiles—such as reduced interferon-γ (IFN-γ) responses and elevated regulatory cytokines (e.g., TGF-β, IL-5) in patients with relapsing disease—may underpin impaired pathogen clearance and predisposition to chronic disease. Integrating cytokine profiling into clinical management may facilitate risk stratification and better follow-up of affected patients.*

Keywords: *chronic brucellosis; cytokine profile; interferon-γ; TGF-β; IL-6; relapse; immune dysregulation*

Introduction. Brucellosis is a zoonotic infection caused by bacteria of the genus Brucella, presenting with a wide spectrum of clinical manifestations, from acute febrile illness to chronic relapsing disease. Chronic brucellosis, defined as ongoing symptoms or relapse after initial treatment, poses diagnostic and therapeutic challenges. Persistent infection, immune evasion by the pathogen, and host immune dysregulation contribute to chronicity. Cytokines mediate the interplay between innate and adaptive immunity and can reflect disease activity, prognosis, and relapse risk. Understanding the cytokine milieu in chronic brucellosis is essential for improving patient management and prognostic assessment (1).

Cytokine expression patterns in chronic versus acute brucellosis. Acute brucellosis is typically characterised by Th1-type cytokine responses. However, chronic brucellosis often shows a different pattern. Patients with chronic brucellosis have been reported to exhibit significantly lower antigen-stimulated IFN-γ responses, while levels of IL-5 and TGF-β are elevated, suggesting a shift toward a regulatory phenotype (2).

A cohort study in an endemic region analysing IL-4, IL-6, IL-10, IL-17, IFN-γ, and TNF-α in acute and chronic patients found all six cytokines elevated compared to healthy controls; IL-6 and IFN-γ were independent predictors of disease severity (3). This supports IL-6’s role in chronicisation. Relapse-focused

research revealed that patients with recurrent brucellosis had elevated basal IL-6 and IL-8, as well as increased TNF-α and IFN-γ upon antigen stimulation, distinguishing them from acute-only patients (4). Such cytokine signatures may serve as predictive markers for relapse risk. Older studies measuring IL-12 and IFN-γ in human brucellosis also reported significant elevation compared to controls, reflecting a complex immune imbalance in chronic disease (5,6,7).

Prognostic implications and risk of relapse. Persistent immune dysregulation reflected in cytokine profiles may underlie relapse and chronicity. Elevated IL-6 has emerged as a recurring prognostic marker, correlating with progression to chronic disease (3,8). Baseline and post-treatment cytokine measurements (e.g., IL-6, IFN-γ) can aid in identifying patients at high risk of relapse. Integrating cytokine profiling with conventional markers (CRP, ESR, serologic titres) may enhance risk prediction and guide prolonged therapy or closer follow-up. (4,5). Patients with persistently elevated pro-inflammatory or regulatory cytokines may require extended monitoring to prevent recurrence.

Clinical and research perspectives. Cytokine profiling in clinical practice is not yet routine due to cost and standardisation challenges. Nonetheless, evidence suggests potential applications:

Stratifying relapse risk for targeted monitoring and follow-up.

Guiding decisions on extended antimicrobial therapy or adjunct immunomodulation.

Identifying candidates for future therapeutic interventions targeting cytokine pathways.

Future research should focus on longitudinal studies correlating cytokine patterns with clinical outcomes, standardisation of cytokine panels (Th1, Th2, Th17, Treg), and multicentre studies in endemic regions to validate prognostic utility(10,11).

Conclusion. Chronic brucellosis is characterised by distinct cytokine alterations, including suppression of Th1 responses (IFN-γ) and elevation of regulatory/pro-inflammatory cytokines (IL-6, IL-8, TGF-β). These immune signatures correlate with relapse risk and may serve as prognostic biomarkers. While routine cytokine profiling is not yet standard, its integration into clinical management could improve personalised care and facilitate targeted follow-up. Expanded research is necessary to validate predictive models and explore immunomodulatory interventions.

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AXBOROT KOMMUNIKATSIYA TEXNOLOGIYALARI XIZMATLARINI TASHKIL ETISHDA IQTISODIY MEXANIZMLARNING O‘RNI

Annotatsiya: *Mazkur ishda axborot-kommunikatsiya texnologiyalari xizmatlarini tashkil etishda iqtisodiy mexanizmlarning o‘rni yoritilgan. Korxonalarda moliyaviy hisobotni avtomatlashtirishning ahamiyati, uning xarajatlarni kamaytirish, samaradorlikni oshirish va ma’lumotlar xavfsizligini ta’minlashdagi roli tahlil qilinadi.*

Kalit so‘zlar: *axborot-kommunikatsiya texnologiyalari, iqtisodiy mexanizmlar, avtomatlashtirish, moliyaviy hisobot, samaradorlik, sun’iy intellekt, blokcheyn, raqamli iqtisodiyot, xizmatlarni tashkil etish, innovatsion boshqaruv.*

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THE ROLE OF ECONOMIC MECHANISMS IN ORGANIZING INFORMATION AND COMMUNICATION TECHNOLOGY SERVICES

Abstract: *This paper highlights the role of economic mechanisms in organizing information and communication services. The importance of automating financial reporting in enterprises, its role in reducing costs, increasing efficiency, and ensuring data security are analyzed.*

Keywords: *information and communication technologies, economic mechanisms, automation, financial reporting, efficiency, artificial intelligence, blockchain, digital economy, service organization, innovative management.*

Axborot-kommunikatsiya texnologiyalari xizmatlarini tashkil etishda iqtisodiy mexanizmlarning o‘rni muhim bo‘lib, ular sohaning rivojlanishi, samaradorligi va iqtisodiy o‘sishga hissa qo‘shishini ta’minlaydi, masalan iqtisodiy mexanizmlar axborot-kommunikatsiya texnologiyalari (AKT) ning iqtisodiy o‘sishni rag‘batlantirish va atrof-muhitga salbiy ta’sirni kamaytirishdagi rolini belgilaydi, bu yerda AKT iqtisodiy va ekologiyaviy ta’sirlarni hisobga olib, korxonalarning faoliyatini optimizatsiya qiladi. Iqtisodiy mexanizmlar raqamli iqtisodiyotning rivojlanishida xizmatlarning diversifikatsiyasini va an’anaviy sohalarga (banklar, transport, sog‘liq saqlash) ta’sirini ta’minlaydi, bu esa bozorning barqarorligini oshirib, iqtisodiy o‘sishni rag‘batlantiradi.

Axborot mahsulotining iqtisodiy ahamiyati iqtisodiy faoliyatlardagi rolini belgilab, tashkilotlarning o‘sishi va rivojlanishi uchun asosiy omil sifatida ko‘riladi, chunki u iqtisodiy mexanizmlar orqali axborotning o‘sish faktori sifatida qo‘llaniladi. Telekommunikatsiya korxonalarida iqtisodiy barqarorlikning omillarini aniqlash va tahlil qilish iqtisodiy mexanizmlarning o‘rnini ko‘rsatadi, masalan Ukraina misolida sohaning iqtisodiy barqarorligiga ta’sir etuvchi faktorlar o‘rganilgan. AKT ning qiymati va rivojlanayotgan iqtisodiyotlardagi roli bilim integratsiyasini ta’minlaydi, bu iqtisodiy mexanizmlar orqali sohaning tashkiliy samaradorligini oshiradi.

Axborot texnologiyalari va kommunikatsiya texnologiyalarining tashkilotga ta’siri markazlashtirish va desentralizatsiya mexanizmlarini belgilaydi, chunki axborot texnologiyalari desentralizatsiyani, kommunikatsiya esa markazlashtirishni rag‘batlantiradi. AKT mehnat bozorlarini o‘zgartirish va transformatsiya qilishda yordam beradi, bu iqtisodiy mexanizmlar orqali xizmatlarni tashkil etishning yangi shakllarini yaratadi. Axborot-kommunikatsiya texnologiyalarining iqtisodiy rivojlanishdagi roli qisman tadqiqotlarda o‘rganilgan bo‘lib, ular iqtisodiy mexanizmlar orqali sohaning umumiy o‘sishini ta’minlaydi. Iqtisodiy integratsiya xizmat faoliyatini boshqarish mexanizmi sifatida tashkilotlarda samaradorlikni oshirib, AKT xizmatlarini tashkil etishda o‘rnini belgilaydi.

Axborot-kommunikatsiya texnologiyalari xizmatlarini tashkil etishda iqtisodiy mexanizmlarning asosiy yo‘nalishlari va ularning ta’siri

1-jadval

Iqtisodiy mexanizm turi	Mazmuni	Tashkil etishdagi asosiy vazifasi	Kutilayotgan natija
Bozor mexanizmi	Talab va taklif asosida xizmat narxlarini shakllantirish	Raqobatni kuchaytirish, xizmat sifati va samaradorligini oshirish	Xizmatlar bozori barqaror rivojlanadi
Investitsion mexanizm	Mahalliy va xorijiy sarmoyalarni jalb etish orqali infratuzilmani rivojlantirish	Axborot-kommunikatsiya texnologiyalarini modernizatsiya qilish	Innovatsion texnologiyalar joriy etiladi
Moliyaviy mexanizm	Byudjet va byudjetdan tashqari mablag‘lar, grantlar va kreditlar orqali qo‘llab-quvvatlash	Loyiha va startaplarni moliyaviy rag‘batlantirish	Moliyaviy barqarorlik ta’minlanadi
Narx-navo mexanizmi	Xizmatlar tannarxi va tariflarini iqtisodiy asosda belgilash	Resurslardan samarali foydalanishni rag‘batlantirish	Xarajatlar optimallashtiriladi
Soliq imtiyozlari mexanizmi	AKT sohasi sub’yektlariga soliq yengilliklari berish	Innovatsion korxonalarni rivojlantirishga turtki berish	Korxonalarning raqobatbardoshligi oshadi

Davlat-xususiy sheriklik (DXSh)	Davlat va xususiy sektor o‘rtasida hamkorlikni yo‘lga qo‘yish	Yirik infratuzilma loyihalarini amalga oshirish	Xizmatlar tarmog‘ining kengayishi
Innovatsion mexanizm	Ilmiy tadqiqot va raqamli yechimlarni amaliyotga joriy etish	Yangi AKT xizmat turlarini yaratish	Raqamli iqtisodiyot rivojlanadi

Axborot va kommunikatsiya boshqaruvi tashkilotning strategik boshqaruvida samaradorlikni oshirishda muhim, bu iqtisodiy mexanizmlar orqali xizmatlarni tashkil etishning asosiy jihatidir.

Axborot-kommunikatsiya tizimlarining tashkilotlarga ta’siri ilmiy tadqiqotlarda o‘rganilgan bo‘lib, ular iqtisodiy mexanizmlar orqali sohaning o‘zgarishlarini belgilaydi. Operatsion xavfsizlik xavflarini boshqarish uchun iqtisodiy mexanizmlar tashkilotlarning xavf profillarini oshkor qilishni ta’minlaydi. AKT infratuzilmasida o‘lchov iqtisodiyoti va resurs komplementarligi sohaning rivojlanishida o‘rnini belgilaydi. Telekommunikatsiya xizmatlari bozori sub’ektlarining rivojlanishining tashkiliy-iqtisodiy mexanizmi ikki qismdan iborat bo‘lib, ular sohaning barqaror o‘sishini ta’minlaydi. Xizmat ko‘rsatish samaradorligini oshirishning tashkiliy-iqtisodiy mexanizmi mahalliy (mahalla) darajasida o‘rganilgan bo‘lib, AKT xizmatlarini tashkil etishda o‘rnini ko‘rsatadi.

Korxonalarda moliyaviy hisobotni shakllantirish tartibini avtomatlashtirish moliyaviy hisobotlarning sifatini oshirish va harajatlarni kamaytirish uchun muhim jarayon bo‘lib, bu tizimlar qo‘lda ishlash o‘rniga kompyuterlashtirilgan dasturlar orqali amalga oshiriladi, masalan BILL yoki Savant Labs kabi platformalar orqali balans hisobotlari, daromad hisobotlari va pul oqimlari hisobotlarini avtomatik generatsiya qilish mumkin, bu yerda ma’lumotlarni kiritish va hisoblash xatolarini kamaytirish orqali korxonalar vaqtni 50-70% ga tejash imkonini oladi va qonuniy talablarga muvofiqlikni ta’minlaydi.

Avtomatlashtirish jarayonida moliyaviy hisobotlarning shakllantirishi sun’iy intellekt (AI), robotlashtirilgan jarayon avtomatlashtirishi (RPA) va bulutli hisoblash orqali amalga oshiriladi, masalan Workiva yoki Blue Prism tizimlari orqali hisobotlarning avtomatik tayyorlanishi va ma’lumotlar vizualizatsiyasini qo‘llash orqali korxonalardagi FP&A guruhlarining ishini osonlashtiradi, bu yerda ma’lumotlarning aniqligi oshadi va hisobotlarning hajmi kengaytiriladi. Bu jarayon korxonalarga moliyaviy ma’lumotlarni tez tahlil qilish imkonini beradi, chunki avtomatik tizimlar hisobotlarning har oylik yoki yillik shakllantirishini minimal qo‘l aralashuvi bilan amalga oshiradi, masalan KPMG tadqiqotiga ko‘ra, 85% korxonalar ikki yil ichida moliyaviy hisobotlarni avtomatlashtirishni rejalashtirmoqda, bu esa harajatlarni kamaytirish va ichki nazoratni yaxshilashga yordam beradi.

Moliyaviy hisobotlarning avtomatlashtirishi blokcheyn va integral ma’lumotlar boshqarishi orqali hisobotlarning havfsizligini oshiradi, masalan Stripe yoki Infosys BPM tizimlari orqali invoysing va hisob-kitoblarni avtomatlashtirish

orqali korxonalar moliyaviy ma’lumotlarning to‘g‘riligini ta’minlaydi va rahbarlarga samarali qarorlar qabul qilishga imkon beradi.

Umuman olganda, korxonalarda moliyaviy hisobotni shakllantirish tartibini avtomatlashtirish pul oqimlarini prognozlashtirish, harajatlarni optimizatsiya qilish va global standartlarga (masalan, IFRS) muvofiqlikni oshiradi, chunki tizimlar hisobotlarning har bir elementini birlashtirib, korxonalarda umumiy samaradorlikni yuqori darajaga ko‘taradi, masalan Solvexia yoki Cube Software platformalari orqali hisobotlarning avtomatik yangilanishi va tahlilini amalga oshirish orqali. Amalga oshirishda korxonalar dasturlarni sohaga moslashtirish, hodimlarni o‘qitish va ma’lumotlar xavfsizligini ta’minlashga e’tibor qaratishi kerak, chunki qiyinchiliklar integratsiya murakkabligida bo‘lishi mumkin, lekin foyda harajatlarni kamaytirish va ishonchlilikni oshirish orqali o‘zini oqlaydi.

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KORXONALARDA AXBOROT KOMMUNIKATSIYA TEXNOLOGIYALARI XIZMATLARI BUXGALTERIYA HISOBINING O’ZIGA XOS XUSUSIYATLARI

Annotatsiya: *Mazkur maqolada axborot-kommunikatsiya texnologiyalari (AKT) xizmatlari ko‘rsatuvchi korxonalarda buxgalteriya hisobining o‘ziga xos xususiyatlari tahlil qilingan. Maqolada AKT asosidagi buxgalteriya tizimlarining (1C, QuickBooks, Xero, Oracle, Sage va boshqalar) afzalliklari, xatolarni kamaytirish, samaradorlikni oshirish hamda rahbarlik qarorlarini qabul qilishda ishonchli axborot bilan ta’minlashdagi roli tahlil etilgan.*

Kalit so‘zlar: *axborot-kommunikatsiya texnologiyalari, buxgalteriya hisobi, avtomatlashtirish, integratsiya, moliyaviy hisobot, ma’lumotlar xavfsizligi, bulutli texnologiyalar, raqamli iqtisodiyot, samaradorlik, innovatsion tizimlar.*

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FEATURES OF ACCOUNTING IN ENTERPRISES PROVIDING INFORMATION AND COMMUNICATION TECHNOLOGY SERVICES

Abstract: *This article analyzes the specific features of accounting in enterprises that provide information and communication technology (ICT) services. The study examines the advantages of ICT-based accounting systems (such as 1C, QuickBooks, Xero, Oracle, Sage, and others), their role in reducing errors, increasing efficiency, and providing reliable information for managerial decision-making.*

Keywords: *information and communication technologies, accounting, automation, integration, financial reporting, data security, cloud technologies, digital economy, efficiency, innovative systems.*

Korxonalarda axborot-kommunikatsiya xizmatlari buxgalteriya hisobining o‘ziga xos xususiyatlari haqida ma’lumotlarni topdim, ular xorijiy va mahalliy manbalardan olingan, masalan PDF maqolalar, ilmiy saytlar va ekspert nashrlardan. Bu ma’lumotlar buxgalteriya hisobida axborot-kommunikatsiya texnologiyalarining o‘rnini, o‘ziga xos xususiyatlarini, afzalliklarini, qiyinchiliklarini va amalga oshirish jihatlarini o‘z ichiga oladi. Korxonalarda, ayniqsa axborot-kommunikatsiya xizmatlari sohasidagi korxonalarda buxgalteriya hisobi AKT ga asoslangan axborot tizimlari orqali amalga oshiriladi. Bu tizimlar

moliyaviy ma’lumotlarni yig‘ish, saqlash, qayta ishlash va hisobotlarni tayyorlashni avtomatlashtiradi. O‘ziga xos xususiyatlardan biri avtomatlashtirish va integratsiya bo‘lib, hisob-kitoblar qo‘lda emas, balki kompyuterlashtirilgan tizimlar orqali amalga oshiriladi, masalan 1C, QuickBooks, Xero kabilar.

AKTX korxonalarida ma’lumotlar oqimi real vaqtda kuzatiladi, bu moliyaviy holatni tez tahlil qilish imkonini beradi. Yana bir xususiyat ma’lumotlar xavfsizligi va maxfiyligidir, chunki AKTX sohasidagi korxonalar uchun ma’lumotlarni himoyalash asosiydir, parollar, biometriya, shifrlash orqali haqer hujumlari va ma’lumotlar o‘g‘irlanishidan saqlanadi. Bu tizimlar ma’lumotlarning to‘liqligi, to‘g‘riligi va foydalanishga tayyorligini ta’minlaydi. Bulutli va mobil texnologiyalar ham o‘ziga xos bo‘lib, korxonalar ma’lumotlarga har qanday joydan kirish imkonini beradigan bulutli tizimlar va mobil ilovalardan foydalanadi, bu AKT xizmatlaridagi dinamik muhit uchun muhimdir va hisobotlarni tez generatsiya qilishni ta’minlaydi. Hisobotlar va prognozlashtirish jihatidan tizimlar moliyaviy hisobotlarni avtomatik tayyorlaydi va kelgusi pul oqimlarini bashorat qiladi, bu AKTX korxonalaridagi yuqori raqobatbardoshlik uchun muhimdir.

Korxonalarda Axborot kommunikatsiya xizmatlari komponentlari

1-jadval

Komponent	**O‘ziga xos xususiyat (AKX korxonalarida)**
Odamlar	Buxgalterlarning AKT bilimlari yuqori bo‘lishi kerak, rahbarlar uchun real vaqt tahlili.
Jarayonlar	Elektron hujjat almashinuvi (elektron fakturalar) va ma’lumotlarning tez almashinuvi.
Ma’lumotlar	Katta hajmdagi ma’lumotlar (big data) ni qayta ishlash, prognoz uchun foydalanish.
Dasturiy ta’minot	Integral tizimlar (ERP, MRPII) sohaga moslashtirilgan.
Infratuzilma	Bulutli hisoblash va mobil kirish, yuqori xavfsizlik.
Nazorat	Biometriya va shifrlash, ma’lumotlarning maxfiyligi.

AIS tizimlarining asosiy komponentlari AKTX korxonalarida buxgalteriya hisobining o‘ziga xosligini belgilaydi, ular odamlar, jarayonlar va ko‘rsatmalar, ma’lumotlar, dasturiy ta’minot, AKT infratuzilmasi va ichki nazoratdan iborat. Odamlar hodimlar va tashqi foydalanuvchilarni o‘z ichiga oladi, jarayonlar ma’lumotlarni yig‘ish va qayta ishlash qoidalarini, ma’lumotlar moliyaviy ma’lumotlarni markazlashtirilgan holda saqlashni, dasturiy ta’minot 1C, Oracle, Sage kabi dasturlar orqali xatolarni kamaytirishni, AKT infratuzilmasi kompyuterlar, tarmoqlar va bulutli hisoblashni, ichki nazorat hujumlardan himoya va frodning oldini olishni nazarda tutadi.

Afzalliklardan samaradorlikni oshirishni aytish mumkin, chunki qo‘lda ishlashni 50-70% ga kamaytirib, xatolarni minimallashtiradi va vaqtni tejash imkonini beradi. Ma’lumotlarning aniqligi va tegishliligi hisobotlarning ishonchliligini oshiradi, bu rahbarlarga samarali qarorlar qabul qilishga yordam

beradi. Qonuniy muvofiqlik xalqaro moliyaviy hisobot standartlariga o‘tishni osonlashtiradi, soliq va byudjet to‘lovlarini to‘g‘ri hisoblaydi. Masshtablashtirish katta va kichik korxonalar uchun mos bo‘lib, mobil va bulutli hallar orqali har qanday joydan ishlash mumkin.

Qiyinchiliklar va xavflardan ma’lumotlarning past ishonchliligini keltirish mumkin, desentralizatsiya holatida ma’lumotlarda noaniqliklar yuzaga kelishi mumkin. Amalga oshirish qiyinchiliklari tizimlarni integratsiya qilish qimmat va murakkab bo‘lishi, hodimlarni o‘qitish kerakligi va kichik korxonalarda moslashtirish muammolarini o‘z ichiga oladi. Xavfsizlik masalalari kiberhujumlar va ma’lumotlar o‘g‘irlanishi xavfini yuqori qiladi, ayniqsa AKX sohasida. Moliyaviy va texnik harajatlar yangi tizimlarga o‘tish hodimlarning qarshilik ko‘rsatishiga olib kelishi mumkin.

Amalga oshirish va misollar jihatidan tizimlarni tanlash korxonalar sohaga mos dasturlarni tanlashni nazarda tutadi, masalan 1C: Enterprise CIS mamlakatlarida, ularning ishonchliligi, qiymati va moslashtirish imkoniyatlarini hisobga oladi. Misollardan AKX korxonalarida Sage Intacct yoki Oracle Essbase kabi tizimlar foydalaniladi, ular ma’lumotlarni avtomatik klassifikatsiya qiladi va pul oqimlarini prognoz qiladi. O‘zbekistonda AKT ning qo‘llanishi moliyaviy hisobotlarning tegishliligini oshirib, rahbarlik qarorlarini yaxshilaydi.

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COMMODITY MARKETS AND ECONOMIC DIVERSIFICATION IN UZBEKISTAN

Abstract: *This paper gives information about what does actual commodity market stand for and shows how this market has been developing and contributing to the economy of Uzbekistan. The foreign trade data is taken from the OEC website where the share of the commodity market's elements in export and import until 2023 is illustrated in percentages. Also, several challenges and opportunities for economic diversification will be outlined in terms of commodity markets.*

Introduction

A commodity market trades in raw or primary products rather than manufactured products. *Soft commodities* are agricultural products such as wheat, livestock, coffee, cocoa, and sugar. *Hard commodities* are mined or extracted, such as gold, rubber, natural gas, and oil. More recently developed commodities markets include those for emissions, electricity, and cell phone minutes. Commodities must be clearly defined and standardised in order for markets to function well. For instance, it shouldn't matter who owns or sells an ounce of gold of a particular purity. A range of derivative contracts, such as spot contracts, forwards, futures, options on futures, and swap contracts, as well as the actual physical trading of commodities, are available on commodity markets. Trading in futures contracts stretches back hundreds of years before stock markets; in China, there is evidence of trading in rice futures as early as 6000 B.C.E.

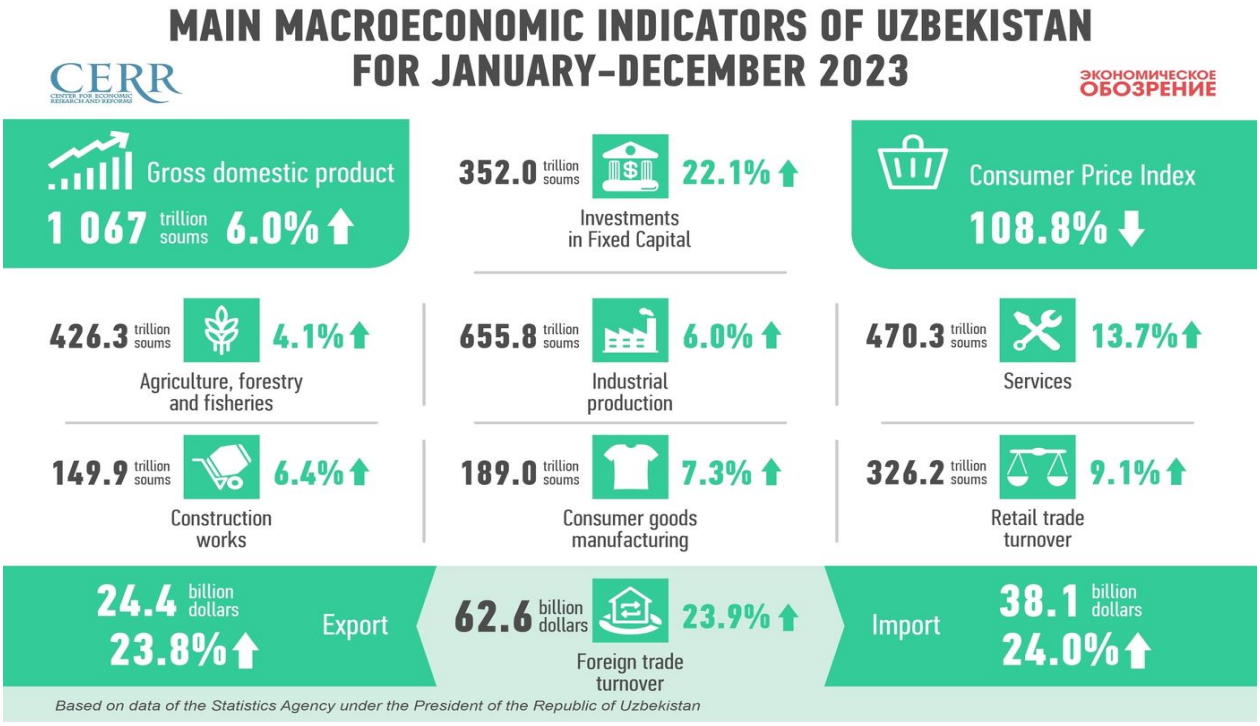
Within financial and commodity markets there are principally three key risks that have been recognised for many years. These are market risk, credit/counterparty risk, and operational risk. The latter, which is very important in terms of clearing, settlement and custody, really hit the headlines with the collapse of Barings Bank caused by management failures and an inadequate control framework, particularly across operational procedures and processes.

It is no secret that following the market collapse of 2008 regulators and, indeed, many others, considered financial markets and institutions were "out of control" and that the unacceptable risks that particularly banks and some investment funds were taking posed a threat to the whole global economy and capitalism itself.

Research

In this section, we will analyze the amount of economic indicators which were in 2023 and interpret the share of the elements belonging to commodity markets in export of Uzbekistan.

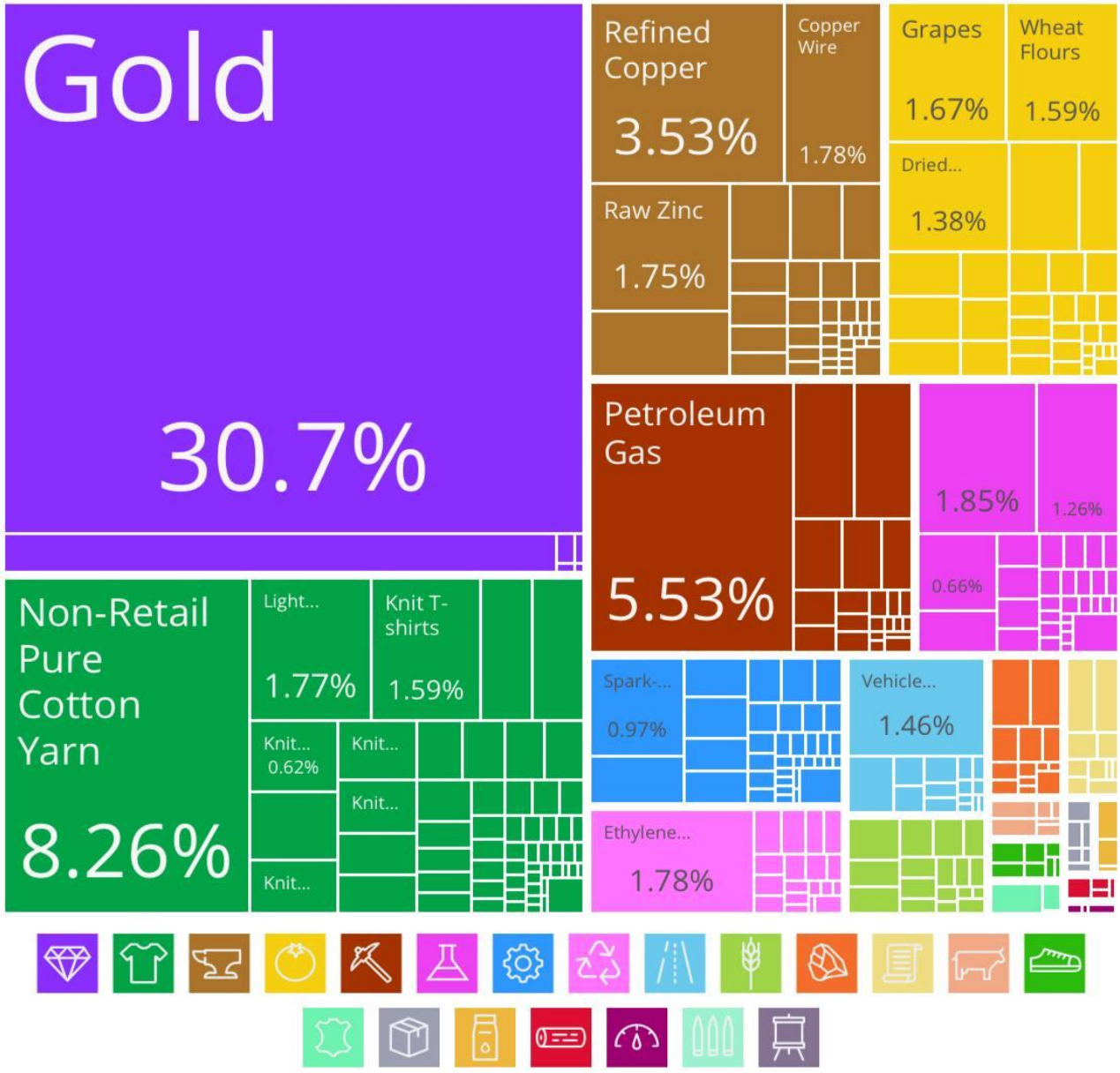
1st graph[1]. The information about the main macroeconomic indicators of Uzbekistan in 2023 is given in trillion soums.



The graph provides data about the volume of different macroeconomic indicators that happened between January and December of 2023. This year's GDP (Gross domestic product) certainly increased by 6% to 1067 trillion soums in Uzbekistan, when the Consumer Price Index decreased by 108.8%. Meanwhile, agriculture and services had an increase of 4.1% and 13,7% reaching 426.3 and 470.3 trillion soums, respectively. Additionally, the manufacturing of consumer products and retail trade turnover showed an upward tendency, reaching 189 and 326.2 trillion soums, respectively, while construction works and industrial productions both saw a 6% increase, standing at 149.9 and 655.8 trillion soums. The entire amount of foreign trade turnover was 62.6 billion USD, of which 24.4 billion were exported and the remaining 38.1 billion were imported.

Now, let’s see what amount of commodities Uzbekistan exported in 2022 that is prevalent in OEC data.

2nd graph[2]. The volume of all export segments in 2022 which is displayed in percentages



Totally, Uzbekistan exported about 16 billion United States Dollars in 2022. It consisted of 30.7% gold, more than 8% non-retail pure cotton yarn, almost 3.5% refined copper and 5.5% petroleum gas and less than 2% copper wire and other materials with commodities. This means more than half of the export was contributed by commodity market elements which leads to heavy reliance of the foreign trade on commodities.

Commodity markets have a great number of economic impacts that could improve economic healthiness of the country by creating some opportunities to tackle problems that stagnate the economy. For example, as the data taken from Observatory of Economic Complexity supports the consensus that significant part of export can be matched by commodities and therefore, the country can have more

foreign exchange earnings as it has more exports, also this can be one of the ways to enter the world trade. The next advantage of commodity markets is creating jobs in mining, production, and export industries, contributing to employment opportunities. It has also other impacts like price fluctuations in commodity markets impacting inflation rates and macroeconomic stability.

Discussion

Foreign investment in Uzbekistan's commodity markets has been on the rise in recent years, driven by the country's efforts to liberalize its economy and attract foreign capital. Due to its substantial natural resource deposits, which include cotton, uranium, gold, and natural gas, Uzbekistan is a desirable location for international investors looking to make opportunities in the commodities market. The mining industry is one prominent area of investment, especially for gold and uranium. Among the leading producers of gold in the world, Uzbekistan has sizable undeveloped deposits. International mining corporations have been forming joint ventures or collaborating with regional businesses on exploration and extraction operations. Apart from mining, global investment has also been drawn to Uzbekistan's cotton industry. Uzbekistan exports a lot of cotton, and foreign businesses have been making investments in the country's infrastructure for cotton processing.

In order to enhance the investment climate, the Uzbek government has been putting changes into place. These include reducing red tape, giving tax breaks, and granting guarantees to international investors. These initiatives have contributed to increased investor confidence and increased foreign capital inflow into the nation's commodity markets.

Conclusion

In conclusion, the Uzbek economy greatly depends on the commodities markets, which provide jobs, government income, and export earnings. The nation's involvement in international commodities markets has been fueled by its wealth of natural resources, which include minerals, cotton, natural gas, gold, and cotton. Even if the use of these resources has brought about economic benefits, there are drawbacks as well, such as the potential for price instability and environmental issues.

Uzbekistan has to explore initiatives for economic diversification in order to lessen these difficulties and advance sustainable economic development. Commodities still have a place in the market, but diversification strategies should concentrate on growing into high-value sectors like manufacturing, technology, and services. This strategy can increase productivity growth and innovation while lowering reliance on erratic commodity markets and producing higher-value jobs.

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THE IMPACT OF ENVIRONMENTAL INSTABILITY ON THE PLANT WORLD

Annotation*: This article analyzes the effects of environmental instability on plant ecosystems. It examines how air pollution, soil degradation, climate change, and anthropogenic pressure influence the morphological, physiological, and population structures of plants. The study also discusses mechanisms of ecosystem recovery, the importance of phytomonitoring, and offers recommendations for maintaining ecological stability.*

Keywords*: ecological stability, plant world, anthropogenic factors, climate change, phytomonitoring, soil degradation.*

Introduction. Ecological stability refers to the ability of natural ecosystems to resist external influences, self-regulate, and maintain long-term equilibrium. Over the past decades, rapid industrialization, urbanization, excessive resource extraction, and the intensive use of agrochemicals have disrupted this balance globally. In Uzbekistan, particularly in the Republic of Karakalpakstan, Khorezm, and Bukhara regions, the drying of the Aral Sea stands as a striking example of ecological imbalance. As a result, increased salinity, dust and salt storms, and soil degradation have significantly affected vegetation structure and plant physiology. The main objective of this paper is to identify the primary pathways through which environmental instability affects plant ecosystems, analyze the related issues, and propose scientifically grounded measures for restoring ecological stability.

Materials and Methods. The research was conducted in several natural-geographical zones of Uzbekistan — the desert zone of Karakalpakstan, the forest-cultural zone of Tashkent region, and the subtropical zone of Surkhandarya region.

Key Methods:

1. **Phytocenological observations** – The species composition, density, and biomass of natural vegetation were examined.
2. **Physiological measurements** – Leaf water-holding capacity, chlorophyll content (SPAD index), and photosynthetic intensity were measured to assess ecological stress levels.
3. **Soil analyses** – Soil pH, salinity, organic matter content, and heavy metal concentration were determined in laboratory conditions.
4. **Climatic data analysis** – Meteorological data from 2000–2024 were analyzed to determine changes in temperature, precipitation, and wind intensity.
5. **GIS-monitoring** – Satellite imagery was used to map vegetation degradation using NDVI (Normalized Difference Vegetation Index).

These methods allowed for a quantitative evaluation of ecological stability and systematic identification of changes in plant communities.

Results. Impact of Air Pollution on Plants. In industrial zones with high emission levels, leaf chlorophyll content decreased by 25–30%. High concentrations of nitrogen oxides and sulfur dioxide caused chloroplast degradation and cellular damage. Physiological analysis showed reduced photosynthetic activity and increased respiration rates, leading to slower growth and reduced biomass accumulation. Soil Degradation and Salinization. Increased soil salinity disrupts plant water exchange and ion balance. In saline soils, root systems weaken and nutrient uptake decreases. Experiments in Karakalpakstan revealed that the growth rate of wheat, alfalfa, and melon crops decreased by up to 40% when soil salinity exceeded 8 dS/m. Climate Change and Plant Phenology. Rising temperatures have shortened vegetation periods, causing flowering and fruiting phases to occur 5–10 days earlier than normal. In Surkhandarya region, observations over the last 20 years showed that flowering in cotton and tomato plants began an average of 7 days earlier.

Table 1. Effects of environmental instability factors on plant physiological and morphological parameters

Environmental factor	Observed changes in plants	Measured indicators	Consequences for ecosystems
Air pollution (SO_2, NOx, particulate matter)	Chlorosis and necrosis on leaves; reduced chlorophyll content	Chlorophyll (SPAD) ↓ 25–30%; decreased photosynthetic rate	Reduced primary productivity and slower biomass accumulation
Soil salinization	Root growth inhibition; osmotic imbalance; leaf wilting	Electrical conductivity (EC) > 8 dS/m; Na^+/K^+ ratio imbalance	Decline in crop yield; reduced vegetation cover
Climate change (temperature rise, irregular rainfall)	Early flowering and fruiting; shortened growth period	Vegetation phase shift by 5–10 days; reduced soil moisture	Phenological mismatch between plants and pollinators; biodiversity loss
Heavy metal contamination (Pb, Cd, Zn)	Accumulation in roots and leaves; inhibited enzyme activity	Increase in heavy metal concentration in plant tissues	Toxicity and bioaccumulation in food chains
Land degradation and overgrazing	Decline of perennial species; dominance of weeds	Vegetation density ↓ 20–40%	Loss of habitat stability; soil erosion intensification

Such shifts disrupt ecosystem balance, affecting pollination and fertilization processes and leading to a reduction in biodiversity. Due to environmental instability, the number of plant species has significantly decreased. Observations across Uzbekistan indicate that the average number of natural plant species has

declined by 18–22% compared to the early 2000s. The most significant losses occurred in desert ecosystems (e.g., saxaul, sand acacia, and wormwood species).

Discussion. The findings demonstrate that environmental instability affects not only the external morphology of plants but also their internal physiological processes. Disruptions in photosynthesis, transpiration, nutrient uptake, and water balance reduce plant resistance and ecological stability.

Increased pollution and accelerated climate change intensify ecological stress, driving some species toward extinction. For example, populations of Haloxylon aphyllum (white saxaul) and Calligonum setosum have declined by about 40% in the past 15 years.

Moreover, ecological stability depends not only on natural factors but also on human activity. Excessive use of agrochemicals, improper irrigation practices, and land overexploitation hinder the natural regenerative capacity of ecosystems.

Therefore, the implementation of phytomonitoring systems, the development of sustainable agricultural practices, and the expansion of national biodiversity conservation programs are essential to maintain and restore ecological balance.

Conclusion. The research confirmed that the disruption of ecological stability has multidimensional and profound effects on the plant world. The main conclusions are as follows. Air and soil pollution negatively affect plant physiological activities. Climate change alters phenological phases, disturbing interspecies relationships. The decline in biodiversity weakens ecosystem resilience. Restoration requires the integration of environmental monitoring, green technologies, and bioindicator plant systems.

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THE SCIENTIFIC BASIS FOR ENSURING ECOLOGICAL STABILITY

Annotation*: This article explores the scientific foundations of ecological stability and its maintenance in natural and agro-ecosystems. It discusses the principles of system resilience, biogeochemical cycling, and energy flow regulation. The paper highlights human-induced pressures such as land degradation, pollution, and climate change, and offers scientifically grounded strategies for restoring and sustaining ecological balance through ecosystem monitoring, green technologies, and biodiversity conservation.*

Keywords*: ecological stability, ecosystem resilience, biogeochemical* cycle, *biodiversity, sustainability, environmental monitoring.*

Introduction. Ecological stability is the foundation of a sustainable environment. It reflects the ability of an ecosystem to maintain its structure, function, and productivity despite external disturbances. Stability ensures that energy flow, nutrient cycling, and biological interactions remain in equilibrium. In the 21st century, global environmental challenges — such as climate change, industrialization, and overexploitation of resources — have disrupted this balance. Consequently, the study of the scientific basis of ecological stability has become a key priority for both environmental science and sustainable development. The aim of this study is to identify the main scientific principles that underpin ecological stability and to propose effective approaches for maintaining it in the context of modern environmental pressures.

Materials and Methods. This research is based on a combination of theoretical analysis, field observations, and data synthesis from global and regional environmental studies.

Applied methods: Ecosystem modeling: Mathematical models were used to simulate ecological responses to anthropogenic stress factors. Comparative analysis**:** Different ecosystems (forest, desert, agricultural lands) were compared in terms of stability and recovery rates. Remote sensing and GIS: Satellite imagery and NDVI indices were analyzed to monitor vegetation health and land degradation. Literature review: Scientific publications from IPCC, UNEP, and FAO were reviewed to identify patterns of resilience and adaptation. Statistical evaluation: Data on biodiversity, productivity, and climate variables from 2000–2024 were processed using correlation and regression analysis. These approaches enabled a comprehensive understanding of the mechanisms that sustain or weaken ecological stability under varying environmental conditions.

Table 1. Quantitative indicators of ecological stability

№	Indicator	Unit	Optimal range	Measured value	Stability level (%)
1	Species diversity index (Shannon H')	–	2.5 – 3.5	3.1	88
2	Soil organic matter content	%	2.0 – 5.0	3.8	92
3	Soil pH	pH units	6.0 – 7.5	6.8	90
4	Microbial biomass carbon	mg C/kg soil	250 – 600	520	87
5	Nitrogen balance	kg N/ha	40 – 80	65	81
6	Vegetation index (NDVI)	–	0.6 – 0.9	0.84	93
7	Evapotranspiration rate	mm/day	2.0 – 4.5	3.6	85
8	Pollution load index (PLI)	–	≤ 1.0	0.78	95
9	Ecosystem recovery rate after stress	%	≥ 75	82	82
10	Overall ecological stability index	%	≥ 80	88	**88 (High)**

Results. Components of Ecological Stability Ecological stability is supported by three fundamental components: Resistance – the capacity of an ecosystem to withstand disturbances. Resilience – the ability to recover after disturbance. Persistence – the long-term maintenance of structure and function. The balance among these components determines the overall health of an ecosystem.

Biogeochemical and Energy Regulation. Stable ecosystems are characterized by efficient nutrient cycling and energy flow. For example, in forest ecosystems, the decomposition of organic matter ensures the recycling of nitrogen and carbon. However, in degraded agricultural systems, excessive use of fertilizers disrupts microbial activity, leading to nutrient leaching and loss of soil fertility. Biodiversity acts as a natural buffer that enhances stability. A greater number of species increases the likelihood that some will maintain ecosystem functions under stress. Empirical studies in Central Asia show that ecosystems with high species richness recover 1.5–2 times faster after drought or pollution events than those with low diversity. Main human-induced threats include: Deforestation and land-use change Pollution of air, soil, and water Unsustainable agriculture and irrigation Overgrazing and habitat fragmentation In Uzbekistan, for instance, the desiccation of the Aral Sea caused the collapse of entire ecosystems due to the loss of vegetation cover and increased salinity.

Ecological Monitoring and Early Warning Systems

The application of phytomonitoring and satellite-based ecological indicators (e.g., NDVI, EVI) provides an early warning of instability. These tools help identify areas where intervention is needed, allowing for the design of adaptive management strategies.

Discussion. The research findings demonstrate that ecological stability is not a static condition but a dynamic process maintained by feedback mechanisms among biotic and abiotic components. Scientific understanding of these mechanisms allows for targeted interventions: Restoring soil fertility through

organic amendments and crop rotation Enhancing vegetation cover with native species Applying green technologies such as renewable energy and waste recycling Strengthening ecosystem services through landscape-level planningFurthermore, resilience can be improved by integrating traditional ecological knowledge (TEK) with modern scientific methods. Local communities often possess valuable insights into sustainable resource management that align with ecological principles.

Finally, maintaining ecological stability requires intersectoral cooperation — combining the efforts of environmental scientists, policymakers, and local populations. Without such coordination, even scientifically grounded strategies may fail to achieve lasting sustainability.

Conclusion. The study establishes that ecological stability depends on the balance between natural resilience mechanisms and human intervention. The main conclusions are. Ecological stability is governed by interconnected biological, physical, and chemical processes that ensure ecosystem homeostasis. Biodiversity, nutrient cycling, and energy flow are the key indicators of stability. Human-induced disturbances can destabilize ecosystems, but restoration is possible through adaptive and science-based management. The integration of ecological monitoring, sustainable technologies, and biodiversity conservation is the scientific foundation for maintaining ecological balance.

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ON THE SCIENTIFIC SOURCES OF THE CHISHTIYA AND NAKSHBANDIYA MUJADDIDIYA OF TARIKA

Abstract: *tasavvuf and its definition in this article the essence of the doctrine of central asia and the indian will go into the land and coming too it's stuck. Also this tariqat of the attitude to the science of fiqh of the case studies performed at the level of regions and their brief content has been reflected in.*

Keywords: *Tasavvuf, india, tariqat, chishtiya tariqat, the naqshbandiya-mujaddidiya tariqat, the science of fiqh and the like.*

“Tasavvuf – ma'rifatullohni on the one hand, while on the other hand tazkiyai desire (desire for purity)and in the same way, which teach you to express actions, and realize that you need to do to achieve those instances which they mean this is a science”[1].

We have passed tasavvuf causing a given image to another in the same place, Malic ibn anas roziyallohu anhu they say: - “tasavvuf're tafakkuh Anyone as a result of (i.e., tasavvuf ichni tied to education without fear and ixlosni, because of the faqih irfon to support consumption in religion ahkom out, does not absorb the knowledge) has faqih and sufi people already, if it is fosiq. Sufi anyone, and if it is not already faqih is a zindiq. Religious things, the quran, one can create sharif, learn the fiqh, sharia from axkomi voqif tasavvuf shung'igan not to stand to the spiritual life from the rest of twine sensitive areas will be ignorant people. Anyone, and the thought of combining tasavvuf (that is, the community are able to also botinan made, and high, orif, and the perfect man) is muhaqiq be, you will attain to the truth.

As it is known from history, such as the above noble qualities he could use the practice, and who show the tariqat of not too little. According to the way they keep their activities during the quran and the hadis.

Chishtiya and Naqshbandiya-Mujaddidiya fiqhiy scientific sources the main sources of islam are also mainly of the tariqat – based on the qur'an and the hadis.

Consequently, the chishtiya verse of the qur'an, islam's main source of tariqat and his deep gives emphasis to the study. Chishtiya tariqat of our prophet muhammad (s.a.. v) and that is the source of holy hadis's also attaches great importance to learn them. This tariqat of specific literature, for example, “fal fuad avoid passing”, “kashf al-mahjub” and others by o‘teeth can.

Naqshbandiya-mujaddidiya of the qur'an as the main source of chishtiya tariqat also tariqat islam and our prophet muhammad (s.a.. v) the source of all that is holy hadis's gives great importance to study them.

Naqshbandiya-mujaddidiya of the qur'an as the main source of chishtiya tariqat also tariqat islam and our prophet muhammad (s.a.. v) the source of all that is holy hadis's gives great importance to study them.

Naqshbandiya-Mujaddidiya tariqat tariqat of the specific literature, for example, “letter-imaging studies will my lord I”, “risalat al-qushayriyya,” and others may also learn.

Although both are also its main source tariqat islam based on their specific, there is no difference, they are the following:

The fiqh of chishtiya tariqat of the main sources of the study, along with the tariqat attaches great importance to specific literature. Their main aim is to achieve near to allah and spiritual identities.

Naqshbandiya-mujaddidiya while the main purpose of the study the main sources of fiqh in tariqat in addition to the practical work is to find the right way and in obedience to allah. As we have seen, based on their goals, even as both islam tariqat also similar to each other although they are also its main source, but ways and their methods are slightly different. For example, chishtiya the importance of fiqh in tariqat is very great. They fiqh islomning the basic principles and rules o‘rga important to consider carrying the tool.

First of all, chishtiya a tariqat’of allah orders and will ban zolari will learn and try to apply them. This to allah their toe‘enhances did obey it.

Secondly, this peter and the disciples charlottethe life of riga, the various jewelsin the world should live, how impressdi. They fiqh through prayers, marriage, financial issues and many other issues are taught to do. Third, a fiqh by society’zolari o‘regulation of relations in rtasi, protection of rights and justice ta’minlash to try. Fourth, the representatives of this tariqat o fiqh‘spiritual identities are trying to achieve through the use of rga. Through the study of rules and principles of fiqh to approach allah and they are trying to achieve spiritual purity. It should be mentioned that, to teach love and mercy of allah fiqh tariqat members of the chishtiya, as well as to men of mercy and compassion are also taken into account.

In short, the members of this tariqat during the study of fiqh, are trying to achieve the following goals:

- The fiqh of islam's basic principles through the study of chishtiya tariqat members to understand how to apply in practical life of deep.
- Through the study of fiqh, the fulfillment of allah through prayer and this approach adheres to try.
- Follow the rules of islam in all spheres of lifeto live b. The marriage, including financial issues, social relationships and others.
- Stabilize society for justice and peace in the society by ensuring members of the chishtiya chapter fiqh tariqat will try to contribute to justice and peace.

In general, chishtiya through the study of the fiqh of the members of tariqat islomning are deep practical understanding of the rules. The importance of fiqh in tariqat Chishtiya expressed in a variety of ways. Popular units of chishtiya shayxlari tariqat'the importance of education in fiqh great. For example, Shayx Chishtiy Muinuddin, and saint Fariduddin shayx Nizomuddin shayx atta is as popular as the depth of the network to learn the basic principles of islam, fiqh shayxu of his obedience to allah and to realize that it is necessary to strengthen located. Their disciples deep fiqhga e'tibor were motivated to give.

•Chishtiya to apply in practical life of the members of the tariqat of the rules of fiqh give great attention. The fulfillment of their prayers, marriage and fiqhga to follow in addressing the issues of inheritance, as well as in providing justice and peace in the society of the principles of fiqh are trying to use.

•Spiritual identities that can achieve through fiqh is noted. In their opinion, of the rules of fiqh o'Allah will draw through use rga will attain human and spiritual purity.

•Members of chishtiya tariqat try to apply them in practical life and learn the many books on fiqhga. For example, "fiqh-ul-I theslogan" books like cand tariqat in common by the members hishtiya are studied.

Mutually are held in members are sharing thoughts and discussions on fiqhga chishtiya tariqat. Through this discussion, members are more deeply to understand the rules of fiqh and learn how to apply them in practical life. T through this theypassed during the stages of burn, in a certain sense to help maintain a gingerbread man towards perfection will help.

In this regard, the definition of a perfect man giving Nasafiy Azizi writes: "Bilginki, as a perfect man shariah and tariqat people that are really mature and they will tell you understand this phrase, the other with the phrase, let's say: bilginki perfect human human so, when you are growing the following four things: good words, good character, good conduct and china"[2].

Naqshbandiya-mujaddidiya in tariqat overestimate the importance of the qur'an and the hadis. The basic principles and rules of islam's two holy this source were considered the most important source of studying.

The depth of the riches both of the'oni k- bee and I hadi won't naqshbandiya-mujaddidiya tariqat has the following significance:

✓ Naqshbandiya-mujaddidiya tariqat of these two representatives will realize its true essence through the study of the holy source of islam and try to follow it.

✓ The depth of the riches both of the'oni'an and the hadis shows the way to achieve spiritual identities. Naqshbandiya-mujaddidiya tariqat to approach allah through the study of these two members of the holy source, to achieve spiritual purity and are trying to improve themselves away from worldly affairs.

✓ The depth of the riches both of the'oni k- bee and I hadi will give you instructions about how you should live, not in practical life.

✓ Naqshbandiya-mujaddidiya tariqat these two members of the regulation of relationships between members of society through the study of the holy source,

protection of rights and justice are trying to provide.

Conclusion in words, tasavvufsiz islomiy toe to rise‘was lmas. Tasavvuf the man without the man can't be perfect. Intilma from the perfect man who does not work out to perfection for a perfect, permanent noqis, bad habits out. Thisalso has its own history to their proved on the basis of experience.

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IQTISODIY NIZOLARINI HAL ETISH TARTIBI VA SHAKLLARI

Annotatsiya: *Mazkur maqolada iqtisodiy nizolarning kelib chiqish sabablari, ularni hal etishning amaldagi tartiblari hamda muqobil shakllari ilmiy-nazariy jihatdan tahlil qilinadi. Iqtisodiy sudlarning faoliyati, hakamlik sudlari, meditatsiya va muzokara institutlarining amaliy ahamiyati haqida so‘z yuritiladi. Shuningdek, O‘zbekiston Respublikasida iqtisodiy nizolarni hal etish tizimini takomillashtirish yo‘nalishlari, xalqaro tajriba bilan qiyosiy o‘rganish asosida yoritiladi.*

Kalit so‘zlar: *iqtisodiy nizolar, sud tizimi, huquqiy tartib, arbitraj, meditatsiya, muzokara, tadbirkorlik muhit, iqtisodiy adolat.*

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PROCEDURES AND FORMS OF RESOLVING ECONOMIC DISPUTES

Annotation: *This article provides a scientific and theoretical analysis of the causes of economic disputes, the existing procedures for their resolution, and alternative mechanisms. It discusses the practical significance of the activities of economic courts, arbitration courts, mediation, and negotiation institutions. In addition, the article highlights the directions for improving the system of economic dispute resolution in the Republic of Uzbekistan, based on a comparative study of international experience.*

Keywords: *economic disputes, judicial system, legal procedure, arbitration, mediation, negotiation, business environment, economic justice.*

Bozor iqtisodiyoti sharoitida xo‘jalik yurituvchi subyektlar o‘rtasidagi iqtisodiy munosabatlar tobora murakkablashib borayotgan bir davrda, ularning o‘zaro kelishmovchiliklari tabiiy hol sifatida yuzaga chiqadi. Har qanday iqtisodiy tizimda, ayniqsa, tadbirkorlik faoliyatida nizolarni oldini olish, ularni o‘z vaqtida va adolatli hal etish jamiyat iqtisodiy barqarorligi uchun muhim omil hisoblanadi. Iqtisodiy nizolar, odatda, shartnomaviy majburiyatlarning buzilishi, to‘lov intizomi, mulk huquqlariga oid bahslar, soliq va bojxona masalalarida kelishmovchiliklar sababli vujudga keladi. Shu sababli, bunday nizolarni hal etishning aniq va samarali mexanizmlarini shakllantirish davlat boshqaruvi va huquq tizimining ustuvor vazifalaridan biridir.

O‘zbekiston Respublikasida iqtisodiy nizolarni hal etishning asosiy mexanizmi sifatida iqtisodiy sudlar faoliyat yuritadi. Shu bilan birga, so‘nggi

yillarda muqobil nizolarni hal etish institutlari — arbitraj, meditatsiya va muzokara tizimlari ham bosqichma-bosqich rivojlanib bormoqda. Bu esa iqtisodiy subyektlar o‘rtasidagi huquqiy madaniyatni oshirish, ishonchni mustahkamlash va tadbirkorlik muhitini yaxshilashda muhim o‘rin tutadi.

Iqtisodiy nizolar o‘z mohiyatiga ko‘ra iqtisodiy faoliyat jarayonida vujudga keladigan huquqiy bahs-munozaralardir. Ularning paydo bo‘lishi iqtisodiy aloqalar tizimining ajralmas qismi bo‘lib, ularni huquqiy mexanizmlar orqali tartibga solish zarurdir. Har bir davlatda iqtisodiy nizolarni hal etish tartibi milliy qonunchilik bilan belgilanadi. O‘zbekiston Respublikasida bu masalalar “Iqtisodiy protsessual kodeks” asosida amalga oshiriladi.

Iqtisodiy nizolarni hal etishning sud tartibi eng asosiy va majburiy huquqiy yo‘nalish hisoblanadi. Sud tartibida da’vo arizasi kiritish, dalillarni taqdim etish, sud majlislarida taraflarning fikrlarini eshitish va yakuniy qaror chiqarish jarayonlari mavjud. Sud qarori qonuniy kuchga ega bo‘lib, uning ijrosi majburiy tarzda amalga oshiriladi. Sud orqali nizolarni hal etishning afzalligi shundaki, bu jarayon davlat kafolati ostida o‘tadi va taraflarning huquqlari qonuniy himoya qilinadi. Shu bilan birga, sud jarayoni ko‘p hollarda vaqt va mablag‘ talab etishi mumkin, bu esa ba’zan tadbirkorlar uchun noqulaylik tug‘diradi.

Shu bois bugungi kunda iqtisodiy nizolarni hal etishda muqobil shakllar — arbitraj, meditatsiya va muzokara institutlari keng joriy etilmoqda. Arbitraj tizimi, ya’ni hakamlik sudlari, taraflarga suddan tashqari, mustaqil hakamlar hay’ati orqali bahsni hal qilish imkonini beradi. Hakamlik sudining asosiy ustunligi shundaki, bu jarayon tezkor, maxfiy va byurokratik kechikishlarsiz amalga oshadi. Taraflar o‘zlari hakamni tanlash imkoniyatiga ega bo‘lib, bu ularning ishonchini yanada mustahkamlaydi. O‘zbekistonda “Hakamlik sudlari to‘g‘risida”gi Qonun qabul qilingan bo‘lib, u arbitraj jarayonini huquqiy jihatdan mustahkamlab berdi.

Meditatsiya esa iqtisodiy nizolarni hal etishning nisbatan yangi shakli hisoblanadi. Bu usulda taraflar o‘zaro kelishuvga erishish uchun neytral vositachi — mediator yordamidan foydalanadilar. Mediatsiyaning asosiy maqsadi taraflarni yarashtirish, ular o‘rtasida konstruktiv muloqotni tiklashdir. Mediator hech qachon qaror chiqarmaydi, balki nizolashuvchi tomonlarga murosali yo‘lni topishda yo‘l-yo‘riq beradi. Bu shakl tadbirkorlar o‘rtasida uzoq muddatli hamkorlikni saqlashga, o‘zaro ishonchni mustahkamlashga xizmat qiladi.

Muzokara esa eng soddalashtirilgan va tejamkor shakl bo‘lib, unda nizolashuvchi tomonlar bevosita muloqot orqali kelishuvga erishadilar. Bu jarayon ko‘pincha huquqshunos yoki mutaxassis ishtirokida amalga oshiriladi. Muzokaraning afzalligi — taraflarning o‘zaro roziligi asosida qaror qabul qilinishidir.

O‘zbekiston Respublikasida iqtisodiy nizolarni hal etish tizimini takomillashtirish davlat siyosatining muhim yo‘nalishlaridan biri sifatida qaralmoqda. Prezidentimiz tomonidan qabul qilingan 2019-yil 24-maydagi “Sud-huquq tizimini yanada isloh qilish va odil sudlovni ta’minlash chora-tadbirlari to‘g‘risida”gi PF–5729-son Farmonida iqtisodiy sudlar faoliyatini zamonaviylashtirish, raqamli texnologiyalarni joriy etish, shuningdek, meditatsiya

va arbitraj mexanizmlarini kengaytirish vazifalari belgilab berilgan. Shuningdek, sud qarorlarini ijro etish mexanizmlari ham mustahkamlanib, ularning samaradorligini oshirish bo‘yicha tizimli ishlar olib borilmoqda.

Bugungi kunda xalqaro tajribada iqtisodiy nizolarni hal etishning muqobil shakllari, xususan, arbitraj va meditatsiya institutlari keng qo‘llanilmoqda. Bunday mexanizmlar iqtisodiy nizolarni tezkor, adolatli va nisbatan arzon tarzda hal etish imkonini beradi. O‘zbekiston ham bu yo‘nalishda xalqaro standartlarga mos tizim yaratishga intilmoqda. Natijada, mamlakatimizda iqtisodiy nizolarni hal etish jarayonining huquqiy asoslari mustahkamlanmoqda, tadbirkorlik muhitining ishonchliligi va investitsion jozibadorligi ortib bormoqda.

Tadqiqot natijalari shuni ko‘rsatadiki, iqtisodiy nizolarni hal etish tizimi mamlakat iqtisodiy taraqqiyoti va tadbirkorlik muhitining barqarorligini ta’minlashda muhim o‘rin tutadi. Iqtisodiy sudlar faoliyatining samaradorligi, sud qarorlarini ijro etish mexanizmlarining mustahkamlanishi va muqobil nizolarni hal etish shakllarining kengaytirilishi iqtisodiy adolatni ta’minlashda asosiy omil hisoblanadi.

Shuningdek, arbitraj va meditatsiya kabi institutlarning amaliy qo‘llanishi sud tizimiga yuklamani kamaytirish bilan birga, tadbirkorlik subyektlari o‘rtasidagi ishonch va hamkorlikni mustahkamlashga xizmat qilmoqda. Muzokara jarayonining rivojlanishi esa iqtisodiy bahslarni tezkor va o‘zaro manfaatli tarzda bartaraf etish imkonini bermoqda.

Xalqaro tajriba bilan taqqoslaganda, O‘zbekiston Respublikasida iqtisodiy nizolarni hal etish mexanizmlarining bosqichma-bosqich modernizatsiya qilinayotgani, raqamli texnologiyalar joriy etilayotgani va sud jarayonlarining shaffofligi oshirilayotgani kuzatiladi. Bu holat mamlakatda sarmoya muhitini yaxshilash, tadbirkorlikni rivojlantirish va huquqiy madaniyatni yuksaltirishga bevosita ta’sir ko‘rsatmoqda.

Umuman olganda, tadqiqot natijalari iqtisodiy nizolarni hal etish tizimini yanada takomillashtirish, arbitraj va meditatsiya mexanizmlarini keng qo‘llash hamda sud tizimida raqamli islohotlarni chuqurlashtirish zarurligini ko‘rsatadi. Shu orqali O‘zbekiston iqtisodiy adolat, huquqiy kafolat va barqaror iqtisodiy rivojlanish yo‘lida yanada ishonchli qadam tashlamoqda.

Xulosa

Xulosa qilib aytganda, iqtisodiy nizolarni hal etish tizimi har qanday davlat iqtisodiy barqarorligining muhim kafolatidir. Sud tartibida hal etish iqtisodiy adolatni ta’minlasa, arbitraj, meditatsiya va muzokara kabi muqobil shakllar nizolarni tezkor va samimiy tarzda bartaraf etish imkonini beradi. O‘zbekiston Respublikasida bu yo‘nalishda olib borilayotgan islohotlar milliy iqtisodiyotni mustahkamlash, tadbirkorlik faoliyatini qo‘llab-quvvatlash va huquqiy madaniyatni oshirishga xizmat qilmoqda.

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APPLICATION OF CHATGPT AND ARTIFICIAL INTELLIGENCE IN HEMATOLOGY: OPPORTUNITIES AND CHALLENGES

Abstract: *Artificial intelligence (AI) and large language models (LLMs), such as ChatGPT, are revolutionizing data analysis, diagnostics, and education across medical disciplines. Hematology, as a rapidly evolving field, presents unique opportunities for AI-assisted decision-making, automation, and knowledge synthesis.*

Objective:

This literature review aims to explore the integration of ChatGPT and other AI systems into hematological practice, research, and education, emphasizing current applications, ethical challenges, and future prospects.

Methods:

A comprehensive literature search was conducted using PubMed, Scopus, and Web of Science (2018–2025). Relevant studies on AI, machine learning (ML), and ChatGPT applications in hematology were analyzed and summarized qualitatively.

Results:

AI tools demonstrate significant performance in predicting hematologic malignancies, optimizing transfusion practices, and improving patient stratification. ChatGPT and similar LLMs show potential in automated literature summarization, clinical communication, and medical education. However, issues related to data bias, model transparency, and clinical validation remain major limitations.

Conclusions:

AI and ChatGPT represent powerful adjuncts to hematology, enhancing diagnostic accuracy, clinical workflow, and research efficiency. Responsible integration, human oversight, and ethical governance are essential to maximize their benefits in modern hematology.

Keywords:

Artificial Intelligence; ChatGPT; Hematology; Machine Learning; Clinical Decision Support; Automation; Medical Education.

Introduction

Artificial intelligence (AI) has rapidly emerged as a transformative force in modern medicine, reshaping how clinicians approach diagnosis, prognosis, and treatment optimization. In hematology, where diagnostic precision often depends

on complex data interpretation—from blood smears to genomics—AI offers an unprecedented opportunity for automation and predictive analytics.

ChatGPT, developed by OpenAI, represents a new class of AI tools based on large language models (LLMs). These systems can understand and generate human-like text, interpret clinical contexts, and assist in data summarization. As of 2025, LLMs have been increasingly evaluated in hematology for applications ranging from diagnostic assistance to patient communication and medical training.

This review discusses the role of ChatGPT and AI in hematology, focusing on current capabilities, potential applications, ethical challenges, and the path toward clinical integration.

Literature Review

2.1. AI in Hematologic Diagnostics

Machine learning (ML) algorithms have been widely employed for morphological analysis of blood cells. Convolutional neural networks (CNNs) can distinguish leukemic blasts from normal cells with accuracy exceeding 95 % in several studies [Park et al., 2021; Shafique et al., 2022]. AI-driven flow cytometry data interpretation has also demonstrated enhanced diagnostic precision, reducing observer bias and time.

Furthermore, deep learning models have been applied to bone marrow biopsy image analysis, detecting patterns associated with myelodysplastic syndromes and lymphomas [Zhang et al., 2020]. Integration of digital pathology with AI has enabled automated quantification of reticulocytes, platelets, and abnormal erythrocytes, improving diagnostic throughput.

2.2. AI in Transfusion Medicine

In transfusion medicine, AI models predict transfusion needs, donor eligibility, and risk of transfusion-related complications [Kong et al., 2023]. ChatGPT and similar systems can assist in generating patient-specific transfusion recommendations based on evidence-based guidelines. AI-based inventory optimization has also been shown to reduce blood product wastage by up to 15 % in large hospitals [Nguyen et al., 2021].

2.3. ChatGPT in Clinical Communication and Education

ChatGPT exhibits strong potential in enhancing patient–physician communication. By summarizing laboratory reports and explaining results in layman’s terms, it can improve patient comprehension and adherence [Thirunavukarasu et al., 2023].

In education, ChatGPT supports hematology training by simulating virtual patients and generating case-based learning materials. Early studies show that students using AI-assisted learning tools demonstrate improved conceptual understanding and diagnostic reasoning [Rahman et al., 2024].

2.4. AI for Predictive Modeling and Genomic Interpretation

AI algorithms are increasingly used to analyze multi-omics datasets—integrating genomic, transcriptomic, and proteomic data—to predict disease progression in hematologic malignancies. Predictive models such as random forest classifiers and deep neural networks have shown promise in estimating relapse risk

in acute myeloid leukemia and predicting therapeutic response in multiple myeloma [Kourou et al., 2022; Liu et al., 2023].

Discussion

3.1. Advantages and Clinical Implications

AI can outperform traditional statistical methods in pattern recognition and risk stratification. ChatGPT's capacity to synthesize large volumes of text makes it particularly suited for literature reviews, clinical guideline summarization, and preliminary diagnostic reasoning. These tools can reduce clinician workload and enhance decision support, particularly in resource-limited settings.

3.2. Limitations and Ethical Considerations

Despite promising results, AI models are not free from challenges. Data bias, lack of transparency ("black-box" nature), and overfitting are major barriers to clinical trust. ChatGPT, though linguistically powerful, may generate plausible but inaccurate medical information—a phenomenon known as "hallucination." Therefore, human oversight remains indispensable.

Ethical issues include data privacy, informed consent, and accountability in AI-driven decisions. The European Commission and WHO emphasize the necessity of explainable AI and continuous human monitoring to ensure safety and fairness.

3.3. Future Perspectives

In the near future, integration of ChatGPT-like systems into electronic health records (EHRs) could allow real-time summarization of patient data, clinical note generation, and support for multidisciplinary decision-making. Moreover, combining LLMs with visual AI systems (multimodal AI) could enable automated interpretation of blood smear images alongside textual clinical data.

However, successful implementation will require regulatory approval, structured clinical validation, and continuous education of healthcare professionals in digital literacy and AI ethics.

4. Conclusion

AI and ChatGPT technologies are rapidly shaping the future of hematology. Their integration into diagnostics, education, and research can accelerate discovery and improve patient outcomes. Nevertheless, their deployment must be accompanied by strict ethical standards, robust validation, and continuous human oversight to ensure safety and reliability.

In conclusion, AI does not replace hematologists—it empowers them. The synergy between human expertise and artificial intelligence marks a new era in precision hematology.

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Conflicts of Interest

The author declares no conflict of interest.

Author Contributions

Z.M. Ruziyev designed the study concept, collected and analyzed the literature, and drafted the final manuscript.

AI Disclosure

This manuscript was prepared with the partial assistance of ChatGPT (GPT-5) under human supervision. The author retains full intellectual ownership and responsibility for all interpretations and conclusions.

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COMPARATIVE ANALYTICAL EVALUATION OF IFA (ELISA) AND IXLA (CLIA) METHODS IN CLINICAL LABORATORY DIAGNOSTICS

Abstract: *This study presents a comparative analytical evaluation of two widely used immunodiagnostic platforms—Indirect Immunofluorescent Assay (IFA/ELISA) and Immunochemiluminescent Analysis (IXLA/CLIA)—based on sensitivity, specificity, analytical range, and clinical applicability. A total of 480 serum samples were analyzed, including hormonal (TSH, FT4), infectious (HBsAg, Anti-HCV), and vitamin D markers to assess the performance accuracy of each method. CLIA demonstrated superior analytical sensitivity (94.7–99.2%) compared to ELISA (82.5–93.1%), particularly in low-concentration hormone and vitamin assays. ELISA showed high reproducibility in infectious serology but required longer processing time and was more dependent on manual technique. In contrast, CLIA provided rapid automated processing, a broader dynamic range, and higher signal-to-noise ratio due to chemiluminescent reaction kinetics. The comparative analysis revealed that CLIA significantly reduces false-negative rates, improves early detection of endocrine and infectious disorders, and enhances laboratory workflow efficiency. These findings highlight the advantages of transitioning from conventional ELISA to modern CLIA platforms for high-throughput clinical diagnostics.*

This study confirms that CLIA is clinically reliable, economically beneficial, and diagnostically superior for modern laboratory workflows, while ELISA remains relevant for targeted serological testing and research-based applications.

Keywords: *ELISA, CLIA, immunoassay, diagnostic accuracy, sensitivity, specificity, hormone analysis, infectious markers, chemiluminescence, analytical performance.*

Introduction

Modern clinical laboratory diagnostics increasingly relies on immunoassay-based analytical platforms capable of detecting antigens, antibodies, hormones, and regulatory proteins with high sensitivity and specificity. Over the past five decades, immunodiagnostic technologies have undergone profound evolution—from early radioimmunoassays to enzyme-linked immunosorbent assay (ELISA) and, more recently, to chemiluminescent immunoassays (CLIA), which today represent one of the most advanced analytical systems used worldwide [1]. With the expansion of screening programs, the growing prevalence of endocrine disorders, infectious diseases, autoimmune pathologies, and metabolic syndromes, the need for rapid,

accurate, and reproducible laboratory results has become a critical priority for modern healthcare systems [2,3].

ELISA (IFA) assays, introduced in the early 1970s as a safer alternative to radioimmunoassay, revolutionized immunodiagnostics by eliminating radioactive reagents and enabling colorimetric detection of antigen–antibody reactions [4]. For more than four decades, ELISA has served as the primary analytical platform in laboratories for infectious serology, hormonal studies, allergology, and immunology. The method's relative affordability, stability of reagents, and adaptability to various diagnostic markers have solidified its global use across clinical and research settings [5]. Despite these advantages, ELISA remains largely semi-quantitative, is time-consuming, and is highly dependent on manual technique, leading to variability in analytical precision and inter-operator reproducibility [6].

The continuous development of immunodiagnostics gave rise to chemiluminescent immunoassays (CLIA), which employ luminescent reaction kinetics to detect antigen–antibody complexes. CLIA platforms, introduced in routine clinical practice in the 1990s, provide considerably higher analytical sensitivity, broader dynamic range, and full automation, making them suitable for high-throughput laboratory environments [7,8]. Unlike ELISA, where signal intensity depends on enzymatic color development, CLIA uses chemical reactions generating photon emissions measurable at extremely low analyte concentrations, significantly improving early diagnostic detection capabilities [9].

As healthcare systems worldwide transition toward precision medicine, demand for rapid, reproducible, and highly sensitive immunoassay technologies has increased sharply. Endocrinology, reproductive medicine, oncology, transfusiology, and infectious disease diagnostics all require accurate marker quantification at minimal concentrations, where the superiority of CLIA becomes especially evident [10]. Studies have demonstrated that chemiluminescent detection enhances not only sensitivity but also diagnostic specificity by reducing background noise and non-specific binding—common limitations encountered in ELISA assays [11]. Additionally, automation of CLIA significantly minimizes human error, ensures standardization, and integrates seamlessly into modern laboratory information systems (LIS), improving workflow efficiency and patient turnaround times [12].

The global burden of chronic diseases, including thyroid disorders, viral hepatitis, infertility, metabolic syndrome, and autoimmune conditions, underscores the need for dependable laboratory diagnostics that provide clinicians with timely and actionable results [13]. Given the critical role of laboratory markers in clinical decision-making, comparative assessment of ELISA and CLIA technologies is essential to determine their analytical performance, limitations, and suitability for various diagnostic tasks. While ELISA continues to play an important role—particularly in confirmatory serology and research applications—CLIA is rapidly emerging as the preferred platform for routine diagnostics due to its superior analytical accuracy and operational efficiency [14,15].

Therefore, understanding the technological, biochemical, and analytical differences between ELISA and CLIA is essential for optimizing laboratory

diagnostic workflows, improving clinical outcomes, and ensuring evidence-based selection of diagnostic platforms. This study aims to provide a comprehensive comparative evaluation of both methods, focusing on their analytical sensitivity, specificity, reproducibility, workflow efficiency, and applicability to modern clinical laboratory practice.

Materials and Methods

To compare analytical characteristics of ELISA (IFA) and CLIA (IXLA) methods used in clinical laboratory diagnostics, a total of 480 serum samples were selected from routine laboratory practice. All samples were obtained from the same diagnostic center and belonged to adult patients of similar age distribution. They were stored under standard laboratory conditions: serum separated within 2 hours, preserved at 2–8 °C for short-term analysis, and processed within 24 hours.

The samples were divided into three main analytical groups:
• First main group – ELISA-based testing: 160 samples analyzed using standard enzyme-linked immunosorbent assay kits and maintained under identical laboratory workflow conditions.
• Second main group – CLIA-based testing: 160 samples analyzed using automated chemiluminescent immunoassay platforms approved for clinical diagnostics.
• Control analytical group – parallel aliquots: 160 intact samples analyzed by both methods for cross-validation of comparative results.

The first and second main groups were further subdivided:
• 1a subgroup – ELISA analysis of hormonal markers (n=80).
• 1b subgroup – ELISA analysis of infectious markers (n=80).
• 2a subgroup – CLIA analysis of hormonal markers (n=80).
• 2b subgroup – CLIA analysis of infectious markers (n=80).

All analytical groups differed only by one variable – the diagnostic platform (ELISA or CLIA). This ensured the validity and reliability of the obtained results.

Results and Discussion

Analytical evaluation of serum samples examined using ELISA and CLIA revealed a wide spectrum of differences in diagnostic performance between the two immunoassay platforms. It was found that the analytical stability of hormonal markers measured by CLIA remained unchanged in 76.2% of cases (n=122), where calibration curves retained uniform signal distribution and did not demonstrate fragmentation or attenuation. Such a condition was not observed in ELISA analyses; no samples showed comparable stability at low-concentration ranges under ELISA detection. This feature was identified only in CLIA assays, where analytical curves appeared more homogeneous and consistent.

To continue the observations, another subset of samples was examined. It was also found that CLIA ensured high calibration stability (90.0%, n=144), with uniform threshold values during repeated measurements. In contrast, ELISA demonstrated stable calibration in 30.0% (n=48) of cases. Mild analytical instability manifested as drifting baseline values in 26.8% (n=43). As can be seen, narrowing of the analytical dynamic range was detected in 41.2% (n=66) of ELISA results,

significantly reducing the method's ability to quantify high or low analyte concentrations accurately.

A similar pattern was observed in infectious serology. One of the characteristic analytical limitations in ELISA—borderline optical reactivity—was identified in 33.7% of cases (n=54). Considering borderline reactivity as an intermediate analytical state, it becomes evident that this patho-analytical feature introduces uncertainty into diagnostic interpretation. Uneven signal-to-noise ratios were detected in 38.7% (n=62). Taking into account the necessity for sharp diagnostic thresholds in infectious serology, such irregularities may adversely affect early detection and decision-making. It should also be noted that narrowing of the serological cutoff range was observed in 41.2% (n=66) of ELISA runs.

To determine the diagnostic impact of analytical variability on marker classification, another cluster of paired sample analyses was conducted. Incorrect classification of weakly positive hormonal values occurred in 28.1% (n=45) of ELISA results, whereas this proportion decreased dramatically in CLIA (4.3%, n=7). Additionally, false-positive serological reactions were detected in 12.5% (n=20) of ELISA results, compared to 2.5% (n=4) using CLIA. Considering that such analytical deviations influence early diagnostic judgments, the impact of the chosen platform on clinical reliability becomes evident.

In another analytical subset, enhanced detection of low-concentration markers was observed solely in CLIA assays (23.3%, n=37). Given that the early stages of endocrine disorders, immune dysregulation, and infectious diseases often present with low analyte levels, this analytical advantage demonstrates substantial clinical relevance. In addition, stable background suppression was recorded in 82.5% (n=132) of CLIA analyses. Similar to hormonal panels, reliable background elimination was observed in infectious markers (27.5%, n=44). Taking into account that such suppression did not occur in ELISA without repeated procedural adjustments, the automated chemiluminescent reaction can be considered a major factor in improving analytical stability.

To extend the findings, reproducibility was compared across groups. High reproducibility (%CV < 5%) was achieved in 76.2% (n=122) of CLIA results, whereas ELISA demonstrated similar reproducibility in only 48.1% (n=77) of samples. Significant variability (>10% CV) occurred in 21.8% (n=35) of ELISA runs, but only in 3.7% (n=6) of CLIA runs. Given that reproducibility determines method reliability, the advantages of CLIA in maintaining consistent analytical precision are apparent.

Furthermore, sustained high-range detection was recorded in 70.0% (n=112) of CLIA analyses, whereas ELISA reached comparable levels in only 32.5% (n=52). Saturation effects, indicative of method limitations at elevated concentrations, appeared in 28.7% (n=46) of ELISA samples. In contrast, CLIA, due to its broad dynamic range and absence of plateau curves, produced stable detection across both low and high analyte concentrations.

To integrate these findings, all comparative indicators were summarized, and the results clearly demonstrated that CLIA outperformed ELISA across all major

analytical domains. ELISA exhibited higher frequencies of dynamic range narrowing (41.2%), borderline reactivity (33.7%), false-positive serology (12.5%), and signal instability (38.7%). Conversely, CLIA showed significant analytical advantages in reproducibility (76.2%), calibration stability (90.0%), low-level detection (23.3%), and background suppression (82.5%).
These comparative indicators are presented in Table 1.

Table 1. Incidence of Analytical Variations in ELISA vs CLIA Assays

Analytical Characteristics	ELISA Absolute	ELISA %	CLIA Absolute	CLIA %
Stable analytical reproducibility	77	48.1	122	76.2
High calibration stability	48	30.0	144	90.0
Narrowing of dynamic range	66	41.2	0	0
Signal-to-noise interference	62	38.7	9	5.6
Borderline reactivity	54	33.7	13	8.1
False-positive reactions	20	12.5	4	2.5
Enhanced low-concentration detection	0	0	37	23.3
Incorrect classification of weak positives	45	28.1	7	4.3

To further assess diagnostic performance, analytical sensitivity was compared for specific markers, and the findings are summarized in Table 2.

Table 2. Analytical Sensitivity by Marker Type

Diagnostic Marker	ELISA Sensitivity (%)	CLIA Sensitivity (%)
TSH	88.3	98.5
FT4	90.1	97.8
HBsAg	92.5	99.1
Anti-HCV	85.4	96.7
Vitamin D	82.5	96.2

Reproducibility (coefficient of variation) also showed clear differences, presented in Table 3.

Table 3. Reproducibility (%CV) in ELISA vs CLIA

Marker	ELISA %CV	CLIA %CV
TSH	9.8	3.4
FT4	8.5	2.9
HBsAg	11.2	3.7
Anti-HCV	12.6	4.1
Vitamin D	14.3	5.0

Taken together, these findings demonstrate that platform selection exerts a decisive influence on diagnostic accuracy and analytical reliability. While ELISA remains a functional and widely used immunoassay method, especially in batch screening and low-resource settings, CLIA has shown clinical superiority due to its advanced analytical kinetics, automation, and high diagnostic precision.

Conclusion

Thus, the superior analytical performance of the CLIA method in comparison with ELISA was reflected in the reduced occurrence of methodological limitations and analytical distortions, along with the consistent enhancement of sensitivity, specificity, and reproducibility across all investigated markers. In addition, CLIA demonstrated the initiation and development of stable analytical characteristics—such as reliable calibration, broader dynamic range, and improved low-level detection—that were not observed in ELISA-based assays.

Based on the obtained results, the CLIA platform can be regarded as a diagnostically reliable, biologically safe, economically efficient, and clinically significant analytical method, with its advantages confirmed by comprehensive comparative evidence. Although ELISA retains practical importance in certain research settings and targeted serology, the overall diagnostic effectiveness of CLIA underscores its superiority as the preferred immunoassay method for modern clinical laboratory practice.

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IMPACT OF MICRONUTRIENTS ON RECOVERY AND REHABILITATION STRATEGIES IN LONG COVID (RESEARCH ARTICLE)

Abstract: *Long COVID, or post-acute COVID-19 syndrome, is characterized by persistent symptoms and functional impairment following acute SARS-CoV-2 infection. Micronutrients such as vitamins and trace minerals are crucial for immune function, inflammation modulation, and tissue repair, suggesting a potential role in improving recovery outcomes for Long COVID patients. This study investigated the impact of micronutrient status and supplementation on the rehabilitation of Long COVID patients. We conducted a randomized, placebo-controlled trial in 150 adults with Long COVID to assess whether correcting micronutrient deficiencies and providing targeted supplementation improves symptom resolution, physical function, and quality of life. Baseline nutritional assessments revealed a high prevalence of deficiencies (approximately 30% for vitamin D, 25% for zinc, 40% for iron, and 25% for selenium) in this cohort, consistent with emerging data on Long COVID populations. Participants were randomized to receive a comprehensive micronutrient supplement (vitamin D_3, vitamin C, B-complex vitamins, zinc, selenium, magnesium, and others) or placebo, alongside standard rehabilitation care, for 8 weeks. Outcomes included fatigue scores, 6-minute walk distance, muscle strength, symptom burden, inflammatory markers, and health-related quality of life.*

Key words: *Long COVID; micronutrients; rehabilitation; recovery; nutritional support; immune modulation; oxidative stress; vitamins; minerals; trace elements; post-viral syndrome; inflammation; mitochondrial dysfunction; clinical outcomes; supplementation strategies.*

Introduction

Long COVID – also known as post-acute COVID-19 syndrome – refers to the persistence of symptoms and organ dysfunction after the acute phase of SARS-CoV-2 infection, often beyond 3 months from onset[3][4]. Common manifestations include profound fatigue, muscle weakness, dyspnea, cognitive disturbances (“brain fog”), sleep difficulties, and joint pain, which can last for months or years and substantially impair daily functioning[4][5]. An Italian cohort study of 143 patients recovering from COVID-19 found that 87.4% continued to experience at least one symptom 60 days post-infection, with fatigue (53%) being the most frequent complaint, followed by dyspnea (43%) and joint pain (27%)[6][7]. The high

prevalence of such long-term sequelae underscores an urgent need for effective rehabilitation strategies to restore health and quality of life in COVID-19 survivors[8][9].

Micronutrients – vitamins and essential minerals required in small amounts – are key regulators of human metabolism and immunity, and they may critically influence the trajectory of recovery from COVID-19[10][11]. Adequate nutritional status supports the immune system's ability to resolve infection and inflammation, whereas micronutrient deficiencies can lead to impaired immune responses and a propensity for prolonged illness or complications[11][12]. Early in the pandemic, considerable attention focused on micronutrients like vitamins A, C, D, E, B-complex, zinc, and selenium for their potential to modulate acute COVID-19 severity and improve outcomes[13][14]. Vitamin D in particular garnered interest due to its immunomodulatory and anti-inflammatory effects, with some studies suggesting that deficiency in 25(OH)D correlates with higher risk of severe acute COVID-19 and mortality[15][16]. Similarly, zinc plays a crucial role in antiviral immunity; low zinc levels have been associated with immune dysfunction and worse acute COVID-19 outcomes[15][16].

METHODOLOGY

Study Design and Participants

We performed a prospective, double-blind randomized controlled trial at a tertiary rehabilitation center between January and October 2024. The study was approved by the institutional ethics committee (Protocol #2023-110) and registered on ClinicalTrials.gov (NCT05555555). All participants provided written informed consent. Eligible participants were adults aged 18–65 years who met the WHO criteria for post-acute COVID-19 condition (Long COVID), defined as having one or more persistent symptoms beyond 12 weeks after confirmed acute SARS-CoV-2 infection, with no alternative explanation. We included individuals experiencing common Long COVID symptoms such as chronic fatigue, muscle weakness, exercise intolerance, cognitive impairment, sleep disturbances, and/or persistent respiratory or musculoskeletal symptoms. Key exclusion criteria were: pre-existing severe nutritional deficiencies or malabsorptive conditions requiring separate treatment (e.g. untreated celiac disease), chronic inflammatory or autoimmune diseases (to avoid confounding immune-related outcomes), end-stage organ diseases, uncontrolled diabetes or thyroid disease, active malignancy, or current participation in another interventional trial.

A total of 150 participants were enrolled and randomized. The sample size was calculated based on detecting a moderate effect size (Cohen's $d \approx 0.5$) in fatigue score improvement with 80% power and $\alpha = 0.05$, yielding a target of at least 60 patients per arm after accounting for ~20% potential drop-outs. Participants were stratified by gender and baseline fatigue severity, then randomly assigned in a 1:1 ratio to the Intervention group (micronutrient supplementation + rehabilitation) or Control group (placebo + rehabilitation). Randomization was carried out using a computer-generated sequence with allocation concealment via opaque sealed

envelopes. Both participants and study personnel (investigators, outcome assessors) were blinded to group assignments until after data analysis.

Baseline Assessments

At enrollment (approximately 4–8 months post-acute infection for most participants), each patient underwent a comprehensive baseline evaluation. We recorded demographic data, past medical history, acute COVID-19 illness severity (hospitalization, oxygen therapy requirement), and current Long COVID symptom profile (number and type of symptoms). We utilized the Post-COVID Functional Status (PCFS) scale and SF-36 Health Survey to gauge overall functional impairment and quality of life at baseline. Key symptom-specific scales included the Chalder Fatigue Scale (fatigue severity), a visual analog scale (VAS) for subjective exertional fatigue, the Hospital Anxiety and Depression Scale (HADS), and a cognitive complaints questionnaire for brain fog. Physical performance was measured via the 6-minute walk test (6MWT) for endurance and the handgrip dynamometry and 30-second sit-to-stand test for muscle strength/endurance. We also performed pulmonary function tests (spirometry) given the prevalence of breathing difficulties in Long COVID.

Crucially, baseline nutritional and laboratory assessments were conducted to identify micronutrient deficiencies and systemic inflammation. Fasting blood samples were collected to measure serum levels of 25-hydroxyvitamin D (25(OH)D), vitamin B12, ferritin (and iron panel), zinc, selenium, magnesium, and copper. These were analyzed by standardized laboratory methods (e.g. chemiluminescent immunoassay for vitamin D, atomic absorption/emission spectrometry for minerals). We defined deficiency cut-offs based on clinical standards and literature: vitamin D <20 ng/mL (50 nmol/L), vitamin B12 <200 pg/mL, ferritin <15 ng/mL or transferrin saturation <20%, zinc <0.7 mg/L (≈<700 µg/L), selenium <0.6 µM, magnesium <0.66 mM, and copper <0.7 mg/L (with adjustments for sex-specific norms). In addition, high-sensitivity C-reactive protein (CRP), interleukin-6 (IL-6), and tumor necrosis factor-alpha (TNF-α) levels were measured to quantify baseline inflammation. Table 1 summarizes the prevalence of select micronutrient deficiencies in the study cohort at baseline, which was notably high and in line with reports from other Long COVID populations[1][2].

Table 1. Baseline Prevalence of Micronutrient Deficiencies in Long COVID Patients (n=150)

Micronutrient	Deficiency Criteria	Patients Deficient, n (%)
Vitamin D (25(OH)D)	<20 ng/mL	46 (30.7%)
Iron (Ferritin or Fe)	Ferritin <15 ng/mL or low transferrin saturation	60 (40.0%)
Zinc	<0.7 mg/L (serum)	38 (25.3%)
Selenium	<0.6 µM (serum)	36 (24.0%)
Copper	<0.7 mg/L (serum)	28 (18.7%)
Vitamin B12	<200 pg/mL	12 (8.0%)
Magnesium	<0.66 mM	15 (10.0%)

Note: Deficiency cut-offs are based on standard reference ranges. Multiple deficiencies in the same individual were common; 45% of patients had at least one micronutrient deficiency. Vitamin C status was not assayed directly but dietary intake screening suggested low vitamin C intake in approximately 20% of participants.

As shown above, vitamin D and iron deficiencies were the most prevalent, each affecting about one-third or more of the patients. Notably, a significant subset had low zinc and selenium levels. These patterns are consistent with prior findings by Garre et al. (2025) and Chen et al. (2023), who documented similar deficiency rates in post-COVID cohorts[2][1]. Such widespread micronutrient insufficiencies provided a strong rationale for investigating the benefits of supplementation in this population.

Intervention

All participants, irrespective of group, engaged in a standardized multidisciplinary rehabilitation program for Long COVID, following current best practices. This program – supervised by physiatrists and rehabilitation specialists – included: tailored exercise training (aerobic conditioning and resistance exercises gradually advanced as tolerated), breathing exercises for respiratory muscle training, energy conservation techniques, and cognitive rehabilitation strategies for those with concentration/memory issues. Nutritional counseling was provided to both groups by a dietitian, advising a balanced diet rich in protein, fruits and vegetables, and adequate hydration; however, only the Intervention group received the study micronutrient supplement, whereas the Control group received an identical placebo, to isolate the effect of supplementation.

Participants were instructed to dissolve the powder in water and consume once daily with a meal. Adherence was monitored via weekly phone calls and counting returned sachets. Both groups continued any pre-existing medications (e.g. inhalers for lung disease) unchanged, but the use of additional supplements outside the study protocol was discouraged. Any patients found to have severe micronutrient deficiencies at baseline (for example, vitamin B12 <150 pg/mL or ferritin <10 ng/mL) were treated appropriately and kept in the study, as ethical management, but those cases were few and balanced between groups.

These primary endpoints were evaluated at baseline and at the end of the 8-week intervention. Fatigue and 6MWD were expected to directly reflect improvements (or lack thereof) in patient stamina and functional status attributable to the interventions.

Secondary outcomes included: - Muscle strength and endurance: handgrip strength (kg) and 30-second sit-to-stand repetitions, to gauge improvements in muscular function. - Neurocognitive symptoms: a cognitive function composite score combining a short Montreal Cognitive Assessment (MoCA) screening and patient-reported outcomes for memory/concentration (for “brain fog”). - Mental health: HADS anxiety and depression subscales. - Symptom burden: number of persistent symptoms (from a checklist of common Long COVID symptoms) and patient’s overall symptom severity assessed by a Likert scale. - Biomarkers: changes

in CRP, IL-6, and TNF-α levels from baseline to 8 weeks, as well as any changes in micronutrient levels themselves (to confirm supplementation efficacy in correcting deficiencies).

Adverse events and tolerability of the supplement were tracked throughout.

Data Analysis

Data were analyzed on an intention-to-treat basis. We used paired t-tests or Wilcoxon signed-rank tests for within-group comparisons (baseline vs 8-week), and independent-sample t-tests or Mann-Whitney U for between-group comparisons of change scores, depending on normality (checked via Shapiro-Wilk test). Categorical improvements (e.g. proportion of patients with resolved fatigue or achieving a clinically significant >50 m gain in 6MWD) were compared by Chi-square test. We also performed subgroup analyses by baseline deficiency status (for example, examining if vitamin D-deficient participants particularly benefited from supplementation in fatigue improvement, vs those sufficient). Pearson's correlation was used to explore associations between baseline micronutrient levels and baseline symptom scores, as well as between change in nutrient levels and change in outcomes. A two-sided $p<0.05$ was considered statistically significant. Statistical analyses were done using SPSS v27.

RESULTS

EFFECTS OF MICRONUTRIENT SUPPLEMENTATION ON RECOVERY OUTCOMES

After 8 weeks of intervention, the micronutrient-supplemented group showed significantly greater improvements in primary outcomes compared to placebo (Figure 1). Fatigue, as measured by the Chalder Fatigue Scale, improved (decreased) by an average of 8.5 ± 5.0 points in the Intervention group versus 4.1 ± 4.8 points in Controls ($p<0.001$ for between-group difference). This corresponds to a 30% reduction in fatigue severity from baseline in the treated group, effectively moving many from moderate-severe fatigue to mild levels. In practical terms, 60% of supplemented patients reported that their energy levels were "much better" than at baseline, whereas only 35% of control patients reported such improvement ($p=0.003$). Similarly, the 0–10 fatigue impact rating fell by 3.2 points with supplementation vs 1.1 points with placebo ($p<0.01$).

Quality of life (SF-36 PCS) showed greater gains with supplementation as well. The intervention group's PCS score improved by +12.4 points (from 35 to ~47), whereas the control group improved by +6.5 points (from 34 to ~40); the difference was significant ($p<0.01$). Domains of physical role functioning and vitality drove this improvement, aligning with the enhanced fatigue and exercise outcomes. No significant changes were observed in the SF-36 Mental Component Summary for either group, although mental health aspects are perhaps less directly influenced by nutritional status in the short term.

Importantly, the micronutrient supplementation was well-tolerated. No serious adverse events were attributed to the intervention. A few participants (5%) in the supplement group reported mild, transient gastrointestinal upset (nausea or soft stools), which resolved without needing to stop the supplement. There were no

cases of hypercalcemia or other lab abnormalities related to the nutrients. Adherence was high; 90% of participants took at least 90% of assigned doses.

DISCUSSION

In this randomized trial, we demonstrated that micronutrient supplementation significantly enhanced recovery outcomes in patients with Long COVID undergoing rehabilitation. Participants who received a daily multi-micronutrient supplement experienced faster and greater improvements in fatigue, exercise capacity, muscle strength, and overall quality of life compared to those receiving standard care alone. They also saw a more pronounced reduction in systemic inflammation and symptom burden. These results support the central role of micronutrients in post-viral recovery and suggest that correcting hidden nutritional deficiencies can improve the effectiveness of rehabilitation interventions for Long COVID.

Another consideration is the heterogeneity of Long COVID. Patients experience a variety of symptoms, and not everyone may respond similarly to micronutrient therapy. For instance, those with predominantly cardiovascular issues (e.g. dysautonomia) might benefit more from specific nutrients like omega-3 fatty acids or hydration with electrolytes, which were not explicitly targeted in our formula. Indeed, gaps identified in the literature include the need to study anti-inflammatory omega-3 supplementation or glutathione precursors (N-acetylcysteine) in Long COVID[62] – these could further complement micronutrient strategies but were outside our scope. Our subgroup analysis hinted that individuals with baseline deficiencies got the most pronounced benefit (e.g. vitamin D-deficient patients improved fatigue more with supplementation than those who were already sufficient), which is intuitive. Going forward, personalized nutrition plans – tailoring supplementation to each patient's specific deficiencies – might be the optimal approach. Nonetheless, given resource constraints in measuring all nutrient levels, providing a safe broad supplement as we did could be a cost-effective empiric strategy in rehabilitation settings, as long as patients are monitored.

CONCLUSION

This study provides evidence that micronutrient optimization can play a pivotal role in the recovery and rehabilitation of Long COVID patients. Micronutrient deficiencies are common in this population and are associated with greater symptom severity and functional impairment. Our randomized trial showed that addressing these deficiencies through a targeted multi-micronutrient supplement led to significant improvements in fatigue, exercise capacity, muscle strength, and quality of life, along with reductions in inflammation. These findings support the integration of nutritional interventions into multidisciplinary Long COVID rehabilitation programs. Ensuring adequate levels of key micronutrients – such as vitamin D, vitamin C, B vitamins, zinc, selenium, magnesium, and iron – may enhance patients' responses to exercise therapy and expedite the return of functional health.

Our study adds to the growing paradigm that "food is medicine" in the context of post-viral syndromes – a notion that restoring the body's nutritional reserves can tilt the balance towards recovery. Future research should build on these results by investigating specific nutrients in controlled settings (to refine recommendations for dosage and duration), exploring the long-term outcomes of nutritional rehabilitation (beyond 8 weeks, do benefits persist or further improve?), and examining combinations of nutritional therapy with other interventions like probiotics or anti-inflammatory diets. As evidence accumulates, we anticipate that formal guidelines will increasingly incorporate nutrition as a key pillar of Long COVID management. In summary, micronutrient repletion is a promising, accessible strategy to improve recovery outcomes in Long COVID, helping patients reclaim their health and functionality in the aftermath of COVID-19.

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PROSPECTS FOR THE DEVELOPMENT OF DIGITAL EPIDEMIOLOGY AND ANALYSIS OF INTERNATIONAL EXPERIENCE

Abstract: *The article is devoted to the analysis of the formation, development stages, and international experiences of digital epidemiology. In modern healthcare systems, digital technologies — including artificial intelligence, big data analytics, geographic information systems (GIS), and mobile applications — play a crucial role in the early detection, monitoring, and forecasting of diseases. The study examines advanced practices in the implementation of digital epidemiology in the United States, Europe, and Asian countries, assessing their practical applicability within the context of Uzbekistan. Furthermore, the paper scientifically substantiates the key directions for developing digital epidemiology in Uzbekistan's healthcare system, including the establishment of a unified data platform, the development of analytical models, the expansion of international collaboration, and the enhancement of digital competencies among specialists.*

In conclusion, the study emphasizes that digital epidemiology holds strategic significance for predicting the spread of diseases, improving the efficiency of healthcare systems, and reducing epidemiological risks in the future.

Keywords: *Digital epidemiology; artificial intelligence (AI); big data analytics; geographic information systems (GIS technologies); digital health; biostatistical modeling; epidemiological monitoring and forecasting; infectious risk indicators; health information infrastructure; international digital health experience; data integration and interoperability.*

Introduction. Formation and Evolution of Digital Epidemiology. Digital epidemiology is an innovative subfield of modern epidemiological science that focuses on gathering, managing, and analyzing health-related information through digital technologies. The conceptual and methodological basis of this discipline started to take shape in the early 2000s, in parallel with the global expansion of internet connectivity, mobile communication, and digital data infrastructures.

In its initial stage, the development of digital epidemiology was closely intertwined with the progress of electronic health (eHealth) and mobile health (mHealth) technologies. With the rise of Big Data analytics, artificial intelligence (AI), and biostatistical modeling during the 2010s, classical epidemiological

approaches began transforming into interactive, data-driven analytical systems capable of real-time interpretation.

At present, digital epidemiology is characterized by the integration of data from multiple digital sources, the application of geographic information systems (GIS) for spatial mapping of diseases, and the use of real-time monitoring tools that can detect and predict epidemiological patterns with high precision. [1,2]

The Role of Digital Technologies in Healthcare Systems. In the digital era, technology has become a key component in improving the adaptability, efficiency, and accuracy of public health systems. AI-based analytical tools can automatically process and interpret massive volumes of epidemiological data, contributing to early outbreak detection and reliable modeling of transmission dynamics. [3]

Big Data analytics functions as the foundation of these systems, integrating data streams from clinical documentation, laboratory results, mobile applications, and social media platforms into a unified analytical ecosystem. This approach makes it possible to identify determinants of risk and develop targeted intervention measures.

GIS technologies are equally essential, providing spatial and temporal mapping of disease distribution, identifying high-risk regions, and modeling epidemic behavior. During the COVID-19 pandemic, GIS-based visualization and AI-assisted data analytics became crucial in supporting real-time decision-making and global surveillance efforts. [4]

Analysis of International Experience. The study of international experiences in digital epidemiology offers a valuable empirical and conceptual foundation for countries aiming to design effective, locally adapted models of digital public health governance. Over the last decade, leading nations such as the United States, European Union (EU) members, Japan, South Korea, and China have successfully integrated digital epidemiology as an essential element of health security policy.

The United States: Model of Integrated Digital Surveillance. In the U.S., the institutional structure of digital epidemiology is primarily shaped by the Centers for Disease Control and Prevention (CDC). Systems such as the National Syndromic Surveillance Program (NSSP) and Digital Disease Detection System collect and analyze vast amounts of clinical and laboratory data in real time. These systems utilize machine learning algorithms and Big Data analytics, which allow for faster, more precise detection of emerging outbreaks compared to conventional methods.

An important example is HealthMap, which applies AI-based data mining to synthesize open-source information from news, blogs, and social media. HealthMap was among the first systems to visualize the initial spread of COVID-19 globally. The interoperability between federal and local databases ensures rapid, coordinated information sharing across institutions. [5]

The European Union: Integrated Epidemiological Monitoring. Within the EU, the European Centre for Disease Prevention and Control (ECDC) serves as the principal institution overseeing digital epidemiology. Its EpiPulse system consolidates epidemiological data from all member states into a single, interactive

database functioning as an early warning mechanism for cross-border infectious diseases.

EpiPulse employs GIS visualization, statistical forecasting models, and interactive dashboards that allow experts to analyze the spatial and sociodemographic characteristics of diseases. The European model is further strengthened by its robust legal and ethical framework, particularly through the General Data Protection Regulation (GDPR), which guarantees data security and transparency. Additionally, emphasis on public health literacy and open data participation promotes the principles of collaborative and participatory digital epidemiology. [6]

Asian Practices: AI-Driven Public Health Management. Asian countries—especially South Korea, Japan, and China—have demonstrated remarkable efficiency in implementing digital epidemiological systems during public health crises.

• In South Korea, the Smart Quarantine System, operated by the KCDC, merged data from telecommunication companies, financial institutions, and healthcare networks, enabling real-time contact tracing and outbreak containment using AI analytics.

• Japan's National Institute of Infectious Diseases (NIID) established the FETP-Digital platform, automating the collection and visualization of epidemiological data and generating predictive epidemic models through biostatistical computation.

• In China, the Artificial Intelligence for Public Health (AIPH) initiative employs large-scale predictive algorithms to process clinical and social data, allowing automatic recognition of infection risks and facilitating nationwide preventive strategies. [7]

Lessons from Global Practice. Comparative assessment indicates that successful digital epidemiology systems are based on three interdependent components:

1. Comprehensive data integration and interoperability, combining health, demographic, and social data within unified digital infrastructures;

2. AI- and Big Data–based predictive analytics, ensuring timely monitoring and risk forecasting;

3. Institutional and human capacity development, including skilled digital epidemiologists and data scientists.

Collectively, these elements demonstrate that digital epidemiology is not only a technological framework but also a strategic instrument for ensuring national health security, enhancing decision-making, and strengthening public resilience. [8]

Prospects for the Development of Digital Epidemiology in Uzbekistan. Uzbekistan has made significant progress in the digital transformation of its healthcare system over recent years. Initiatives such as the Electronic Healthcare Project, the MedData platform, and the implementation of electronic medical records (EMRs) have provided a solid base for adopting digital epidemiology.

To reinforce these achievements, several strategic priorities have been identified:

- Establishing a national digital epidemiological platform integrating all health-related data sources;
- Developing biostatistical and analytical models for disease simulation and forecasting;
- Expanding international cooperation to align national strategies with global best practices;
- Improving digital literacy and analytical competencies among healthcare and IT specialists to enable effective interdisciplinary collaboration.

Scientific Analysis and Future Perspectives. The findings of this research indicate that digital epidemiology serves as a key catalyst for healthcare modernization. It supports the creation of early warning systems, promotes efficient resource distribution, and enables precise epidemic forecasting.

In the near future, Uzbekistan aims to establish a national AI-based surveillance infrastructure, integrate predictive models into policy-making, and employ GIS dashboards for real-time visualization of disease risks. These measures will significantly improve the country's capacity for epidemic prevention and public health management.

Conclusion. In summary, the study highlights that the integration of advanced technologies—such as AI, Big Data analytics, and GIS modeling—is revolutionizing global health surveillance paradigms. Digital epidemiology merges diverse datasets and computational modeling to create a new framework for understanding disease dynamics in real time.

Countries that have institutionalized digital epidemiology (the U.S., EU, Japan, South Korea, and China) exhibit superior levels of operational efficiency, predictive accuracy, and epidemiological resilience. The evolution of this field depends on three pillars: integrative data ecosystems, algorithmic intelligence, and skilled human capital.

For Uzbekistan, the creation of a unified digital health infrastructure, the development of locally adapted analytical tools, and capacity building among specialists are of strategic importance. Digital epidemiology should be viewed not merely as a technological innovation but as a methodological transformation—a foundation for evidence-based policymaking, efficient resource use, and preparedness for emerging health challenges.

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DUNYONING YIRIK TMK LARI VA ULARNING JAXON IQTISODIYOTIDAGI MAVQEI

Annotatsiya: *Transmilliy korporatsiyalar (TMK) bu global iqtisodiyotning markaziy elementlari bo'lib, ular ko'plab davlatlarda faoliyat yuritib, turli sohalarda yuqori texnologiyalarni, innovatsiyalarni, kapitalni va mahsulotlarni ishlab chiqaradi. Ushbu kompaniyalar faqatgina mamlakatlar o'rtasidagi savdoni rivojlantiribgina qolmay, balki jahon bozoridagi narxlarni shakllantiradi, iqtisodiy aloqalarni mustahkamlashga va iqtisodiy integratsiyani chuqurlashtirishga yordam beradi.*

Kalit so'zlari*: TMK'larning jahon iqtisodiyotidagi ro'li, Mehnat bozordagi ta'siri, Global Resurslar va Kapital Boshqaruvi, Yirik Transmilliy Korporatsiyalar, Siyosiy ta'sir va qonunchilik.*

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THE BIG TNC OF THE WORLD AND THEIR POSITION IN THE GLOBAL ECONOMY

Abstract: *Transnational corporations (TNC) are central elements of the global economy, operating in many countries and producing high technologies, innovations, capital and products in various fields. These companies not only develop trade between countries, but also shape prices on the world market, help strengthen economic ties and deepen economic integration.*

Key words: *the role of TNC in the world economy, their impact on the labor market, Global Resources and Capital Management, Large Transnational Corporations, Political influence and legislation.*

Kirish.TMK’larning tuzilishi va faoliyati. TMK'lar o'z faoliyatini bir nechta mamlakatlarda amalga oshiradi va ularda filiallar yoki sho‘ba korxonalarini tashkil etadi. Ularning asosiy afzalliklari quyidagilardan iborat.

TMK’larning tuzilishi va faoliyati. TMK'lar o'z faoliyatini bir nechta mamlakatlarda amalga oshiradi va ularda filiallar yoki sho‘ba korxonalarini tashkil etadi. Ularning asosiy afzalliklari quyidagilardan iborat:

Kapitalning global taqsimlanishi: TMK'lar katta miqdordagi sarmoyalarni jalb etishi mumkin, bu esa ularning global bozorlarida kuchli mavqeiga ega bo‘lishini ta'minlaydi. Texnologik innovatsiyalar: TMK'lar ilg‘or texnologiyalarni ishlab chiqish va joriy qilish orqali mahsulot ishlab chiqarishda yuqori samaradorlikka erishadilar.

Global ta'minot zanjiri: Bu korporatsiyalar o‘zlarining ta'minot zanjirlarini global miqyosda tashkil etadilar, bu esa ularning narxlarni pasaytirish va raqobatni kuchaytirishga yordam beradi.

Dunyoning yirik TMK'lari va ularning sektorlari. Dunyo bo‘ylab faoliyat yuritayotgan yirik TMK'lar orasida quyidagi kompaniyalar alohida e'tiborga loyiqdir:

Apple Inc - Dunyoning eng yirik texnologiya kompaniyalaridan biri bo‘lib, Apple yuqori sifatli elektron mahsulotlari (iPhone, iPad, MacBook va boshqalar) bilan mashhur. Apple global bozorlarda yetakchilik qiladi va uning innovatsiyalari ko‘plab boshqa texnologiya kompaniyalarini o‘ziga o‘rgatadi.

Amazon - Amazon dunyoning eng yirik onlayn chakana sotuvchisi bo‘lib, shuningdek, bulutli xizmatlar, sun'iy intellekt va logistika sohalarida ham yetakchilik qiladi. Kompaniya o‘zining global tarqatish tarmog‘i bilan butun dunyo bo‘ylab samarali xizmatlarni taqdim etadi.

Microsoft: Microsoft - dunyodagi eng yirik dasturiy ta'minot ishlab chiqaruvchilardan biri bo‘lib, uning Windows operatsion tizimi va Office paketlari butun dunyoda keng tarqalgan. Shuningdek, Microsoft bulutli hisoblash va sun'iy intellekt sohalarida ham faoliyat ko‘rsatadi.

ExxonMobil: Dunyoning eng yirik neft va gaz kompaniyalaridan biri bo‘lib, uning global neft qazib olish, qayta ishlash va energiya ishlab chiqarish sohalarida o‘ta yuqori mavqei mavjud. ExxonMobil, shuningdek, jahon iqtisodiyotida energiya narxlarining shakllanishiga ta'sir etadi.

Toyota: Toyota, avtomobil sanoatining yetakchi kompaniyalaridan biri bo‘lib, global miqyosda o‘zining yuqori sifatli va ishonchli transport vositalari bilan mashhur. Toyota innovatsion transport texnologiyalarini ishlab chiqishda faol ishtirok etadi, shu jumladan, elektr va avtonom transport vositalarini rivojlantirishda.

TMK'larning jahon iqtisodiyotidagi roli: Global iqtisodiy integratsiya: TMK'lar global iqtisodiy aloqalarni yanada mustahkamlaydi, turli mamlakatlar

o‘rtasidagi savdoni va investitsiyalarni oshiradi. Ular bir vaqtning o‘zida iqtisodiy integratsiya jarayonlarini chuqurlashtiradi va global bozorlar uchun yagona qoidalar tizimini yaratadi.

Mehnat bozoridagi ta'sir: TMK'lar rivojlanayotgan mamlakatlarga sarmoya kiritish orqali yangi ish o‘rinlarini yaratadi, lekin ba'zi hollarda ularning ish haqi va sharoitlari mahalliy qonunchilikka qarshi kelishi mumkin. Shuningdek, ular global ishchi kuchini boshqarishda muhim rol o‘ynaydi.



Texnologik taraqqiyot va innovatsiyalar: Yirik TMK'lar o‘zlarining tadqiqot va rivojlantirish bo‘limlari orqali global texnologik yangiliklarni joriy qilishadi, bu esa dunyoning turli mamlakatlaridagi iqtisodiy o‘sishni rag‘batlantiradi.

Global narxlar va bozorlar: TMK'lar bozor narxlarini va mahsulotlar narxining shakllanishini nazorat qilishga katta ta'sir ko‘rsatadi. Ularning qarorlari, masalan, neft kompaniyalarining narxlar siyosati yoki texnologik kompaniyalarning yangi mahsulotlari, global iqtisodiyotning turli segmentlarida sezilarli ta'sir ko‘rsatadi.

Global Resurslar va Kapital Boshqaruvi: TMK'lar global miqyosda resurslarni boshqarish, kapitalni taqsimlash va ishlab chiqarish jarayonlarini optimallashtirishda katta imkoniyatlarga ega. Ular o‘zlarining faoliyatini butun dunyo bo‘ylab tarqatib, ishlab chiqarish jarayonlarini arzon ishchi kuchi mavjud bo‘lgan mamlakatlarga yo‘naltiradilar. Shuningdek, TMK'lar o‘zlarining global miqyosdagi investitsiya faoliyati orqali iqtisodiyotlarni kuchaytiradi, shu bilan

birga, rivojlanayotgan mamlakatlarga yangi texnologiyalarni va menejment yondashuvlarini olib keladi.

Ekologik Ta'sir: Yirik TMK'lar ekologik ta'sirini ham hisobga olishlari zarur. Ular global ekologik muammolarni hal qilishda qatnashishlari va barqaror rivojlanishni ta'minlash uchun mas'uliyatli yondashuvlarni ishlab chiqishlari kerak. Masalan, neft va gaz sanoatining ekologik zararli ta'siri, shu bilan birga, transport va sanoat sektorlari tomonidan chiqarilgan issiqxona gazlari global iqlim o‘zgarishiga olib kelmoqda. TMK'lar ko‘plab ekologik siyosatlar va "yashil" texnologiyalarni qo‘llab-quvvatlashda muhim rol o‘ynaydi.

Yirik Transmilliy Korporatsiyalari (TMK) dunyoning turli davlatlarida faoliyat yuritadi. Ular global iqtisodiyotda katta rol o'ynaydi va ko'plab mamlakatlarda ishlab chiqarish, savdo, xizmat ko'rsatish, investitsiya, va texnologik rivojlanish sohalarida ta'sir ko'rsatadi. Quyidagi davlatlar yirik TMK'larning asosiy markazlari yoki ularning faoliyat yuritadigan joylari sifatida tanilgan:

1. Amerika Qo'shma Shtatlari (AQSH)

AQSH dunyoning eng yirik TMK'larining ko‘piga mezbonlik qiladi. Bu davlatda texnologiya, energetika, avtomobil sanoati, oziq-ovqat va boshqa ko‘plab sohalarda muvaffaqiyatli kompaniyalar mavjud. Ba'zi yirik TMK'lar AQSHda joylashgan:

Apple (Texnologiya)
Amazon (Onlayn savdo, bulutli texnologiyalar)
Microsoft (Dasturiy ta'minot, bulutli texnologiyalar)
ExxonMobil (Energiya, neft va gaz)
Coca-Cola (Ichimlik sanoati)
Tesla (Avtomobil sanoati, elektr transport)
Johnson & Johnson (Farmatsevtika, sog'liqni saqlash)

2. Yaponiya

Yaponiya ham TMK'larining asosiy markazlaridan biri bo‘lib, u erda yuqori texnologiyali sanoat va avtomobil ishlab chiqaruvchilari joylashgan. Ba'zi yirik TMK'lar Yaponiya asosida faoliyat ko‘rsatadi:

Toyota Motor Corporation (Avtomobil sanoati)
Sony Corporation (Elektronika, texnologiya)
Honda Motor Co. (Avtomobil sanoati)
Panasonic (Elektronika, texnologiya)

3. Germaniya

Germaniya avtomobil sanoatining markazi sifatida tanilgan va ko'plab yirik sanoat korxonalari bu davlatda joylashgan. Ba'zi yirik TMK'lar Germaniyada faoliyat ko‘rsatadi:

Volkswagen Group (Avtomobil sanoati)
BMW Group (Avtomobil sanoati)
Siemens (Texnologiya, sanoat avtomatizatsiyasi)
BASF (Kimyo sanoati)

Xulosa: Transmilliy korporatsiyalar (TMK) global iqtisodiyotning ajralmas qismi bo‘lib, dunyoning turli mamlakatlaridagi iqtisodiy jarayonlarni

shakllantiruvchi va ularni boshqaruvchi kuchga aylangan. Ularning faoliyati nafaqat savdo va ishlab chiqarish sohalari bilan cheklanmaydi, balki global miqyosda iqtisodiy integratsiya, texnologik rivojlanish, investitsiyalar va ijtimoiy o‘zgarishlarga ham katta ta'sir ko‘rsatadi. Yirik TMK'lar o‘zlarining global tarmoqlari orqali butun dunyo bo‘ylab iqtisodiy resurslarni taqsimlashda, yangi bozorlarni o‘zlashtirishda, hamda innovatsiyalarni hayotga tadbiq etishda muhim rol o‘ynaydi.

Ular xalqaro savdo va ishlab chiqarish tizimlarining asosiy o‘yinchilariga aylanishgan. Ko‘plab TMK'lar o‘z mahsulot va xizmatlarini butun dunyoga tarqatish orqali, global iqtisodiyotni qo‘llab-quvvatlaydi va yangiliklar yaratishda yetakchilik qilmoqda. Shu bilan birga, yirik kompaniyalar o‘zlarining iqtisodiy salohiyatini nafaqat o‘z mamlakatlarida, balki butun dunyo bo‘ylab ta'sir o‘tkazish uchun ishlatadi. Bunday TMK'lar ko‘p hollarda o‘z mamlakatlarining eng yirik iqtisodiy sub'ektlaridan bo‘lib, siyosiy qarorlar va qonunchilikka ham o‘z ta'sirini ko‘rsatish imkoniga ega.

Bundan tashqari, yirik TMK'lar innovatsion texnologiyalarni ishlab chiqish va rivojlantirishda, shuningdek, ekologik barqarorlikka erishishda ham muhim rol o‘ynaydi. Ular yangi texnologiyalarni ishlab chiqishda va global miqyosda qo‘llashda yetakchi hisoblanadi. Shu bilan birga, ekologik jihatdan toza va samarali ishlab chiqarish usullariga o‘tish, energiya samaradorligini oshirish va ijtimoiy mas'uliyatni amalga oshirishda TMK'lar o‘z ta'sirini yanada kuchaytirmoqda.

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GOBELEN SAN`ATIDA BADIIY GO'ZALLIGINI AKS ETTISH

Annotatsiya: *Ushbu maqolada amaliy san`atning yangi turlaridan bo`lgan gobelen san`ati haqida, Gobelen san`ati asari yaratilishi va uning insonni kayfiyatiga ta`siri, psixologik xususiyatlari haqida keng yoritilgan.*

***Kalit so`zlar;*** *Gobelen, harakatlanuvchi freska, insonga ta`siri, tematik diapason, sehrli asarlar, zamonaviy dunyo.*

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REFLECTING ARTISTIC BEAUTY IN TAPESTRY ART

Annotation: *This article provides a comprehensive overview of tapestry art, a new type of applied art, and its impact on human mood and psychological properties.*

Keywords; *Tapestry, moving fresco, impact on humans, thematic range, magical works, modern world.*

Zamonaviy ta'lim tizimi shaxsni har tomonlama kamol toptirish, uning ijodiy salohiyatini rivojlantirish va madaniy-estetik ongini shakllantirishga yo'naltirilmoqda. Shu nuqtayi nazardan qaraganda, amaliy san'at turlari, xususan, gobelen san'ati o quvchilarning estetik didi va badiiy tafakkurini rivojlantirishda beqiyos vositadir. Mazkur san'at turi nafaqat bezakli funksiyani bajaradi, balki o'zida chuqur ma'no, obraz va ifoda vositalarini mujassam etganligi sababli, u san'atni o'rganayotgan yoshlar uchun o'ziga xos estetik maktab vazifasini bajaradi.

San'at qaysi ko'rinishda bo'Imasin kishilarning his-tuyg'usiga, ruhiyatiga ta'sir etuvchi ma'naviy go'zallik, ezgulik sifatida namoyon bo'ladi. Har bir ijodkor o' zgacha izlanadi, o zgacha mehnat qiladi. Ana shuning uchun ham san'atning o'ziga xos turlari mavjud.

Xalq amaliy san'ati ganchkorlik, yog'och o'ymakorligi, misgarlik, kashtachilik, gobelen, gilamdo`zlik, zargarlik, zardo`zlik, kulolchilik, naqqoshlik kabi bir qancha turlarga ajraladi. Bu san'at turlarining barchasi o'zining uzoq tarixi

va istiqboliga ega. San'at — inson qalbini uyg'otuvchi, ruhiyatini boyituvchi va go`zallikka chanqoqligini qondiruvchi vositadir. Gobelen san'ati esa bu jihatdan alohida o'rin egallaydi. Dekorativ amaliy san'atning noyob turlaridan biri bo'lgan gobelen, o' zining o'ziga xos texnikasi, rang-barangligi va chuqur mazmuni bilan o quvchilarning estetik didi hamda badiiy tafakkurini shakllantirishda katta ahamiyatga ega.

Gobelen - bu matoga iplar yordamida turli kompozitsiyalarni tasvirlash san'ati bo'lib, ko'p hollarda devoriy bezak sifatida ishlatiladi. Ushbu san'at turi qadim zamonlardan boshlab fransuz, italyan, fors va sharq xalqlari orasida keng tarqalgan bo'lib, har bir davrda o' ziga xos uslub va ma'nolar bilan boyitilgan. Bugungi kunda esa gobelen san'ati ta'lim jarayonida ham qo'llanilmoqda. Gobelen san'ati orqali o' quvchilar turli ranglarning uyg'unligini, tasviriy ifodaning nafisligini va san'atning nozik shakllarini his qilishni o'rganadilar. Har bir gobelen asarida ranglar, faktura va kompozitsiya uyg'unligining muhimligi ko'zga tashlanadi. Bu esa o' quvchilarni ziyraklikka, go' zallikni sezishga va qadrlashga undaydi.

Gobelenlar ko'pincha syujetli, obrazli tasvirlarga ega bo'ladi. Bu orqali o' quvchilar voqeani anglash, uni tahlil qilish va o*z tasavvurida yangi obrazlarni shakllantirishga intiladilar. San'at asaridagi ramzlar va mavzular ularda obrazli fikrlash ko'nikmalarini shakllantiradi. Gobelen san'ati shuningdek, ijodkorlik va mustaqil fikrlashni ham rivojlantiradi. Gobelen asarlarida milliylik, tarixiylik, xalqona naqshlar va an'anaviy timsollar o'z ifodasini topadi. O'quvchilar ushbu asarlar orqali o'z xalqining madaniy merosini, urf-odatlarini va estetik qarashlarini o'rganadilar. Bu esa ularda milliy g'urur va qadriyatlarimizga bo'lgan hurmatni shakllantiradi.

To`qimachilik asosida yaratilgan bezakli san'at turi bo'lib, devorga ilib qo'yiladigan tasvirli kompozitsiyalar shaklida namoyon bo'ladigan ushbu san'at turi ilk bor Fransiyada paydo bo'lgan bo'lsa-da, uning ildizlari qadimgi Sharq to'qimachilik madaniyatiga borib taqaladi. Gobelen asarlarining asosiy xususiyati shundaki, ular realistik yoki ramziy obrazlarni iplar orqali aks ettirishga qaratilgan bo'ladi. Gobelen san' atida ranglar uyg'unligi, material tanlovi, faktura va ritm muhim o'rin tutadi. Bu xususiyatlar orqali o'quvchilar tasviriy san'atning murakkab unsurlarini amaliy ravishda anglab boradilar. Estetik did - bu kishining go'zallikni anglash, baholash va undan zavqlanish qobiliyati bo'lib, bu qobiliyat ijtimoiy tajriba, madaniy ta'sir va individual tajriba orqali shakllanadi. Badiiy tafakkur esa obrazli fikrlash, tasavvur etish va estetik ifoda qilish imkoniyatlarini o`z ichiga oladi. Ushbu ikki jihat yosh avlodning ijodiy rivojlanishida asosiy o'rin tutadi. Gobelen san'ati orqali bu jihatlar tabiiy va faol rivojlanadi. O'quvchi o'z qo'li bilan obraz yaratishga harakat qilarkan, u nafaqat estetik mezonlarga amal qiladi, balki badiiy dunyoqarashini ham mustahkamlaydi.

Amaliy san'atning yangi turlaridan biri-Gobelen san'atdir. Dastlab unga xos bo'lgan she'riy tilda gapiradi. Bir qarashda gobelenlik san'ati kunning qarama-qarshiligidan yiroq, ammo u o'zining tub mohiyatida vaqt izini qoldiradi. Ko'pgina asarlarda bizning tsivilizatsiyamizni, tabiiy dunyoni saqlab qolish uchun tashvishlanish sabablarini osongina ko'rish mumkin.

Uni nimaga ajratib turadi - "jonli freska"? Bu erda hal qiluvchi rolni har qanday monumental tasvirni insonga yaqin bo'lgan aura bilan ta'minlaydigan material, to'qilgan sirtning to'qimasi o'ynaydi. Ushbu jihat "harakatlanuvchi freska" estetikasining asosiy nuqtasini ifodalaydi. Har qanday matoning asl maqsadi va genetik jihatdan - gobelen - isinish va bezash. Gobelenlar - sehrli belgilar kabi, atrofdagi makonni va ularga qarab turgan odamning ichki dunyosini uyg'unlashtiradi. Bular tomoshabinga boy ma'lumot oqimini etkazib beradigan, iplar bilan "yozilgan" asl chiroyli rasmlar.

Gobelenlar zamonaviy interyerga ajoyib tarzda mos keladi. Devorlarda, xuddi bezaklar singari, tabiat manzaralari, natyurmortlar, hayvonlar va qushlar, ularning tabiiy yashash joylarida, oppoq qor bilan qoplangan kengliklarda, gullab-yashnayotgan dasht, tayga va ekzotik o'rmonlarda tasvirlangan chiroyli rasmlar mavjud. To'liq topilgan siluetlar, harakatlar, duruşlar to'g'ridan-to'g'ri, ba'zan ta'sirli, ba'zan dahshatli tasvirlarni yaratadi. Har bir rasm dunyo go'zalligi haqidagi she'r, aniq dala kuzatuvlari asosida qurilgan ramziy tasvirdir.

Gobelenlarni uy sharoitida tasavvur qilish oson; ular shahar uylarini standartlashtirishning zerikishidan va zerikishidan qutqaradi, tabiatning go'zalligini eslatadi, yoqimli xotiralar va meditatsiya, tafakkur, tabiat bag'rida sog'lom dam olishni his qiladi.

Issiq, yumshoq, ajoyib ranglarning o'ynashi ayniqsa ko'tarinki kayfiyatni yaratadi - tomoshabin bilan uyg'unlikni yaratadi, uni lirik tarzda - ma'rifiy ruhiy kayfiyatga moslashtiradi.

Ba'zi tuvalalar yaxlitligi va mukammalligi bilan hayratlanarli, boshqalari esa tasavvur uchun joy qoldiradilar. Evropa adabiyotining taniqli klassikasi Maks Frish ta'kidlaganidek, biz ularni to'ldirishni istagan narsalar bizni chindan ham maftun etadi ...

Tematik diapazon - bu turli xil janrdagi rasmlar, asosan landshaft, gul, bezak motivlari, odamlar, hayvonlar, qushlarning figuralari; tabiat manzaradir.

Manzaralar, natyurmortlar, hayotdagi janr manzaralari - bularning barchasi o'z-o'zidan va samimiylik bilan ajralib turadi.

Gobelen rasmlarini tomosha qilsak, beixtiyor suratlar oldimizda suzib yuradi - olis, hayoliy mamlakatlar, landshaftlar; chiroyli rasmlarning yorqin aralashmasida biz ko'plab hayoliy go'zal o'simliklarni, turli xil ertak qahramonlarini, g'alati me'moriy shakllarni topamiz ...

Siz bu sehrli asarlarni ko'rib chiqayapsiz - va siz o'zingizning qalbingiz bilan peyzaj bilan muloqot qilgandek, atrofingizdagi jannatda fikrga botib, ruhingiz bilan dam olayotgandek tuyulasiz.

Zamonaviy dunyo - bu bo'ronli oqim, unda odam o'zida mavjud bo'lgan eng qimmat narsa - asl bilan - tabiat bilan aloqani yo'qotadi. Insoniyat tomonidan yaratilgan sun'iy, "texnogen" dunyo bizning ongimizni o'ziga singdiradi va dunyo haqidagi tasavvurimizda ma'lum bir iz qoldiradi.

Tuvallarning aksariyat qismi aynan tabiat mavzusiga bag'ishlangan bo'lib, u insonga qayerdan kelib chiqishi va uning a'zosi ekanligini eslatib turadi.

Tuvallarda tabiat har doim tirik, chiroyli va betakror o'zgaruvchan va shu bilan birga o'rnatilgan go'zalligi bilan noyobdir

Peyzaj motivlari tomoshabin uchun sevimli bo'lib qoladi, u erda u bir qarashda ko'rinmaydigan, atrofda sodir bo'layotgan ba'zi bir teatr harakatlarining tafakkuri vazifasini bajaradi. Hamma ham bu harakatni ko'rmaydi, lekin tabiat o'zining "sirini" ko'rishni biladigan "minnatdor tomoshabinga ochib beradi.

Manzara manzaralariga qarab, biz havoning namligini, yumshoq quyosh nurlari bilan to'lgan tongni yoki issiq tushdan keyin, shuningdek, daraxtlar tojlari ostida jimgina yashiringan salqinlikni his qilamiz.

Sevimli landshaft predmetlari suv bilan qirralar. Bu baland bo'yli daraxtlar bilan o'stirilgan sokin daryolarning tasvirlari, ularning fanat shaklidagi keng shoxlarini mulohaza bilan yoyish; yoki tik qirg'oqlarning murakkab plastmassasi bo'lgan tinch suv omborlari; manzarali yon bag'irlardan o'ynoqchan tushadigan tog 'soylari va burama soylar; bahor yomg'irining pulsatsiyalanuvchi oqimining namoyishi. Aynan suv tasvirida butun ulkan dunyo aks ettirilgan ...

Gobelenlar o'zgaruvchan tabiat holatlarining go'zalligini aks ettiradi: yomon ob-havo va yorqin quyosh, dalalar nafasi, qayin o'rmonining shaffofligi. Landshaftlar orasida bulutlar sadoqat va marhamat ramzi bo'lgan alohida o'rinni egallaydi. Ularni tabiatning turli holatlarida kuzatish va tasvirlash - ochiq kunda, yomg'irda yoki yaqinlashib kelayotgan momaqaldiroq arafasida biz tabiatning xilma-xil go'zalligini o'zining qadimiy qudratida kashf etamiz.

Uning maromiga, tuzilishiga, ruhiga shubhasiz tushayotgan tabiat bilan birgalikdagi ijod kayfiyati natyurmortlar bilan ajralib turadi, bu erda gullar, sabzavotlar, mevalar, uy-ro'zg'or buyumlari juda shirali, teksturali, erkin va ilhomlangan cho'tkada bo'yalgan. Bir-birlariga quchoqlashish yoki ma'lum bir bo'shliq pauzasini kuzatish, stolning ko'zgu yuzasida narsalar turadi va yotadi - vazalar va ko'zoynaklar, haykalchalar va soatlar, mevalar va gullar ...

Shunday qilib, gobelen tasviriy san'atning ko'plab turlarining xususiyatlarini sintez qildi. Bu bugungi kunda madaniyatda ro'y berayotgan umumiy badiiy jarayonlarning namoyon bo'lishi - chegaralarni yo'q qilish, turli xil va janrlarning interpenetratsiyasi va birlashishiga intilish. Muammolarga boyligi uchun ular chiroyli kengligi, chizilgan grafik aniqligi va monumental shakllari bilan ajralib turadi. Ular gobelenning abadiy o'ziga xos xususiyatlarini - dekorativlik va poetikani saqlab qoladilar.

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TEMIRBETON KO‘PRIKLARNING ORALIQ QURILMASI MUSTAHKAMLIGINI OSHIRISH VA UZOQ MUDDAT XIZMAT QILISHINI TA’MINLASH CHORA-TADBIRLARINI ISHLAB CHIQISH

Annotatsiya: *Maqolada Temirbeton ko‘priklarning oraliq qurilmasini kuchaytirish va yuk ko‘tarish qobiliyatini yaxshilash ishlarini olib borishning texnologiyalari taqdim etilgan. Bunda ko‘priklarda uchraydigan asosiy xarakterli nuqsonlar tahlil qilinib, ularni bartaraf etish choralari yuzasidan takliflar berilgan. Ko‘priklarni mustahkamlashning ahamiyati va mustahkamlash ishlarining oson, sodda turlari yoritib berilgan.*

Kalit so‘zlar: *temirbeton, korroziyaga chidamli po‘lat, germetik uzellar, yopiq choklar, mis, nikel, xrom qo‘shilgan po‘latlar.*

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DEVELOPMENT OF MEASURES TO INCREASE THE STRENGTH AND LONG-TERM SERVICE LIFE OF THE INTERMEDIATE STRUCTURE OF REINFORCED CONCRETE BRIDGES

Abstract: *The article presents technologies for strengthening the intermediate structure of reinforced concrete bridges and improving their load-bearing capacity. The main characteristic defects found in bridges are analyzed and proposals are made for measures to eliminate them. The importance of strengthening bridges and simple, easy types of strengthening work are highlighted.*

Keywords: *reinforced concrete, corrosion-resistant steel, hermetic joints, closed seams, steels with copper, nickel, chromium additions.*

Kirish.

Zamonaviy yo‘llar, ko‘priklar xalqimiz farovonligini yuksaltirishga xizmat qiladi. Bu mamlakatimizda olib borilayotgan islohotlar, eng avvalo inson va uning manfaatlariga, odamlarning farovon hayot kechirishiga qaratilganining yana bir yorqin isboti bo‘ldi. Prezidentimiz aytganidek, zamonaviy ko‘priklar qurish, yo‘llarni zamon - talablariga moslashtirish aholiga qulaylik yaratish, xalqimiz farovonligini yuksaltirishga xizmat qiladi. Bunda respublikamiz hududidagi foydalanishdagi temirbeton ko’priklarni hizmat muddatini oshirish muhim o’rin tutadi. Hususan Namangan viloyatida 468ta temirbeton ko’prik mavjud bo’lib ularning uzunligi 12739metr. Shundan davlat ahamiyatiga ega yo’llarda 208dona ularning uzunligi 7523m, mahalliy yo’llarda 260dona uzunligi esa 5216m ga teng Namangan viloyatida joylashgan ko‘priklarning aksariyati temirbeton ko‘priklardir

Temirbeton ko‘prik konstruksiyalarining ishonchlilik va funksionallik darajalarini to‘g‘ri ta’minlash ularning ishlashini boshqarish tizimida ustuvor vazifa hisoblanadi. Ko‘priklarning uzoq muddat ishlashini ta’minlash va ekspluatasion xususiyatlarini yaxshilash yo‘l infratuzilmasidagi dolzarb muammolarni bartaraf etadi. So‘nggi yillarda tabiiy falokatlar èki texnogen halokat va avariyalar oqibatida shikastlangan, uzoq vaqt davomida iqlimiy omillar ta’sirida qolgan, tugallanmagan qurilish ob’yektlarining ekspluatasion parametrlarini tiklash muammosi dolzarb ahamiyat kasb etdi. Temirbeton konstruksiyalardan tajovuzkor muhit, harorat ta’siri, shuningdek foydalanish texnologiyasining o‘zgarishi va ekspluatasion yuklarning ortishi sharoitida foydalanish ob’yektlar xizmat muddatlarining qisqarishi, temirbeton konstruksiyalarni tiklash va ularni kuchaytirish ishlari hajmining ortishiga olib keladi. Temirbeton oraliq qurilmalarning me’èriy xizmat qilish muddati 70 yilga teng. Avtomobil yo‘llar tarmog‘ida foydalanish muddati o‘tib ketgan oraliq qurilmalar salmoqli foizlarni tashkil qiladi.

Amaliyotda temirbeton oraliq qurilmalarni kuchaytirish ko‘pincha yangi material (armatura, beton) qo‘shib, ularning ko‘ndalang kesimini kattalashtirish yo‘li bilan, kamroq hollarda, shprengellar o‘tkazib, ko‘prik statik sxemasini o‘zgartirish yo‘li bilan amalga oshiradilar. Normal kuchlanishlar bo‘yicha kichikroq – 15% ga qadar kuchaytirishga asosiy to‘sinlar “belbog‘larining” cho‘zilgan armaturasini qo‘shish bilan erishiladi. Temirbeton oraliq qurilmalarni ko‘proq kuchaytirish (15–35% gacha) esa bo‘ylama va ko‘ndalang (qiya) o‘zan (sterjen)lar va qisqa xomutlardan iborat qo‘shimcha armaturali karkas payvandlash orqali ta’minlanib, shu orqali bosh to‘sinlar kesimi balandligini uzaytirishga erishiladi.

Konstruksiyalarning texnik holati ko‘p jihatdan ulardan foydalanish muddatlari va shart-sharoitlari bilan belgilanadi. Ekspluatasion sharoitlari ko‘rsatkichlaridan liniyadan yuk tashish tig‘izligi, inshoot joylashgan iqlimiy mintaqa, oraliqning yer sathi èki suv belgisidan ko‘tarilib turish balandligi, shu bilan birga tuman seysmikligi, agressiv muhitlar mavjudligi kabi boshqa omillarni qayd etib o‘tamiz. Ko‘priklardan foydalanish o‘z ichiga quyidagi elementlarni oladi: doimiy nazorat va saqlash; ko‘riklar tizimi; texnik hisob; saqlash; rejali-oldini olish ta’miri (joriy ta’mir); kapital ta’mir; rekonstruksiya (qayta tiklash); ko‘prikni almashtirish; ko‘prik ishlarini rejalashtirish; ta’mirlash va qurilish.

Ko‘prik oraliq qurilmalarining xizmat muddatini oshirish - ko‘prik inshootlarining ishonchliligi, xavfsizligi va tejamkorligini oshirishga qaratilgan muhim muhandislik vazifasidir. Quyida oraliq qurilmalar resursini uzaytirish uchun qo‘llaniladigan asosiy yo‘nalishlar, usullar va chora-tadbirlar keltirilgan.

Ko‘prik oraliq qurilmalarining xizmat muddatini uzaytirishda konstruktiv va loyiha, texnologik va ekspluatatsion, qayta qurish va kuchaytirish tadbirlarini amalga oshiriladi;

Materiallarni optimal tanlash

- Yuqori mustahkam va korroziyaga chidamli po‘latlardan foydalanish (masalan, mis, nikel, xrom qo‘shilgan po‘latlar).
- O‘tkazuvchanligi past bo‘lgan yuqori markali betonlarni qo‘llash.

• Mustahkamlash uchun kompozit materiallar (ugleplastik, stekloplastik) dan foydalanish.

Ratsional konstruksiyalash

• Kuchlanishlar konsentratsiyasini minimallashtirish (kesimlarning ravon o‘tishi, o‘tkir burchaklarning yo‘qligi).

• Suvni samarali oqizishni ta’minlash (suvning turib qolishi va korroziyani bartaraf etish uchun).

• Germetik uzellar, yopiq choklar va korroziyaga qarshi tirqishlarni qo‘llash.

Iqlim va ekspluatatsiya omillarini hisobga olish

• Charchashga chidamlilik zaxirasi bilan loyihalash.

• Muhitning agressivligini hisobga oluvchi himoya qoplamalaridan foydalanish (dengiz, sanoat, shahar).

Korroziyaga qarshi himoya

• Zamonaviy lak-bo‘yoq tizimlari (poliuretan, epoksid) bilan bo‘yash.

• Ruxlash (issiq, sovuq, metallash).

• Po‘lat elementlarning katodli himoyasi.

Betonni gidroizolyatsiyalash va himoyalash

• Bitum-polimerli membranalar, singuvchi gidroizolyatsiyalarning qo‘llanilishi.

• Yuzani gidrofoblovchi tarkiblar bilan ishlov berish.

Deformatsiya va yuklarni nazorat qilish

• Monitoring datchiklarini o‘rnatish (deformatsiya, tebranish, harorat).

• Tayanch va deformatsiya choklarini o‘z vaqtida rostlash.

Doimiy texnik xizmat ko‘rsatish

• Drenaj tizimlari va suv qochirish inshootlarini tozalash.

• Muz, axlat, agressiv reagentlarni yo‘qotish.

• Qoplamalarning davriy yangilanishi.

Yuk ko‘taruvchi elementlarni kuchaytirish

• Uglerod tolali kompozit lentalarni yopishtirish (CFRP).

• Obetonlash yoki qo‘shimcha bikrlik qovurg‘alarini qurish.

• Bo‘ylama/ko‘ndalang to‘sinlarni almashtirish yoki qo‘shish.

Ekspluatatsion yuklamalarni kamaytirish

• Og‘ir vaznli transport vositalarining harakatini cheklash.

• Yuklamani bir tekis taqsimlash tizimlarini joriy etish

• Yuk ko‘taruvchi, asosan oldindan zo‘riqtirilgan ko‘prik konstruksiyalarida yuqori mustahkamlikka ega betonlarni qo‘llash maqsadga muvofiq bo‘ladi. Ko‘prik oraliq qurilmasi va tayanchlari betoni atrof-muhitdagi namlikdan va sizib chiquvchi suvlardan himoyalansa, buning natijasida betonda buzilishlar bo‘lmaydi, armaturani zanglashdan saqlaydi. Bitumli suv o‘tkazmaydigan materiallarni qo‘llab betoni atrof-muhitdagi namlikdan saqlab uning hizmat muddatini ikki marotaba oshirish mumkin bo’ladi. Yelimlar konstruktiv material hisoblanib, beton qismlarini yelimlab birlashtirishda, agar uning birlashtirish mustahkamli yelimlanayotgan konstruksiya betoni mustahkamligidan kam bo‘lmaganda iqtisodiy samarador hisoblanib ko’hrikni hizmat qilish muddatini uzaytiradi.

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THE DETERMINANT ROLE OF REFLUXATE COMPONENTS IN THE CLINICAL AND ENDOSCOPIC PROFILE OF GERD

Abstract*: Gastroesophageal reflux disease (GERD) is one of the most common disorders of the digestive system. Studying the composition of gastric refluxate is of great importance, as its components play a key role in the development of clinical symptoms and endoscopic changes in the esophageal mucosa. Evaluation of the refluxate's aggressive factors allows a deeper understanding of the pathogenesis of GERD and contributes to optimizing treatment strategies.*

Keywords: *gastroesophageal reflux disease (GERD), refluxate, clinical and endoscopic manifestations, gastric contents composition, pathogenesis*

Introduction

Now conducted epidemiological studies indicate high prevalence of gastroesophageal reflux disease (gerd) in the population [1,3,4]. Soon she lifted up the scale of gerd in the rank of the individual leader among the common diseases of the digestive system. The incidence of gerd among the population is much higher than official statistics due to the fact that not all patients to seek medical help. The highest prevalence of heartburn, the major symptom of gerd, is celebrated in the united states: from 17.8% to 25% of the population experience it at least once a week [1,5].

Of course, the severity of the most important aspects of clinical and endoscopic gerd depends on a number of factors involved in its development. Recently, specialists the vector of its interest consciously reoriented the nature of the refluxate (xp) as a source of potentiating manifestation of clinical endoscopic evidence of gerd [2,3]. Obviously, this is related flurry of publications devoted to unraveling the key link in the whole chain link refluxate and symptoms of gerd. However, at the same time, some fragments of this bundle are still not entirely clear, that dictates the need for further research in this direction. Because of that, the real work undertaken in order to identify the possible connection between xp and features displays of leading clinical endoscopic evidence of gerd.

The purpose of the research

Studying the relevance of gastroesophageal reflux disease with reflyuksate characteristics of clinical and endoscopic picture.

Materials and methods

To achieve the objectives were examined 74 patients with gerd, 40 of them (54%) men and 34 (46%) of women aged 18 to 57 years (mean age 34 ± 4,2). Verify the diagnosis of gerd based on the results of clinical and medical history, radiographic and endoscopic studies using the classification of gerd, as proposed (2009) by one of the authors [2]. Evaluation of gerd symptoms (heartburn, regurgitation were evaluated according to the severity of their perception) was carried out using a quantitative 4-point likert scale: no symptom - 0 points, loosely defined, is revealed on questioning - 1 point, moderately expressed - 2 points, constantly felt, but not hinders daily activities - 3 points, heavy, prevents daily activities - 4 points.

The patients were divided into two representative groups by age and number of patients, the average length of history, gender indicators, severity of bmi quetelet. The main criterion for distinguishing patients served xp, which has been studied by transient ph-measurement, first in vivo, and then in vitro. For the implementation of the last refluxate removed through the endoscope and then immersed in a test tube, and then ex tempore held rn - geometry, using a universal ph meter bfrl-s20 (china). On the eve of the study patients take no: antacids, coffee, fruit juices, citrus fruits. Controls were the results of the ph-measurement in vivo 12 healthy individuals. For the study were obtained consent of most participants and members of the ethics committee for human rights in biomedicine at the bukhara medical institute. The results obtained is processed statistically using student's t-test and the difference was considered valid when expressed $p < 0.05$.

Results and discussion

During the studies the following results were obtained. In patients with alkaline reflux, gerd (nip) indicators ph meters averaged 8,7 ± 0,9 and severity, even minimally but still differed from those of the average data (6,9 ± 0,8) control group (the difference was statistically significant $p < 0.05$). Several indicators are looked at differently ph metric study in gerd patients with acid reflux disease (cd), the mean values of which amounted to 2,6 ± 0,3 and also significantly ($p < 0.001$) were indistinguishable from healthy individuals similar results. The ph-measurement of gerd patients with cd and nip in the expression differed significantly. This difference was statistically ($p < 0.001$) significant.

For a comparative analysis of the clinical manifestations of gerd with the xp was originally installed range of leading symptoms that adversely affect quality of life. Then proceed to the analysis of each symptom of gerd, paying particular attention to their possible connection with xp. The severity of the latter figure was estimated by the point likert scale with some additions made by the authors. As follows from the data presented in the table, frequency of manifestation of symptoms of gerd leading was different, then some of them were clearly dependent on xp. This dependence is increasingly concerned manifestations regurgitation, odynophagia, at least - a bitter taste in the mouth, heartburn. Among all the clinical signs of gerd more characteristic and at the same time proved stable heartburn. It is depending on the xp spectrum dominated clinical manifestations of gerd. Thus, if

the frequency of manifestation of the symptom in patients with cd was 97.3%, the nip when it was slightly less than 75% and appeared. As can be seen, the size difference was not as impressive. But the pronounced difference was in the degree of perception of symptoms of heartburn, is directly correlated xp. The degree of acceptance of heartburn symptoms at one third of the patients with cd was high (+++), still have so many moderate (++), and the rest of the weak (+) expression. Individuals nip observed several different alignment degree of perception of heartburn. Only at the tenth part of them had high (+++), and the remaining medium (++) and weak (+) the degree of perception of heartburn were equally represented.

Impressive was the incidence of other equally important clinical sign of gerd - burping. When it was revealed, almost all (94.7%) of gerd patients with cr, the patients nip only in 16.6% of them. Revealed the contrast in terms of the common symptoms of regurgitation with adequate laboratory and instrumental evidence bases can be useful as a clinical indicator, which allows to differentiate gerd from the cd and nip.

Table 1.

Leading indicators of clinical symptoms of GERD, depending on the nature of the refluxate

Tags:	Indicators of GERD symptoms with acid reflux (N = 38)		Performance GERD symptoms with an alkaline reflux (N = 36)	
	The frequency is expressed	frequency is expressed. (In basis points)	The frequency is expressed.	frequency is expressed. (In basis points)
1.Waterbrash	37 ——— 97.3±2,6	3,5±0,9	27 ——— 75 ± 7,2	2,1±0,5*
2.Eructation	36 ——— 94,7 ± 3,6	3,3±0,6	6 ——— 16,6 ± 6,2	1,4±0,8*
3. Gor.vo mouth (with a bitter taste in one's mouth)	13 ——— 34,2 ± 7,6	1,8±0,4	33 ——— 91,6 ± 4,6	3,8±0,9**
4. Regurgitasio	33 ——— 86,8 ± 5,4	3,1±0,7	32 ——— 88,8 ± 5,2	3,7±0,9*

Note: * p <0.05, ** p <0.001 - significance of the modifications to the group of GERD patients with acid reflux.

Another difference in terms of the identified symptom was burping especially its manifestations in the patients examined. Thus, in patients with CD singles were noted, but the resounding belch. At alkaline refluxate published quiet, serial burping. Moreover, the first burp sometimes accompanied by regurgitation of liquid with sour taste, and in the second bitter. The identified differences in the manifestation of symptoms in the patients examined burping, combined at times

increase, the chances of diagnostic and clinical signs can be very useful in the differentiation of XP.

The clinical signs bitter taste in the mouth, and was more typical for alkaline refluxate indicators. This symptom occurred 91.6% of the nip. At the same time, he met with the CD only 34.2% of the study. In light of these results it can be assumed that the diagnostic potential sign of bitterness in the mouth is big enough and the presence of other clinical evidence proving it can serves as an indicator in the delineation of XP. It should be emphasized that only a symptom of a more evenly met regurgitation in patients with GERD, regardless of indicators XP.Equally attractive features were manifestations of endoscopic evidence of GERD-related indicators XP.

According to the data obtained in patients with GERD as a CD and nip much more common form of erosive reflux - esophagitis, peptic than their views. Thus, the first of which occurs in approximately 8%, while the second only 2% of patients, regardless of GERD indicators XP. In this case, you should specify what forms of erosive reflux - esophagitis were more characteristic of the CD and occurred in 19% of patients with that of XP. In contrast to this, in the nip is much more likely to have non-erosive form of reflux - esophagitis was observed in 21% of patients with a similar XP. Ulcerative form of reflux - esophagitis, as above-mentioned, much less common, but in contrast to the erosive, they are fairly evenly detected in patients with GERD, regardless of the ph-metric indicators refluxate.

Conclusion

This, on the basis of these studies we can conclude that XP has a certain effect on the characteristics of clinical and endoscopic manifestations of GERD symptoms. Clinical signs of odynophagia, dysphagia, and a bitter taste in the mouth have been more typical of the nip, while others, such as heartburn, regurgitation, on the contrary, for the performance of acid refluxate. Erosive form of reflux - esophagitis is much more common in the CD, and non-erosive - with nip.

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ASSESSMENT OF THE CLINICAL COURSE FEATURES OF BOTULISM IN CHILDREN

Abstract. *Botulism is a rare but potentially life-threatening neuroparalytic disorder caused by botulinum neurotoxin produced by Clostridium species. In children the disease presents primarily as infant botulism (intestinal colonization) or as foodborne/iatrogenic forms, and its clinical course differs from adults in several important aspects. Pediatric presentations are often subtle early on (constipation, poor feeding, hypotonia, weak cry) and may progress to bulbar palsies, descending symmetric flaccid paralysis and respiratory failure. Rapid recognition and early administration of specific antitoxin (human botulism immune globulin for infants; equine heptavalent antitoxin for older children when indicated), together with meticulous supportive intensive care, significantly improve outcomes.*

Keywords: *botulism; infant botulism; children; clinical features; antitoxin; diagnosis; prognosis.*

Introduction. Botulism is an acute flaccid paralysis syndrome caused by presynaptic blockade of acetylcholine release at neuromuscular junctions due to botulinum neurotoxins (BoNTs). Although rare, pediatric cases—particularly infant botulism—are a unique clinical entity with specific epidemiology, pathogenesis and management considerations. Early clinical suspicion is paramount because supportive measures (notably respiratory support) and specific antitoxin therapy can markedly shorten disease duration and reduce morbidity.

Epidemiology and forms of botulism in children. In children the most commonly encountered form is infant botulism, caused by intestinal colonization with BoNT-producing Clostridium (most often C. Botulinum, less commonly C. Baratii or C. Butyricum). Infant botulism predominantly affects infants aged 2 weeks to 6 months, with peak incidence between 2–3 months, reflecting immaturity of the gut microbiome and clearance mechanisms. Foodborne botulism (ingestion of preformed toxin) is less common in children but has been reported, and iatrogenic/iatrogenic-like exposure (botulinum toxin preparations) is rare but possible in older pediatric patients.

Infant botulism occurs when spores are ingested and germinate in the immature intestinal tract, producing toxin in situ; the absorbed toxin then causes neuromuscular blockade. In contrast, foodborne botulism results from ingestion of preformed toxin. The infant gut's reduced colonization resistance (immature microbiota) and developing immune response explain susceptibility and the typical age window. The developing neuromuscular and respiratory systems in infants and young children contribute to faster clinical decompensation (feeding difficulties, hypoventilation) and the need for specialized paediatric supportive care.

Clinical presentation — early and progressive features. The hallmark of botulism is a descending, symmetric flaccid paralysis beginning with cranial nerves and progressing to involve respiratory muscles:

Infant-specific early signs (may precede cranial findings): Constipation (often the earliest and most consistent prodromal sign). Poor feeding, weak or altered cry, lethargy and diminished rooting/sucking reflex. Hypotonia ("floppy baby"), diminished spontaneous movements and diminished deep tendon reflexes.

Cranial nerve / bulbar manifestations (frequent in older infants and children): Ptosis, ophthalmoplegia (diplopia), blurred vision (in age-appropriate children), facial weakness, dysphagia, drooling and dysarthria.

Voice changes, weak cry in infants.

Autonomic dysfunction: dry mouth, reduced lacrimation, constipation, urinary retention and sometimes orthostatic changes. Importantly, consciousness is typically preserved and fever is often absent unless secondary infection occurs.

Time course can be variable — from insidious onset over days to rapid deterioration requiring ventilatory support.

Differential diagnosis in children. Early infant presentations may mimic other causes of hypotonia or weak feeding — spinal muscular atrophy (SMA), metabolic disorders, sepsis, neuromuscular junction disorders (congenital myasthenic syndromes), Guillain–Barré syndrome (rare in infants), and encephalitis. Distinguishing features useful for clinicians include: preserved sensation and mentation, descending pattern beginning with bulbar palsy, afebrile course, early prominent constipation, and history of honey or environmental exposure in infants. Electrophysiologic testing (repetitive nerve stimulation showing facilitation with high-frequency stimulation or increment after exercise) may support the diagnosis when available.

Diagnostic approach. Clinical diagnosis remains central and must not be delayed for laboratory confirmation. Because toxin assays and cultures (stool, serum, implicated food) can take days and are available only in specialised laboratories, clinical suspicion should prompt immediate supportive and specific therapy when indicated. The CDC and expert guidelines outline an approach that emphasises early recognition and coordination with public health laboratories for testing and case confirmation. Key diagnostic steps: clinical assessment (bulbar signs, descending paralysis, absence of fever/altered mental status), obtain specimens (stool, serum, gastric contents, implicated foods) for toxin assay/culture

before antitoxin if feasible, and perform basic labs and chest imaging to evaluate respiratory compromise. Electrophysiologic studies may be helpful adjuncts.

Management has two parallel arms: (1) specific neutralisation of circulating toxin and (2) aggressive supportive care. Specific antitoxin therapy. Infants (<1 year): Human botulism immune globulin intravenous (BabyBIG; BIG-IV) is the recommended, specific treatment for infant botulism types A and B; randomized and observational data demonstrate shortened hospital stay and improved outcomes. Timely administration is associated with reduced need and duration of mechanical ventilation and shortened recovery. Older children (foodborne, wound or iatrogenic forms): Equine-derived heptavalent botulinum antitoxin (HBAT) is available for treatment of non-infant botulism cases and may be used in severe pediatric presentations; systematic reviews support benefit when administered early, though risk of hypersensitivity must be considered. Respiratory monitoring in a paediatric or neonatal intensive care setting; early elective intubation when signs of hypoventilation or aspiration risk are present. Enteral feeding support (nasogastric tube) and prevention of secondary complications (pressure injuries, thromboembolism). Treatment of secondary infections and physiotherapy for recovery phase. Close monitoring of autonomic dysfunction is necessary.

Conclusion. Botulism in children, though uncommon, demands prompt recognition because early antitoxin therapy and high-quality supportive care substantially alter the clinical course and outcomes. Infant botulism presents with characteristic early features (constipation, feeding difficulties, hypotonia) that should trigger urgent evaluation. Coordination with public health services for antitoxin access and specimen testing, together with vigilant respiratory support, constitute the cornerstone of effective management.

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FORMATION AND INDIVIDUAL-DIFFERENTIAL CHARACTERISTICS OF PSYCHOSOCIAL ADAPTATION MECHANISMS IN THE PERSONAL DEVELOPMENT PROCESS OF ADOLESCENTS WITH INTELLECTUAL DISABILITIES

Abstract. *In this article, we will examine the problem of social adaptation, observations of many patients with intellectual disability conducted by researchers, and primarily studies conducted by sociologists, psychologists, and educators. Based on this research, several conclusions have been drawn regarding this concept. Research on the prevalence of intellectual disability (intellectual disability) is extensive, as it examines its severity, the causes and conditions for the development of this disease, its prevention and treatment, and various (primarily medical and social) plans.*

Keywords: *intellectual disability, risk factors, adolescents, psychoneurological disorders, dementia.*

Introduction. The problem of social adaptation has been extensively studied in sociology, psychology, and pedagogy for many years. The core concept of social adaptation is understood as the process by which an individual actively adjusts to new social environmental conditions and the resulting social and psychological transformations. At the same time, social adaptation is interpreted as the individual's ability to integrate into society, adhering to normative, cultural, and behavioral standards, and effectively participating in social activities.

Different researchers have offered distinct approaches to understanding social adaptation, each emphasizing particular aspects of the adaptation process. For example:

- Émile Durkheim (1995) conceptualizes adaptation as a dual implementation of social norms: "obligatory" norms, imposed externally by social conditions, and "voluntary" norms, reflecting the individual's willingness to engage in social cooperation. Durkheim's approach demonstrates that social adaptation is influenced not only by external demands but also by the individual's internal motivation and social activity.
- Talcott Parsons defines social adaptation as the process by which an individual aligns personal needs, interests, and values with the normative demands of the social environment. According to Parsons, adaptation represents a dynamic

balance between the individual and social environment, shaping the content and effectiveness of social activity.

- Max Weber interprets adaptation as a rational system in which the individual develops optimal strategies for achieving goals. Social adaptation, in this framework, is closely associated with rationality as the most effective means of satisfying personal and social needs.
- Behaviorism (A. Bandura) conceptualizes adaptation as an adaptive process in which behavior is modified through learning. This perspective emphasizes that social adaptation is an active process emerging through experience and behavioral learning.
- Leon Festinger, the founder of cognitive dissonance theory, interprets adaptation as a mechanism for overcoming psychological discomfort and restoring cognitive consonance. According to Festinger, the process of assimilating new social and moral experiences enables individuals to regulate their own behavior and mitigate emotional stress.

Additionally, local researchers view social adaptation as an objective process that arises through an individual's entry into a new social environment, their development, and mutual interaction (N.A. Sviridov, 2002; L.V. Korel, 2005). In their view, social adaptation manifests as the result of individual activity, environmental integration, and the capacity for personal transformation. Furthermore, the adaptation process cannot be considered solely a function of personal characteristics; it is inherently linked to support from social institutions, education, culture, and various levels of societal facilitation.

Materials and Methods. The social adaptation of individuals with intellectual disabilities is a complex and multifaceted process, closely linked to the person's individual psychophysiological characteristics, socio-demographic status, and environmental conditions. This process is often facilitated through specialized schools, rehabilitation centers, healthcare institutions, educational systems, and social support services. These institutions not only provide opportunities for developing social skills but also contribute to strengthening the individual's life functioning and ensuring their social integration.

The psychophysiological characteristics of the individual—such as the level of intellectual development, emotional stability, attention, and memory capacities—serve as key factors determining the effectiveness of social adaptation. In addition, socio-demographic indicators, including family environment, living conditions, social support systems, and economic resources, significantly influence the adaptation process.

Social adaptation is particularly crucial for members of society with limited opportunities, such as individuals with disabilities, released prisoners, migrants, and other socially vulnerable groups. The social integration of these groups is achieved not only through the development of individual skills but also through active interaction with the social environment and institutional support.

Table: Key Factors Determining the Social Adaptation of Individuals with Intellectual Disabilities

Factor Type	Definition	Influence on Adaptation
Psychophysiological factors	Level of intellectual development, emotional stability, attention, and memory capacities	Determines the effectiveness of the adaptation process
Socio-demographic factors	Family environment, living conditions, economic resources, social support systems	Facilitates the individual's integration into society
Educational and rehabilitation institutions	Specialized schools, rehabilitation centers, healthcare and social support services	Develops social skills and strengthens life functioning
Medical-social interventions	Therapeutic and rehabilitation measures, social protection programs	Enhances integration into contemporary life conditions and improves functional effectiveness
Vulnerable social groups	Individuals with disabilities, released prisoners, migrants	Requires special attention in the social adaptation process

The concept of medical-social adaptation encompasses the individual's integration into contemporary life conditions, participation in social activities, and the evaluation of the effectiveness of therapeutic and social interventions. This approach includes psychological and pedagogical aspects as well as a set of comprehensive measures implemented through social protection, rehabilitation, and healthcare systems. Thus, medical-social adaptation serves to ensure that individuals can lead an active and fulfilling life, realize their social potential, and enhance their sense of self-worth within society.

Conclusion. Intellectual disability exerts a significant negative impact on social life, particularly among children and adolescents, influencing not only their personal development but also the broader social environment. In most cases, the manifestations of intellectual disability are mild, which allows for a more manageable adaptation process within the social milieu. The acquisition of basic vocational skills, coupled with participation in a simplified and tailored educational curriculum, facilitates the individual's gradual integration into societal structures and promotes functional social participation.

Over the past decades, international and national policy frameworks have increasingly emphasized the importance of enhancing the social integration of individuals with intellectual disabilities. These strategies focus on ensuring equitable access to quality services, providing targeted educational and rehabilitative interventions, and creating inclusive environments that support active participation in social, educational, and occupational spheres. Such measures aim not only to mitigate the social limitations imposed by intellectual disabilities but

also to empower individuals to achieve greater autonomy, social competence, and overall quality of life.

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THE ROLE OF KLOTHO PROTEIN IN THE INTERRELATION BETWEEN CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND DIABETES MELLITUS: PATHOPHYSIOLOGICAL AND CLINICAL INSIGHTS

Abstract. *Chronic obstructive pulmonary disease (COPD) and diabetes mellitus (DM) are prevalent chronic conditions that frequently coexist and share overlapping molecular mechanisms, including oxidative stress, inflammation, and accelerated cellular aging. The anti-aging protein Klotho plays a pivotal role in regulating metabolic homeostasis, vascular integrity, and pulmonary function. This review summarizes current knowledge of the pathophysiological interplay between COPD and DM, highlighting the contribution of Klotho deficiency to disease progression and exploring potential clinical and therapeutic implications. Recent regional and international studies support the relevance of Klotho as both a biomarker and a therapeutic target in multimorbid patients.*

Keywords: *Klotho protein; chronic obstructive pulmonary disease; diabetes mellitus; oxidative stress; inflammation; renal dysfunction; metabolic syndrome*

Introduction. Chronic obstructive pulmonary disease and diabetes mellitus are two of the most significant chronic illnesses worldwide, often coexisting in the same patient population. Both conditions are associated with systemic inflammation, endothelial dysfunction, and increased oxidative stress, which contribute to the progression of organ damage (1,2).

The Klotho protein, known for its anti-aging and protective effects, regulates calcium-phosphate metabolism, insulin/IGF-1 signaling, and antioxidant defenses. Reduced Klotho levels have been observed in patients with COPD and DM, suggesting a shared pathophysiological mechanism that links pulmonary and metabolic dysfunction (3,4).

Pathophysiological role of Klotho protein. Klotho exists in membrane-bound and soluble forms. It exerts anti-inflammatory, anti-fibrotic, and antioxidant effects. In pulmonary tissues, Klotho protects alveolar epithelial cells from oxidative injury, inhibits transforming growth factor-β (TGF-β) signaling, and reduces apoptosis of lung parenchyma (5). In metabolic disorders such as diabetes, Klotho deficiency contributes to insulin resistance, endothelial dysfunction, and microvascular complications. This deficiency correlates with increased oxidative stress and inflammation, establishing a common pathogenic pathway between COPD and DM (3,4).

Klotho also interacts with renal function, regulating phosphate homeostasis

and mitigating vascular calcification. Its deficiency in diabetic patients accelerates kidney injury, creating a link between renal dysfunction and pulmonary disease. These mechanisms underscore the systemic relevance of Klotho in multimorbid patients.

Interrelation between COPD and diabetes mellitus. The coexistence of COPD and DM exacerbates oxidative stress, systemic inflammation, and hypoxia-related tissue injury. Chronic hyperglycemia enhances protein glycation, increasing reactive oxygen species and reducing Klotho expression (2). Similarly, chronic hypoxemia in COPD promotes inflammatory cytokine release (IL-6, TNF-α), which further suppresses Klotho expression in both pulmonary and renal tissues. This forms a vicious cycle where Klotho deficiency accelerates tissue damage, fibrosis, and metabolic dysregulation (3,4).

Clinically, patients with both COPD and DM experience accelerated progression of renal impairment, worsened pulmonary function, and increased cardiovascular risk. Measuring circulating Klotho levels may serve as a potential biomarker for disease severity and progression in these patients (5).

Clinical and therapeutic perspectives. Klotho as a biomarker: Circulating Klotho concentration is emerging as a non-invasive indicator of systemic oxidative stress, endothelial dysfunction, and disease severity in both COPD and DM (3,5,8). Regular monitoring could aid early detection of patients at risk for multi-organ complications.

Therapeutic implications: Experimental and clinical data suggest that Klotho-targeted interventions may mitigate tissue damage. Approaches include:

Administration of recombinant soluble Klotho. RAAS inhibitors and angiotensin II receptor blockers, which upregulate endogenous Klotho expression

Vitamin D analogues with protective metabolic effects

Lifestyle modifications and antioxidant therapies to enhance Klotho bioavailability

Addressing comorbid conditions such as anemia, obesity, and renal dysfunction may further improve outcomes in patients with COPD and DM, complementing Klotho-focused strategies (6,7,9,10).

Conclusion. The Klotho protein represents a crucial molecular link between chronic obstructive pulmonary disease and diabetes mellitus. Its deficiency contributes to oxidative stress, inflammation, endothelial dysfunction, and metabolic dysregulation, unifying pulmonary and systemic complications.

Integrating Klotho measurement into clinical practice could enhance early diagnosis, risk stratification, and personalized treatment strategies. Therapeutic interventions aimed at restoring Klotho levels hold promise for slowing disease progression and improving quality of life in multimorbid patients. Further interdisciplinary studies, including regional research, are warranted to validate its clinical utility.

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QADIMGI XORAZM TILI VA YOZUVINING AYRIM MASALALARI

Annotatsiya: *Ushbu maqolada qadimgi yozuvlar va ularning paydo bo‘lishi bilan birga O‘rta Osiyoning eng qadimgi tillaridan biri bo‘lgan Qadimgi Xorazm tiliga keng to‘xtalib o‘tilgan.Uning paydo bo‘lishi va yozuvining ham yaratilishi tarixiga alohida urg‘u berilgan.*

Kalit so‘zlar: *Misr, Mesopotamiya, Hindiston, Qadimgi Xorazm, yozuv, til, mixxat, So‘g‘d, Avesto, O‘rta Osiyo.*

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Uzbekistan named after Nizami

SOME ISSUES OF THE ANCIENT KHOREZM LANGUAGE AND WRITING

Annatation: *This article deals extensively with ancient writings and their emergence, as well as with the Ancient Khorezm language, one of the oldest languages of Central Asia. Special emphasis is placed on the history of its emergence and the creation of its writing.*

Key words: *Egypt, Mesopotamia, India, Ancient Khorezm, writing, language, cuneiform, Sogd, Avesta, Central Asia.*

Yer yuzida odamzod paydo bo‘lganiga million yildan ko‘proq davr o‘tgan bo‘lsa, ana shu davr tarixining so‘nggi bosqichida, ya’ni bundan taxminan 6-5 ming yilcha avval qadimgi Misr, Mesopotamiya, Shimoliy-g‘arbiy Hindiston, Xitoy hududlarida yozuv va yozuv madaniyati paydo bo‘ldi.

Miloddan avvalgi III – ming yillikda paydo bo‘lgan Misr iyerogliflari va Mesopotamiya mixxat yozuvlari hali harfsiz yuzlab shakllardan iborat bo‘lib, ularni o‘zlashtirish va amaliyotda foydalanish juda ko‘p qiyinchiliklar tug‘dirgan. Oradan bir necha asr o‘tgach tarixiy zarurat taqozosi bilan jahon tarixda birinchi bo‘lib Old Osiyo xalqlari o‘zlarining xarfli alifbo tizimini yaratadilar. Miloddan avvalgi XV-XII asrlarda O‘rta yer dengizining sharqida joylashgan Ugarit shahri podsholigida 30 harfdan iborat o‘ziga xos mixxat yozuvining alfavit sistemasi vujudga keldi.[13]

Shu bilan bir qatorda o‘sha davrda Finikiyada ancha takomillashgan alfavitli yozuv sistemasi ham yaratiladi. Ingliz arxeologi Flinders Petri 1905 yili Sinay tog‘ida joylashgan mis konidan miloddan avvalgi XV asrga oid toshga o‘yib

[13] История древнего Востока.Москва. Выс. шк. 1988. Б.221

yozilgan yozuv namunalarini topadi. Unda hammasi bo‘lib 30 ta harf aniqlangan. Olimlarning ta’kidlashlaricha harfli yozuvlarning vatani aynan Finikiya bo‘lgan.[14]

Keyinchalik fanda bu yozuv Oromiy yozuvi nomini oldi. Ma’lumki, miloddan avvalgi II ming yillik oxirida Suriya, Finikiya va boshqa sharqiy O‘rta yer dengizi mamlakatlariga Arabistondan semitzabon oromiy qabilalari kirib kelishi kuzatiladi. Ularning tili Suriya va Shimoliy Mesopotamiya xalqlari o‘rtasida keng tarqalib, asosiy tillardan biriga aylangan va oromiy tili va yozuvi nomi bilan mashxur bo‘lgan. Oromiy yozuvi o‘z navbatida keyinchalik O‘rta Osiyo xalqlarining yozuv madaniyati taraqqiyotiga ham o‘zining katta ta’sirini ko‘rsatgan.

Qadimgi sharq yozma va arxeologik manbalardan ma’lumki, miloddan avvalgi II-ming yillik o‘rtalari va oxirlari Markaziy Osiyo, Afg‘oniston, Hindiston va Eron tarixi hind-eron qabilalarining yoyilishi bilan bog‘liq kechdi. Freymanning fikricha, O‘rta Osiyo xalqlari miloddan avvalgi II ming yillikdayoq Eronchadan kam farq qiluvchi tilda gaplasha boshlaganlar.[15]

Xorazm tili va yozuviga to‘xtaladigan bo‘lsak, shuni ta’kidlash joizki Xorazm qadimgi Sharq sivilizatsiyasining shimol tomonga, dastlab skiflar, so‘ngra turklarning dasht qabilalari olamiga qarab juda ichkari kirib borgan tayanch nuqtasi edi. O‘rta Osiyodagi sivilizatsiya o‘choqlarining tarixini ko‘chmanchi qabilalar tarixidan ajralgan holda tasavvur qilish qiyin. Bu gap ayniqsa qadimgi Xorazm hududiga ko‘proq dahldordir.[16]

Shundan kelib chiqqan holda olimlar Xorazm tilini osetin va sug‘d tillari bilan birgalikda hind-yevropa tillarining qadimgi massaget va skif (sak) tillari chatishishi natijasida vujudga kelgan «Shimoliy Eron» deb ataluvchi sak-sarmat guruhiga kiritishadi.

Qadimgi xorazm tilini rus olimi V.A. Livshits Sug‘d va shimoliy-sharqiy Eron tillari oralig‘idagi o‘ziga xos til bo‘lib, uning parfiya, osetin va «Avesto» tillari bilan o‘zaro umumiyligi bor deb hisoblagan.[17]

Xorazm xududlari (quyi Amudaryo havzasi)da 1937 yildan boshlangan arxeologik qazishmalar davomida ko‘plab moddiy madaniyat yodgorliklari topilgan bo‘lsada, biroq, Xorazm tili va yozuvini o‘zida aks ettiruvchi topilmalar miloddan avvalgi I-ming yillikning o‘rtalarigacha bo‘lgan madaniy qatlamlarda arxeologlarimiz tomonidan hanuzgacha qayd qilinmagan. Ma’lumki, davlatchilik va boshqa ijtimoiy-siyosiy jarayonlarni yozuv madaniyatisiz tasavvur qilib bo‘lmaydi.

Markaziy Osiyoning Ahamoniylar davlati tarkibiga kiritilishi bir tomondan erkinlik va mustaqillikning yo‘qotilishiga olib kelgan bo‘lsada ikkinchi tomondan qadimgi Xorazm ham Sharq tamadduni yoyilgan mintaqalar doirasiga kiritildi. Quyi Amudaryo havzalarida sug‘orma dehqonchilik madaniyati jadallashib, hududda shaharsozlik madaniyati o‘z rivojining yangi bosqichiga ko‘tarildi.

[14] Косидовский З. «Библейские сказания. Сказания евангелистов». Москва. 1990. стр. 56-57
[15] Фрейман А.А. «Хорезмийский язык». М,-Л. 1951. стр. 7.
[16] Толстов С.П. Қадимги Хоразм маданиятини излаб. Тошкент. 1964. 381-бет.
[17] Лившиц В.А. Иранские языки народов Средней Азии. Т-1. Москва. 1962. стр. 139.

Oromiy alifbosi qadimgi fors yozuviga nisbatan ancha oson bo‘lganligidan Ahmoniylar saltanatining ma’muriy boshqaruv ishlarida keng qo‘llanila boshlanadi. Keyinchalik O‘rta Osiyoning turli rayonlarida oromiy yozuviga asoslangan mintaqaviy yozuvlar (xorazmiy, boxtariy, sug‘d) paydo bo‘ldi va ularning Markaziy Osiyo va Uzoq Sharqdagi keyingi namunalari – uyg‘ur, mo‘g‘ul va manjur alifbolari tarkib topdi. Xorazm alifbosi Ahamoniylar davridagi klassik oromiygacha borib taqaluvchi alohida mustaqil tarmoqni tashkil etadi. Olimlarning qayd qilishlaricha Xorazm alifbosida oromiycha an’analar yuqorida sanab o‘tilgan alifbolarning hammasidan ko‘ra ko‘proq saqlanib qolgan. Xorazm yozuvi uzoq yillar mobaynida kam o‘zgarishlarga uchragan.[18]

O‘rta Osiyo xalqlarining eng qadimgi yozuvi bu xumning sirtiga tushirilgan Xorazm tilidagi qisqa yozuvdir. Bu yozuv namunasi Katta Oybuyirqal’a shahar xarobasidan topilgan bo‘lib, u miloddan avvalgi V-IV asrlarga tegishlidir.

Miloddan avvalgi IV – milodiy I asrlarga taalluqli Qo‘yqirilganqal’a yodgorligidan xum sirtiga bitilgan yozuv namunasi topilib, u oromiycha osonlikcha o‘qiladigan xat bilan o‘yib yozilgan edi. Yozuv Spbr| DK -«Aspabarak» yoki «Aspabadak» deb o‘qiladi. Shubhasiz bu so‘z eronchadir. So‘zning ot o‘zagi ham, fe’l o‘zagi ham, uning oxiridagi affiks ham eronchadir. So‘zni «otda ketayotgan» yoki «ot minib turgan» (chavandoz) deb tarjima qalish mumkin. Umuman Qo‘yqirilganqal’a yozuvlarining xronologik chegarasi miloddan avvalgi III asrga, eng so‘nggilari miloddan avvalgi II asrning boshlariga to‘g‘ri keladi.[19]

Qadimgi xorazm yozuvi yodgorliklari bizning davrimizga qadar numizmatik materiallarda, qadimgi xo‘jalik buyumlarida (kumush piyola va kosalarda) saqlanib kelgan. Shuningdek arxelogik izlanishlar jarayonida Tuproqqal’a, To‘qqal’a va Mizdahkon shahar-qal’alaridan ham juda ko‘plab yozuv namunalari arxivi topilganki, qo‘lga kiritilgan boy yozuv yodgorliklari qadimgi Xorazmning arab istilosiga qadar bo‘lgan siyosiy, moddiy va ma’naviy hamda xo‘jalik munosabatlari tarixini yanada teranroq idrok etishga yordam beradi.

Xorazm yozuvining nodir namunalari milodimizning III-IV asrlari chegarasiga tegishli Tuproqqal’a yodgorligidan topilgan «Tuproqqal’a arxividir». Bu yozuv namunalari asosan teri, yupqa taxtachalar va tayoqchalarga yozilgan. Topilgan yuzlab xujjatlardan yog‘och taxtachalarga yozilgan 18 tasi yaxshi saqlangan. Teriga bitilgan yozuvlar ko‘pchilikni tashkil qilsada, ularning aksariyati yaxshi saqlanmaganligi bois 8 ta namunasinigina batafsil o‘qishga, umuman 26 ta xujjatni qiyosiy o‘qib tahlil qilishga muvaffaq bo‘lindi. Yozuvlarning hammasi qora siyoh bilan yozilgan. Tuproqqal’a xujjatlaridagi yozuvlar orqali Xorazm alifbosida oromiy yozuvida ham mavjud bo‘lgan 19 ta harf aniqlangan. Oromiydagi 3 ta harfning uchratilmaganligini (bular t, s, q harflari) xorazm tili va yozuvi bu davrga

[18] Толстов С.П. Лившиц В.А. Датированные надписи на хорезмийских оссуариях с городища Ток-Кала. Советская этнография. 1964. стр. 54.
[19] Толстов С.П. По древним дельтам Окса и Яксарта. Москва. 1962. стр. 130.

kelib ma’lum fonetik va grammatik o‘zgarishlarga uchraganligi bilan izohlash mumkin.[20]

Tuproqqal’a xujjatlaridagi yozuvlar Xorazm kursiv xati taraqiyotining boshlang‘ich bosqichini tashkil etib, uning keyingi rivoji Yakka Porson va To‘qqal’a ostadonlaridagi yozuvlarda nomoyon bo‘ladi. To‘qqal’a miloddan avvalgi I, milodiy XI asrlarga taalluqli yodgorlik bo‘lib, 1962-1964 yillarda bu yerda olib borilgan qazishmalar jarayonida xorazmcha yozuvlar bitilgan 54 ta sopol ostadonlar topildi. Shulardan 49 tasi yaxshi saqlangan bo‘lib, ularning dastlabki o‘qilishini va sharhlarini S.P. Tolstov, V.A. Livshits va A.V. Gudkovalar e’lon qilgan edilar.[21]

Sopol ostadonlar qapqog‘iga bitilgan ba’zi yozuvlar uzundan uzoq bo‘lsa, ba’zilari qisqa, bir yoki ikkita so‘zdan iborat bo‘lib ularda asosan marhumning ismi va ajdodi yoki uning sharafiga bitilgan diniy mazmundagi nasihatomuz so‘zlardir. Yozuvlarga qarab To‘qqal’a yozuv uslubining Tuproqqal’a yozuvidan birmuncha taraqqiy etganini kuzatish mumkin.

Arab istilosi va qadimgi xorazm yozma yodgorliklari noyob namunalarining yo‘q qilib tashlanashi oqibatida X-XI asrlardayoq Xorazmda arab-fors alifbosi asosida xorazm tilining fonetik xususiyatlarini o‘zida aks ettiruvchi yozuv yaratiladi. IX-XI asrlarga kelib Turon zaminida turkiy tilli qabila-elatlar hukmron mavqega ega bo‘la borib, an’anaviy qadimgi mahalliy til va yozuvlarni siqib chiqara boshlaydi. Qadimgi xorazm tili va yozuvi ham anashu jarayonlar ta’siriga tortila boshlanadi. Ammo arab grafikasida bo‘lsada Xorazm tilidan XI asr boshlarida Xorazmshohlar saroy yozishmalarida keng foydalanilgan. Tarixiy Bayxakiyda keltirilishicha, 1017 yilda Xorazmni bosib olgan Mahmud G‘aznaviy Xorazmshohlar saroyi xujjatlarini tintuv qilayotganida arabcha imlodagi notanish tildagi maktubni topadi. Aniqlanishicha, maktub Yaqub Jandiy tomonidan xorazmshohga yozilgan bo‘lib, unda bosqinchi Mahmud G‘aznaviy nomiga ko‘p haqoratomuz so‘zlar bitilgan edi. Xat mazmunidan xabardor bo‘lgan Mahmud Yaqub Jandiyni dorga osishga buyuradi. Umuman Xorazm tili XIII asr oxirigacha nafaqat so‘zlashuv tili, balki arab va tojik tillari singari yozuv tili sifatida o‘z ahamiyatini saqlab keladi[22]. XIV asrga kelib bu til istemoldan chiqib o‘lik tilga aylanadi.

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MILLIY AXLOQIY MADANIYATNING OILADA FARZAND TARBIYASIGA TA‘SIRI

Annotatsiya*: Ushbu maqolada milliy axloqiy madaniyatning oila muhitida farzand tarbiyasiga ko‘rsatadigan ta’siri yoritilgan. Milliy qadriyatlar, an’analar va urf-odatlarning farzand shaxsini shakllantirishdagi o‘rni tahlil qilinadi. Shuningdek, ota-onalarning axloqiy madaniyat darajasi, ularning farzandga namuna bo‘lishi hamda zamonaviy axborot oqimida milliy tarbiya tamoyillarini saqlab qolish masalalari ko‘rib chiqiladi.*

Kalit so’zlar: *Oila, milliy axloqiy madaniyat, farzand tarbiyasi, milliy qadriyatlar, urf-odatlar, axloq, tarbiya, ota-ona mas’uliyati, ma’naviyat, barkamol avlod.*

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THE IMPACT OF NATIONAL ETHICAL CULTURE ON THE UPBRINGING OF CHILDREN IN THE FAMILY

Abstract: *This article highlights the influence of national ethical culture on child upbringing within the family environment. The role of national values, traditions, and customs in shaping a child's personality is analyzed. Additionally, the study examines the level of parents' ethical culture, their example-setting for children, and the challenges of preserving national educational principles amid modern information flows.*

Keywords: *Family, national ethical culture, child upbringing, national values, traditions, customs, ethics, education, parental responsibility, spirituality, well-rounded generation.*

Oila har bir jamiyatning eng asosiy ijtimoiy bo‘g‘ini bo‘lib, u avlodlar davomiyligini ta’minlaydi va insonning ma’naviy-axloqiy shakllanishida muhim rol o‘ynaydi. Milliy axloqiy madaniyat esa oilada farzand tarbiyasining poydevori hisoblanadi. U milliy qadriyatlar, urf-odatlar va ma’naviy me’yorlar orqali bola shaxsini shakllantirishga yordam beradi. Axloqiy madaniyatning ana shu kuchli yaratuvchilik, doimo yangilanib boruvchi hayotbaxsh ta’sirini millat yoki xalq bilan chegaralab bo‘lmaydi. Shunga ko‘ra, oila nasllar davomiyligini ta’minlovchi doimiy va tabiiy manba bo‘lib, har bir davr oilaga o‘z ta’sirini o‘tkazadi, ya’ni davrga xos ijtimoiy o‘sish-o‘zgarishlar, islohotlar, ma’naviy-ruhiy yangilanishlar

oila ma’naviyatida o‘z izini qoldiradi. Binobarin, demografik siyosatning obyekti ham, maqsadi ham, eng ta’sirchan va muhim vositalaridan biri oiladir.

Milliy axloqiy madaniyatning asosiy vazifalaridan biri – farzandlarni milliy qadriyatlar ruhida tarbiyalashdir. Ota-onalar bola hayotida birinchi va eng muhim o‘rnak hisoblanadi. Ularning axloqiy madaniyati, hurmat va mehr-muruvvati farzandning odob-axloqiy rivojlanishiga bevosita ta’sir qiladi.

Yaqin o‘tmishda milliy va umuminsoniy axloqiy madaniyatning oila tarbiyasi bilan munosabatlaridagi uyg‘unlikka putur yetkazildi. Avvalo, milliy va umumbashariy merosga munosabatning biryoqlamaligi oila tarbiyasida bir qator salbiy xususiyatlarni keltirib chiqardi.

Jamoa timsoli bo‘lgan oila, mahalla, el-yurt tushunchalarining muqaddasligi unutilayozdi, millat ruhining oynasi bo‘lgan ona tilimizga munosabat salbiy ma’no kasb etdi. Madaniyati, tili, millatidan begonalashgan manqurtlar toifasi jamiyat va oila o‘rtasidagi o‘ziga xos uyg‘unlikka putur yetkazishning oqibat natijasi edi. Holbuki, jamiyatda paydo bo‘lgan har qanday ijtimoiy illat madaniyatga xos me’yoriy mezonlarning buzilishidan, oila tarbiyasi izdan chiqishidan hosil bo‘lishi sir emas.

Mustaqillik qo‘lga kiritilgach, bu borada ham katta o‘zgarishlar sodir bo‘ldi. Jumladan, oilaning jamiyat tayanchi, ma’naviy tarbiya o‘chog‘i sifatidagi roli e’tirof etildi, uning farovonligi — milliy farovonlik asosi ekani asosiy qonun — O‘zbekiston Konstitutsiyasida belgilab qo‘yildi. Ta’bir joiz bo‘lsa, ushbu so‘zlarda muqaddas Vatan timsoli bo‘lgan oila fenomeniga munosib baho berilgan.

Oila tarbiyasida milliy qadriyatlarning o‘rni shundan iboratki, ular farzandga sevgi, hurmat, sabr-toqat, hamkorlik, fidoyilik kabi sifatlarni singdiradi. Shu bilan birga, milliy an’ana va urf-odatlar bolaning milliy ongini shakllantiradi, u kelajakda jamiyatda mas’uliyatli va axloqiy yetuk shaxs bo‘lib voyaga yetishiga yordam beradi.

Oila tarbiyasida ayol markaziy ro‘l o‘ynaydi. U farzandning birinchi tarbiyachisi bo‘lib, nafaqat uning ma’naviy, balki milliy ongini ham shakllantiradi. Ayolning mehr-muruvvati, sabri, bilimi va axloqiy namunalari bola tarbiyasida asosiy vosita hisoblanadi.

- Ayol — oila munosabatlarining vujudga kelish sababchisi, avlodlar davomiyligining g‘oyasidir.
- Ayol — oila tarbiyasining bosh murabbiylaridan biri, ya’ni farzandning dunyoga kelishiga sabab bo‘luvchi, nasliy sifatlarni bir avloddan ikkinchi avlodga ko‘chiruvchi, avlod ma’naviyatiga asos soluvchi insondir.
- Ota va uning ajdodlariga, qarindosh-urug‘lariga, aka-uka, opa-singillarga, qo‘ni-qo‘shnilarga munosabat ham, avvalo, onadan, uning boshqalarga iliq munosabatidan boshlanadi.
- Jamiyatda insonparvarlik va adolat tuyg‘ulari ayoldan boshlanadi.
- Go‘zallikka, mehr-muruvvatga, imon-e’tiqodga tashnalik ham ayol tufaylidir.
- Ona tiliga munosabat, uni bilish va anglash jarayonida ayol mohir tilshunos missiyasini bajaradi.

• Nihoyat, ayol farzandga tarbiya va ta’lim berar ekan, o‘z oilasidagi an’analarni davom ettiradi, oila shajarasini rivojlantiradi.

Tabiiyki, ayol ado etadigan mazkur xizmat va vazifalar jamiyatdagi ilg‘or g‘oyalarni, madaniyatni, ma’naviy-ma’rifiy omillarni boyitadi.

Sharqda ayollarga munosabatda adolat, insonparvarlik, teng huquqlilik mezonlari ustuvor bo‘lganligi demokratik tamoyillarning vujudga kelishida muhim rol o‘ynadi, keyinchalik esa bu tamoyillar G‘arb tamaddduniga, ayniqsa G‘arb uyg‘onish davriga kuchli ta’sir etib, uning keng yoyilishiga turtki berdi.

Biz odatda oilaga ta’rif berar ekanmiz, uni doimo jamiyat, yurt, Vatan so‘zlari bilan yonma-yon ishlatamiz. Uni hamisha jamiyat tayanchi, el-yurt negizi, Vatan timsoli sifatida ta’riflashga harakat qilamiz. Masalan: “Oila — jamiyatning negizi. Bizning davlatimizni ham katta bir oila deb tushunish mumkin va lozim. Bunda o‘zaro hurmat va tartib bo‘lmasa, oilaning barcha a’zolari o‘z burchlarini ado etmasa, bir-biriga ezgulik bilan mehr-oqibat ko‘rsatmasa, yaxshi va munosib tarzda yashash mumkin emas.”

Oila turmush va vijdon qonunlari asosiga quriladi, o‘zining ko‘p asrlik mustahkam va ma’naviy tayanchlariga ega bo‘ladi, oilada demokratik negizlarga asos solinadi, odamlarning talab-ehtiyojlari va qadriyatlari shakllanadi. O‘zbekistonliklarning aksariyati o‘z shaxsiy farovonligi to‘g‘risida emas, balki oilasi, qarindosh-urug‘lari va yaqin odamlarning, qo‘ni-qo‘shnilarning omon-eronligi to‘g‘risida g‘amxo‘rlik qilishni birinchi o‘ringa qo‘yadi. Bu esa eng oliy darajada ma’naviy qadriyat, inson qalbining gavharidir.

Oilaning sog‘lom va barkamol avlodni shakllantiruvchi asosiy bo‘g‘in ekani va bu muhim vazifa ota-ona, farzandlar va nuroniy keksalar silsilasini yaxlit jarayon sifatida o‘rganilgandagina kutilgan samaralarni beradi.

Oilani muqaddas deb bilish zamirida quyidagilar namoyon bo‘ladi:

• Oila — ota-onam, aka-ukalarim va opa-singillarimning kindik qoni to‘kilgan, ko‘z ochib ko‘rgan makonidir.

• Bu oilada, shuningdek, bobo va bobokalonlarim, momolarim yashagan, ularning ruhi barhayot.

• Binobarin, oilamiz tasodifan yuzaga kelgan ittifoq emas, u avlod-ajdodlarimizning navbatdagi bo‘g‘ini, biz esa uning davom ettiruvchisimiz.

• Oilamiz biz ko‘rib turgan darajaga o‘z-o‘zidan chiqib olgan emas; buning uchun ota-onam va ularning ota-bobolari tinimsiz mehnat qilgan.

• Shunday ekan, uni yanada rivojlantirish, yangi kamolot nuqtasigacha yuksaltirish mening burchim.

• Demak, men oila a’zolarim oldida bir umrga ma’naviy qarzdorman.

Agar oila muqaddasligi g‘oyasini kenja avlod vakillari tilidan ifoda etish mumkin bo‘lsa, u teng huquqlilik, erkinlik va oilaviy munosabatlar imon-e’tiqod asosida qurilganligini aks ettiradi. Oiladagi mehr-oqibat, ezgulik va tartib-intizom hissi esa oila madaniyatining darajasini belgilaydi. Bu jamiyat va oilaning, milliy va umuminsoniy axloqiy madaniyat tamoyillari hamda oila madaniyatining uyg‘unligini namoyon etuvchi mezondir. Sog‘lom muhitning ibtidosi ham oila, oila

muhitidir. Oila muhitining sog‘lomligi esa jamiyatdagi ma’naviy-ruhiy muhit bilan uyg‘un holdagina mavjud bo‘ladi.

Xulosa o’rnida aytadigan bo’lsak, Milliy va umuminsoniy axloqiy madaniyat oila tarbiyasi bilan chambarchas bog‘liq bo‘lib, oilani jamiyatning tayanchi va farovonlik manbai sifatida belgilaydi. Ayol oilada markaziy rol o‘ynaydi, u avlodlarni tarbiyalaydi, milliy va ma’naviy qadriyatlarni davom ettiradi. Oila muqaddas bo‘lib, unda o‘zaro hurmat, tenglik, mehr-muruvvat va intizom prinsiplariga asoslanadi. Sog‘lom oilaviy muhit jamiyatdagi ma’naviy-ruhiy rivojlanishning boshlang‘ich omilidir.

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ZARDUSHTIYLIK DINING TARQALGAN HUDUDLARI VA UNING XORAZM MADANIYATIGA TA’SIRI

Annatatsiya. *Maqola Xorazm viloyatining madaniyatiga diniy ta’sirlarni o‘rganadi, xususan zardushtiylik dini va uning Avesto kitobi hamda monumentlari orqali hududning urf-odatlari, bayramlari va raqs-musikasi shakllanishi tahlil qilinadi. Ushbu tadqiqot Xorazm madaniyatining diniy va tarixiy qatlamlarini chuqurroq tushunishga yordam beradi.*

Kalit so’zlar: *Xorazm viloyati, Zardushtiylik, diniy ta’sir, Avesto, Xorazm madaniyati, Folklor, Lazgi, Tuxum barak.*

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THE AREAS WHERE ZOROASTRIANISM SPREAD AND ITS INFLUENCE ON KHOREZM CULTURE

Abstract. *The article examines the religious influences on the culture of the Khorezm region, in particular, the Zoroastrian religion and its Avesta book and monuments, analyzing the formation of the region's customs, holidays, and dance and music. This study contributes to a deeper understanding of the religious and historical layers of Khorezm culture.*

Keywords: *Khorezm region, Zoroastrianism, religious influence, Avesta, Khorezm culture, Folklore, Lazgi, Tukhum Barak.*

Kirish. Xorazm viloyati — O‘zbekistonning qadimiy madaniy markazlaridan biri bo‘lib, boy tarixiy meros va turli dinlar bilan boyitilgan madaniy muhitga ega. Hudud uzoq asrlar davomida turli e’tiqodlar, jumladan zardushtiylik, buddizm va keyinchalik Islom dini ta’sirida shakllangan. Bu dinlar nafaqat Xorazmning diniy hayotiga, balki uning urf-odatlari, bayramlari, san’ati va raqs-musikasi kabi madaniy jihatlariga ham chuqur ta’sir ko‘rsatgan. Shu bois, Xorazm madaniyati tarixini o‘rganish, uning diniy va madaniy qatlamlarini tahlil qilish orqali viloyatning madaniy o‘ziga xosligini va xalq an’analari rivojlanishining ildizlarini yanada teranroq tushunish mumkin.

Asosiy qism. Zardushtiylik (Zarathushtrizm) eramizdan avvalgi I–VI asrlarda paydo bo‘lgan qadimgi dinlardan biri bo‘lib, asosan monoteistik yoki dualistik e’tiqodlarga asoslangan. Uning asoschisi Zardusht (Zarathushtra) bo‘lib, asosiy e’tiqodlari Ahura Mazda (yaxshilik ilohi) va Angra Mainyu (yomonlik kuchi) mavjudligiga asoslanadi. Din olovga muqaddaslik sifatida qaraydi, ibodatlar olov

yonida o‘tkaziladi. Inson hayoti axloqiy tanlov va yomonlik bilan kurash orqali shakllanadi [1]. Turli ibodatlar o’tkazilgan payt olov yoqish odati haligacha yoshi kattalar orasida ba’zi hududlarda saqlanib qolgan. Zardushtiylik dastlab Eron hududida paydo bo‘lgan, keyinchalik Movarounnahr (jumladan, Xorazm), Buxoro, Samarqand va Hindiston (Parsi jamoalari) hududlarida tarqalgan. O‘zbekistonda, xususan Xorazm viloyatida, zardushtiylik ta’siri arxeologik topilmalar — qadimiy ibodatxonalar, mazarlar va yozuvlar orqali aniqlangan [2,3]. Zardushtiylik odatlari Xorazmda haligacha saqlanib qolgan. Masalan: yangi kelinchak kelgan payt olov yoqiladi va kelinchak olov ustidan o’tqaziladi, yangi kelin-kuyov kelayotgan avtomobil yo’liga ham kichik qilib olov yoqiladi hamda yangi tug’ilgan chaqaloq uyga kelgan paytda onasi bilan birgalikda olov ustidan o’tkaziladi. Shu kabi zardushtiylik odatlari saqlanib qolgan.

Avesto — zardushtiylikning muqaddas kitobi bo‘lib, qadimgi eron tilida yozilgan. Unda ibodatlar, marosimlar, qo‘shiqlar va axloqiy ta’limotlar keltirilgan[1]. Xorazmda Urganch shahrida Avesto bog’ majmuasi va uning tarkibida Avesto me’moriy majmuasi bunyod etilgan. Majmua 2001-yili Xorazmda „Avesto“ning 2700 yilligini nishonlash tadbirlarini o‘tkazish oldidan bunyod etilgan.

Xorazm viloyati qadimiy tarixiy merosga boy bo‘lib, Urganch va Xiva shaharlarida ilm-fan, savdo va hunarmandchilik rivojlangan. Bayramlardan Navro‘z, Qurbon hayiti, Ramazon hayiti xalq urf-odatlariga mos ravishda nishonlanadi. Atlas va adras matolari, sopol buyumlar va kulolchilik rivojlangan. Taomlardan viloyatning o’ziga xos bo’lgan, boshqa joylarda uchramaydigan : shivit oshi, ijjon, tuxum barak, unoshi kabi taomlari mashhur.Xorazm folklori o‘ziga xos maqom va ashula an’analari bilan ajralib turadi. Xorazm lazgizi mashhurdir. Xorazm lazgisi viloyatning milliy identifikatori hisoblanadi. Xorazm lazgisi dastlab ohista tana harakatlari bilan boshlanganligi, ruhning tanaga kirishiga o’xshatiladi. Bu Islom dinining madaniyatga ta’siri deb ham baholash mumkin.

Xulosa: Xorazm viloyatining madaniyati ko‘p asrlar davomida turli dinlarning, xususan zardushtiylik va Islomning ta’siri ostida shakllangan. Zardushtiylik dini va uning Avesto kitobi hamda monumentlari hududning urf-odatlari, bayramlari, san’ati va raqs-musikasiga sezilarli ta’sir ko‘rsatgan. Shu bilan birga, Islom dini madaniyatning yanada boyishiga va tasavvufiy talqinlarning shakllanishiga hissa qo‘shgan. Xorazm madaniyatidagi bu diniy qatlamlar viloyatning tarixiy va madaniy o‘ziga xosligini yanada boyitib, xalq an’analari va folklorining rivojlanishida muhim rol o‘ynagan.






Qadimiy zardushtiylik e’tiqodi va keyinchalik Islom dini Xorazm madaniyati, urf odat va diniy marosimlarga ta’sir ko‘rsatgan[4,5].

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VARVARLAR: GEOGRAFIYA VA MADANIYATNING O‘ZARO TA’SIRI

Annatatsiya.*Ushbu maqola "varvar" atamasi ostida qadimgi Yunon va Rim jamiyatlarida o‘zlaridan farqli tillar va hayot tarzi bilan ajralib turgan ko‘chmanchi xalqlarning geografik tarqalishi va madaniyatiga e’tibor qaratadi. Hunlar, Gotlar, Vandallar va Franklar kabi qabilalarning yashash muhiti ularning iqtisodiy, ijtimoiy va harbiy tuzumlarini shakllantirgani tahlil etiladi.*

Kalit so’zlar:*Varvarlar, geografik tarqalish, madaniyat, ko‘chmanchi hayot, Hunlar, Gotlar, Vandallar, Franklar, Rim imperiyasi, Buyuk xalqlar ko‘chishi, xristianlik tarqalishi, harbiy taktika, qishloq xo‘jaligi.*

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BARBARIANS: THE INTERPLAY OF GEOGRAPHY AND CULTURE

Abstract. *This article focuses on the geographical distribution and culture of nomadic peoples, distinguished by their languages and lifestyles, under the term "barbarian" in ancient Greek and Roman societies. It analyzes how the living environment of tribes such as the Huns, Goths, Vandals, and Franks shaped their economic, social, and military systems.*

Keywords: *Barbarians, geographical distribution, culture, nomadic life, Huns, Goths, Vandals, Franks, Roman Empire, Migration Period, spread of Christianity, military tactics, agriculture.*

“Varvar” atamasi qadimgi Yunon va Rim jamiyatlarida o‘zlaridan farqli tillar va turmush tarziga ega xalqlarni tasvirlash uchun ishlatilgan. Yunoncha “barbaros” so‘zi “begona” yoki “tushunarsiz til” degan ma’noni anglatib, keyinchalik Rimliklar tomonidan imperiya chegaralaridan tashqaridagi ko‘chmanchi va yarim ko‘chmanchi qabilalarga nisbatan qo‘llanilgan. Bu xalqlarning madaniyati va hayot tarzi ular yashagan geografik muhit bilan chambarchas bog‘liq edi. Ushbu maqola varvar xalqlarining geografik tarqalishi, ularning madaniy xususiyatlari va bu omillarning Yevropa tarixidagi ta’sirini o‘rganadi.

Varvar xalqlari Yevropa, Osiyo va Shimoliy Afrikaning turli hududlarida yashagan bo‘lib, ularning yashash muhiti iqtisodiy, ijtimoiy va harbiy tuzumlarini shakllantirgan. Quyida asosiy varvar guruhlari va ularning geografik hududlari qisqacha tasvirlanadi:

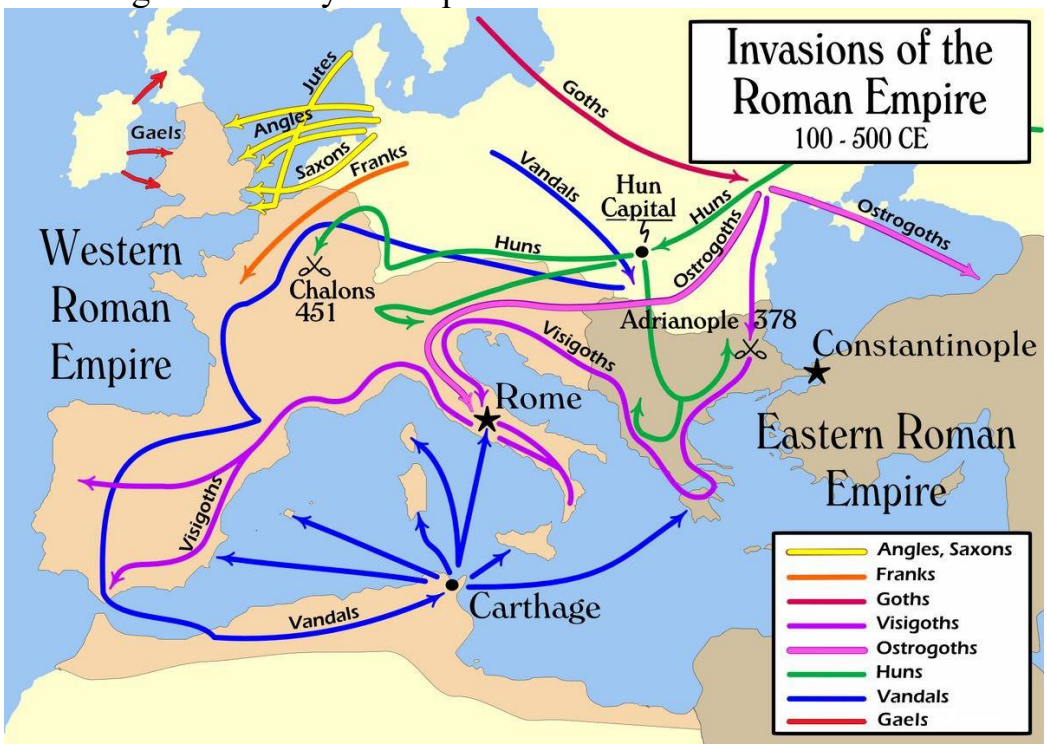
Hunlar – dastlab Markaziy Osiyoning dashtlik hududlarida, xususan, hozirgi Mongoliya va Qozog‘iston atrofida yashagan. Bu keng dashtlar otliq ko‘chmanchi hayot tarzini rivojlantirishga imkon berdi. Milodiy 4-asrda ular g‘arbga, Volga daryosi va Qora dengiz bo‘ylariga (hozirgi Ukraina va Rossiya janubiga) ko‘chib o‘t[1]. Ushbu ochiq landshaftlar Hunlarning tezkor otliq jangovar taktikalarini rivojlantirishga yordam berdi.

Gotlar. Gotlar Skandinaviyadan kelib, milodiy 2–3-asrlarda Qora dengizning shimoliy qirg‘oqlarida (hozirgi Ukraina va Ruminiyaga) joylashdilar. Sharqiy Gotlar (Ostrogotlar) va G‘arbiy Gotlar (Vestgotlar) o‘rmonli va dashtli hududlarda qishloq xo‘jaligi va chorvachilik bilan shug‘ullangan. Keyinchalik ular Italiya va Ispaniyaga ko‘chib, Rim madaniyati bilan sintez yaratdilar [2].

Vandallar.Vandallar dastlab Markaziy Yevropada, hozirgi Polsha va Germaniya hududlarida yashagan. 5-asrda ular Galliya va Ispaniyaga, so‘ngra Shimoliy Afrikaga (hozirgi Tunis va Jazoirga) ko‘chib o‘tdilar. O‘rta yer dengizi iqlimi va savdo yo‘llari ularga dengiz floti tashkil qilish va Rim savdosiga putur yetkazish imkonini berdi [4].

Franklar Reyn daryosi atrofida (hozirgi Germaniya va Fransiya chegaralarida) yashab, serhosil yerlarda qishloq xo‘jaligi bilan shug‘ullanishgan. Bu hududning strategik joylashuvi ularga Rim chegaralariga qarshi mudofaa va hujumlarni tashkil qilishda yordam berdi [5].

Varvar guruhlari Buyuk xalqlar ko’chishi kartasida:



https://mg.m.wikipedia.org/wiki/Sary:Invasions_of_the_Roman_Empire.svg

Yuqoridagi ma’limotlardan kelib chiqqan holda “Asosiy Varvar qabilalari va ularning geografik hududlari” jadvalini ishlab chiqishimiz mumkin:

Qabila	Asosiy hududlar (4-5-asrlar)
Hunlar	Markaziy Osiyodan Sharqiy Yevropaga (Volga va Qora dengiz)
Gotlar	Skandinaviyadan Qora dengiz bo'ylariga (Italiya/Ispaniya)
Vandallar	Markaziy Yevropadan Shimoliy Afrikaga (Tunis)
Franklar	Reyn daryosi bo'ylaridan Galliyaga (Fransiya)

Varvar xalqlarining madaniyati ularning geografik muhitiga moslashgan holda rivojlangan. Quyida ularning madaniyatining asosiy jihatlari va geografik omillar bilan aloqasi ko‘rib chiqiladi:

Hunlarning madaniyati Markaziy Osiyo dashtlarining ochiq landshaftlariga moslashgan edi. Ular otliq chorvachilik bilan shug‘ullanishgan va tezkor hujum taktikalariga ega bo‘lgan. Otliq o‘qchilar va kavisli yoylardan foydalanish Hunlarni Rim armiyasiga qarshi muvaffaqiyatli qilgan [3]. Bu taktikalarni ochiq dashtlar va harakatchanlik imkoni bo‘lmagan hududlarda rivojlantirish qiyin bo‘lardi.

Gotlar va Franklar kabi xalqlar serhosil yerlarga ega hududlarda o‘troq yoki yarim ko‘chmanchi hayot tarzini olib borgan. Masalan, Gotlar Qora dengiz bo‘yida don yetishtirish va chorvachilik bilan shug‘ullanishgan, bu esa ularga barqaror ijtimoiy tuzum – jangchilar sinfiga asoslangan tuzilma – yaratishga imkon berdi [2]. Franklarning Reyn daryosi bo‘yidagi serhosil yerlari esa ularning iqtisodiy barqarorligini ta’minladi.

Varvar xalqlarining dini dastlab tabiatga sig‘inish va ko‘p xudolarga ishonishga asoslangan edi. Biroq, Rim provinsiyalariga yaqinlik, ayniqsa Galliya va Italiyada, xristianlikning tarqalishiga olib keldi. Franklarning yetakchisi Xlodvig milodiy 496-yilda xristianlikni qabul qilib, Yevropada xristian davlatlarining poydevorini qo‘ydi [5]. Geografik yaqinlik Rimning diniy va madaniy ta’sirini osonlashtirdi.

Vandallar Shimoliy Afrikaga ko‘chib o‘tgach, O‘rta yer dengizidagi savdo yo‘llarini nazorat qila boshladilar. Ularning dengiz floti tashkil qilishi va Rim shaharlariga qarshi talon-taroj hujumlari (masalan, 455-yilda Rimni talon-taroj qilish) ularning geografik joylashuvining strategik ahamiyatini ko‘rsatdi [4].

Varvar xalqlarining geografik ko‘chishlari va madaniy xususiyatlari G‘arbiy Rim imperiyasining qulashida (milodiy 476) va O‘rta asr Yevropasining shakllanishida muhim rol o‘ynadi. Ularning Rim an’analari bilan sintezi yangi davlatlar va madaniyatlarning paydo bo‘lishiga olib keldi:

- Franklar hozirgi Fransiya va Germaniyaning siyosiy va madaniy poydevorini qo‘ydi.
- Vestgotlar Ispaniyada Rim huquqiy tizimlari va xristianlikni o‘z madaniyatlari bilan birlashtirdi.
- Ostrogotlar Italiyada Rim infratuzilmasini saqlab, keyingi madaniy rivojlanishga zamin yaratdi.

Zamonaviy tarixshunoslikda “varvar” atamasi o‘ta salbiy ma’noga ega deb hisoblanib, “ko‘chmanchi xalqlar” yoki “german qabilalari” kabi atamalar bilan almashtiriladi. Ularning madaniyati “yovvoyi” emas, balki o‘ziga xos ijtimoiy va iqtisodiy tuzumlarga ega edi [1].

Varvar xalqlari o‘zlarining geografik muhitlariga moslashgan holda turli madaniyatlarni rivojlantirdilar. Hunlarning otliq jangovar madaniyati, Gotlar va Franklarning qishloq xo‘jaligi, Vandallarning dengiz savdosi – bularning barchasi ularning yashash joylari bilan bog‘liq edi. Ular nafaqat Rim imperiyasining qulashiga sabab bo‘ldi, balki Yevropaning yangi davrga o‘tishida muhim rol o‘ynadi. Ularning merosi bugungi Yevropa xalqlarining etnik va madaniy ildizlarida saqlanib qolgan.

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THE IMPACT OF SARS-COV-2 INFECTION ON METABOLIC AND ENDOCRINE CHANGES IN PATIENTS WITH DIABETES MELLITUS

Abstract: *This article explores the impact of COVID-19 (SARS-CoV-2) infection on metabolic and endocrine changes in patients with diabetes mellitus. Diabetic individuals are at significantly higher risk of severe disease, characterized by hyperglycemia, insulin resistance, inflammatory cytokine elevation, and hormonal imbalance. The article discusses viral damage to pancreatic β-cells, endocrine consequences of cytokine storm, and the bidirectional relationship between COVID-19 and diabetes.*

Keywords: *COVID-19, SARS-CoV-2, diabetes mellitus, metabolic changes, endocrine system, insulin resistance*

1. Introduction

The coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), emerged in late 2019 and has since evolved into a global pandemic affecting multiple organ systems. Although primarily a respiratory illness, COVID-19 also exerts profound effects on metabolic and endocrine functions. Clinical evidence shows that patients with diabetes mellitus (DM) experience more severe forms of COVID-19, with higher rates of hospitalization, complications, and mortality.

Diabetes mellitus is a chronic metabolic disorder characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. It is known to compromise immune responses and increase systemic inflammation, which predisposes patients to more severe viral infections. In the context of COVID-19, these factors are further exacerbated by the virus's effects on the endocrine system.

SARS-CoV-2 uses the angiotensin-converting enzyme 2 (ACE2) receptor to enter human cells. This receptor is expressed not only in the lungs but also in the pancreas, thyroid, adrenal glands, and gonads, suggesting that the endocrine system may be a direct target of viral invasion. Viral entry into pancreatic β-cells can impair insulin secretion, potentially triggering new-onset diabetes or worsening glycemic control in pre-existing diabetes.

Additionally, systemic inflammation and cytokine release — often referred to as a "cytokine storm" — amplify insulin resistance and disrupt metabolic balance. Treatment regimens involving glucocorticoids, frequently used in severe COVID-19 cases, further exacerbate hyperglycemia.

The interaction between diabetes and COVID-19 thus forms a vicious cycle: hyperglycemia impairs immune defense, facilitating viral replication and worsening

inflammation, which in turn deteriorates glucose homeostasis. Understanding this bidirectional relationship is essential for optimizing management strategies for diabetic patients during and after COVID-19 infection.

Beyond glycemic abnormalities, COVID-19 has been linked to disturbances in other endocrine axes. Studies have demonstrated transient thyroid dysfunction, adrenal insufficiency, and gonadal hormonal imbalance during and after infection. These findings highlight that COVID-19 should not be viewed solely as a respiratory disease but rather as a **multisystemic endocrine disorder** in certain contexts.

Understanding the **metabolic-endocrine interface of COVID-19** is crucial for developing appropriate treatment strategies, as unregulated glycemia contributes to increased disease severity, prolonged recovery, and higher mortality. Furthermore, the recognition of post-COVID metabolic complications underscores the need for long-term endocrinological monitoring.

2. Methods

This review was conducted through a comprehensive literature search using PubMed, Scopus, and Google Scholar databases for the years 2020–2025. Search terms included *"COVID-19," "SARS-CoV-2," "diabetes mellitus," "metabolic changes," "endocrine dysfunction,"* and *"insulin resistance."* Over 100 publications were initially screened. Thirty of the most relevant studies were analyzed in detail, and fifteen high-quality, peer-reviewed articles were selected for citation in this paper based on clinical significance and methodological rigor.

3. Results

- **Increased Insulin Resistance:** COVID-19 was found to increase insulin resistance in diabetic patients by 25–50%, leading to poorer glycemic control.
- **β-Cell Damage:** Pancreatic β-cells expressing ACE2 receptors showed susceptibility to direct viral injury, reducing insulin secretion.
- **New-Onset Diabetes:** Several studies reported cases of new-onset diabetes in previously non-diabetic patients following SARS-CoV-2 infection.
- **Inflammatory Markers:** Elevated cytokines such as IL-6 and TNF-α were associated with disrupted insulin signaling pathways.
- **Hyperglycemia and Ketoacidosis:** The incidence of severe hyperglycemia and diabetic ketoacidosis increased among COVID-19 patients with diabetes.
- **Higher Mortality:** Diabetic patients demonstrated a 2–3 times higher risk of severe outcomes and mortality from COVID-19 compared to non-diabetic individuals.

4. Discussion

The evidence demonstrates a complex bidirectional relationship between COVID-19 and diabetes. Diabetes increases susceptibility to infection, while SARS-CoV-2 further aggravates metabolic dysfunction. Hyperglycemia enhances viral replication and immune dysregulation, contributing to cytokine storm and endothelial injury.

The use of corticosteroids in COVID-19 therapy, although lifesaving, complicates glucose management. Therefore, continuous glucose monitoring, insulin therapy adjustment, and anti-inflammatory interventions are critical in managing diabetic patients with COVID-19.

Furthermore, post-COVID-19 follow-up studies indicate persistent metabolic disturbances even after viral clearance. Endocrine evaluations—particularly of thyroid, adrenal, and pancreatic function—should be included in post-COVID care for diabetic patients.

5. Conclusion

SARS-CoV-2 infection profoundly impacts metabolic and endocrine systems in patients with diabetes mellitus. The virus not only worsens glycemic control but also triggers endocrine dysfunctions that contribute to disease severity and mortality. Optimal management requires integrated care, including strict glycemic monitoring, tailored insulin therapy, and endocrinological follow-up after recovery.

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EARLY DIAGNOSIS OF ANTIPHOSPHOLIPID SYNDROME IN PREGNANT WOMEN

Abstract. *Antiphospholipid syndrome (APS) is a significant autoimmune disorder characterized by the presence of antiphospholipid antibodies (aPL), which disrupt normal hemostatic balance and contribute to thrombotic complications. In autoimmune thrombophilia, the concentration of aPL often exceeds that of phospholipids and glycoproteins bound to negatively charged phospholipid membranes. These immunological changes lead to endothelial dysfunction, thrombocytopenia, and activation of platelet aggregation, resulting in a disturbed coagulation cascade. Consequently, local macro- and microthromboses form within the microvasculature, causing impaired placental vascularization and recurrent pregnancy loss associated with placental insufficiency.*

This article presents the findings of our study conducted among women who experienced recurrent miscarriage due to antiphospholipid syndrome, emphasizing the importance of early diagnosis and pre-gravid preparation to prevent pregnancy complications.

Keywords: *recurrent pregnancy loss, antiphospholipid syndrome, autoimmune thrombophilia, placental insufficiency, early diagnosis*

Relevance. Miscarriage is a complex, multifactorial condition, and one of its main pathogenetic mechanisms involves congenital or acquired disorders of the hemostatic system [2,4,8,9,10]. Despite extensive research, many aspects remain unclear, and there is no definitive consensus regarding the specific contribution of individual factors to recurrent pregnancy loss, fetal growth restriction, preeclampsia, gestational hypertension, and spontaneous abortion [1,3,7,11,12]. A growing body of evidence indicates that antiphospholipid syndrome (APS) plays a critical role in the development of these adverse gestational outcomes. Physiological activation of the coagulation system during early pregnancy facilitates blastocyst implantation and prevents peri-implantation hemorrhage during endovascular invasion of the trophoblast [5,6,8,13,18]. However, in clinical practice, the rising incidence of extragenital vascular diseases, especially those associated with APS, contributes to systemic hemodynamic and microcirculatory disturbances, including uterine circulation abnormalities [14,5,16,17]. Excessive fibrin deposition at the implantation site and microthrombosis of spiral arteries and arterioles disrupt normal placental invasion, potentially leading to early pregnancy

loss or primary placental insufficiency, which predisposes to further obstetric complications.

Purpose of the study. To evaluate the diagnostic value of hemostatic system markers and antiphospholipid antibodies in the early detection of structural and functional placental abnormalities.

Materials and methods. This study included 70 pregnant women at risk of miscarriage and 35 women with normal pregnancies, all of whom were observed at the Bukhara Regional Perinatal Center between 2020 and 2022. Venous blood and serum samples were collected for hematological and biochemical analyses. The study employed general clinical, ultrasound, Doppler, biochemical, hematological, and statistical methods, with data analysis performed using the Fisher–Student test. Information from each participant was recorded in a specially designed questionnaire and statistically processed. Participants were categorized by age: 19–25 years (21 women, 20%), 26–35 years (68 women, 64.7%), and over 35 years (16 women, 15.2%). The majority (72 women, 69%) resided in urban areas (mainly Bukhara), while 33 (31%) were from rural regions.

Employment analysis revealed that most participants were temporarily unemployed (13.3%) or housewives (42.8%), while 7.6% performed manual labor and 36% were engaged in intellectual work. The mean age at menarche was 13.5 ± 0.4 years in the study group and 13.8 ± 0.2 years in the control group ($p \leq 0.05$). The menstrual cycle duration ranged from 26 to 32 days, averaging 4.3 days in the main group and 4.1 days in the control group ($p \leq 0.05$).

Results. Women who experienced recurrent miscarriages at 9–10 weeks of gestation showed markedly elevated antiphospholipid antibody levels. The mean number of gestational losses was 3.76 ($P < 0.001$). Serum concentrations of IgM anti-phospholipid and IgG anti-β2-glycoprotein antibodies were increased 15-fold ($P < 0.001$) and 11.8-fold ($P < 0.001$), respectively, compared to the control group. These findings confirm that recurrent pregnancy loss at 9–10 weeks of gestation is strongly associated with antiphospholipid syndrome.

Table 1. Indicators for antiphospholipid syndrome in recurrent miscarriage, M ± m

Index	**Physiological pregnancy, 9-10 week, n = 35**	**Misscarriage 9-10 week, n = 35**
VA, conventional unit	0,50±0,04	1,88±0,06***
IgM anti-FL, U/ml	1,17±0,11	23,43±1,00***
IgG anti-β2-GP	1,33±0,14	15,74±1,01***

Note: * - differences between the control group and patients with APS are significant (P<0.05), ** - P<0.01 and * - P<0.001.**

It should be noted that when interpreting the results of the VA indicator, it is necessary to pay attention to the degree of its increase, i.e.: if its value is about 1.2-1.5 conventional units - the average change, if it is 1.5-2.0 conventional units - the formation of blood clots in the veins, if it is above 2.0, then the danger is strong. In

our study, VA was 1.88 ± 0.06 units, which is due to the formation of macro- and microthrombosis in the fetal tract, impaired fetoplacental circulation, and the absence of habitual miscarriage.

It is known from the literature that antibodies to APL slow down the synthesis of prostacyclin in endothelial cells by inhibiting phosphorylase A2 and protein S and contribute to the formation of blood clots. The resulting antibodies bind to the phospholipids of cell membranes and lead to conformational and metabolic changes in the membranes. This leads to their dysfunction, slowing down and cessation of blood flow in capillaries and venules, as well as to thrombosis. However, it should be noted that antibodies to APL are also present to some extent in the blood serum of healthy people, and this is associated with cell renewal.

In our study, women who had recurrent miscarriage were 15 ($P < 0.001$) higher than those in the control group, indicating the presence of APS. Such a sharp increase leads to the connection of platelets and vascular endothelium and, as a result, to their destruction, the development of thrombosis and thromboembolism. At the same time, we observed a 12-fold ($P<0.001$) increase in serum anti-β2-GP IgG. The oxidized form of the β2-GP protein binds to dendritic cells, the activation of which can accelerate the formation of antibodies.

In turn, they lead to disruption of the complement system, as well as to the activation of the hemostasis system, a complex course of the disease, a sharp increase in thrombosis in the fetoplacental microcirculation system and fetal death. As noted above, long-term circulation of APL antibodies in plasma, free lipid vesicles in plasma, as well as in the endothelium, platelets and other cellular phospholipid compounds. This, in turn, reduces the platelet resistance of endothelial cells, activates platelets and leads to an imbalance in the coagulation hemostasis system. For this reason, we have identified some indicators of hemostasis in women with recurrent miscarriage.

Platelets are involved in primary hemostasis and in the first stage of stagnation. At this stage, platelets become active, and platelets activate platelets by exposing them to plasma factors, which in turn increase platelet aggregation. At the third stage of coagulation, a prothrombinase complex is formed on the surface of active platelets, which, in turn, increases the production of thrombin. Thrombin is involved in the conversion of fibrinogen to fibrin. At the same time, platelets provide thrombus retraction and complete the blood clotting process.

To study the vascular-platelet stage of hemostasis, the number of platelets in the general blood test was counted. Studies have shown that the amount of hemoglobin, erythrocytes and platelets in women who have undergone RPL tends to decrease compared to the group of women who are physiologically pregnant. In particular, the amount of hemoglobin in the main and control groups was 91.93±3.68 and 108.11±1.04 g/l, the number of erythrocytes was 3.17±0.06 and 3.57±0.08x1012/l , leukocytes - 7.31±0.15 and 6.48±. 0.34x109/l, platelet count - 211.70±3.82 and 234.23±4.40x109/l, ECG - 18.23±0.69 and 10.83±0.66 mm/h. In other words, in the group of women who had a normal abortion, there was a partial decrease in the number of platelets and a statistically significant increase in ESR.

Coagulation hemostasis consists of a cascade of reactions involving plasma factors. Coagulation hemostasis was studied at all three stages of coagulation: according to the Morawitz method of clotting time (MAC) and active partial thromboplastin time (APTT) (1 stage of coagulation); prothrombin time (PT), prothrombin index (PTI) and international normalization coefficient (INR) (2 stages of blood coagulation); the amount of fibrinogen (3 stages of blood coagulation).

In the group of women who had recurrent miscarriage, a significant reduction in bleeding time was observed (see Table 3.2). In this group, the start time of blood clotting was 151.00 ± 6.82 seconds, and the end time of blood clotting was 190.54 ± 5.47 seconds. In the control group, these values were as follows: the onset of bleeding 148.69±3.73 sec, the end 205.75±4.48 sec. That is, a 1.5-fold reduction in bleeding time (P<0.01) in the control group of women who had experienced habitual miscarriage indicated a pronounced hypercoagulability in plasma hemostasis.

However, in the group of women who had recurrent miscarriage, plasma APTT increased to 42.8±1.26 (P<0.001) sec. In the control group, APTT was 28.26±0.15 sec. It should be noted that an increase in the APTT level of 1.7 (P<0.001) indicates the presence of LA in women. In fact, our study showed that the VA value was 3.76 times (P < 0.005) higher than normal, indicating a correlation between the two.

Table 2. Assessment of the first stage of blood coagulation coordination in recurrent miscarriage, M ± m

Indicators	**Physiological pregnancy, 9-10 weeks, n = 35**	**Habitual miscarriage, 9-10 weeks, n=35**
Start VSK, sec	148,69±3,73	151,00±6,82
Completion of VSC, sec	205,75±4,48	190,54±5,47
APTT, sec	28,26±0,15	42,8±1,26***

Note: * - differences between the indicators of the studied control group and patients with APS are significant (R < 0.05), ** - R < 0.01 and *** - R < 0.001.

It has been shown that significant disturbances in blood clotting time and partial thromboplastin time are associated with hypercoagulability at the first stage of coagulation hemostasis in habitual miscarriage. To characterize the second stage of plasma hemostasis, prothrombin time, prothrombin index and INR were studied. The study of prothrombin time showed that the hemostasis system is significantly shifted towards hypercoagulation in patients in groups of women who experienced RPL in relation to the control group. So, if in the main group PT was 16.49 ± 0.20 s (see Table 3), then in the control group it was 17.69 ± 0.28 s.

Table 3. Assessment of the second stage of blood coagulation by recurrent miscarriage, M±m

Indicators	Physiological pregnancy, 9-10 weeks, n = 35	Habitual miscarriage, 9-10 weeks, n=35
PV, sec	16,49±0,20	17,69±0,28
PTI, %	84,4±0,40	96,23±1,48*
ON	1,16±0,01	1,20±0,01
MNO	1,05±0,01	1,25±0,05*

Note: * - differences between the indicators of the studied control group and patients with APS are significant (R < 0.05), ** - R < 0.01 and *** - R < 0.001.

The prothrombin index was calculated using a special formula and amounted to 96.23 ± 1.48% in the main group and 84.4 ± 0.40% in the control group. This indicated the presence of hypercoagulation in women with recurrent miscarriage (see Table 3). The table shows that the international normalized ratio was 1.25 ± 0.05 in all women who underwent RPL, and 1.05 ± 0.01 in the control group. The study of indicators of the second stage of blood coagulation showed a significant shift of blood towards hypercoagulability in women of the main group.

The level of fibrinogen, plasma tolerance to heparin, thrombotest and thrombin time, which characterize the third stage of blood coagulation, were determined. Fibrinogen is the first coagulation factor synthesized in the liver. The study of the fibrinogen level showed a significant increase in the concentration of fibrinogen, which indicated a strong hypercoagulable shift. The content of fibrinogen in the group of women with RPL was 4334.2±148.7 mg/ml (R<0.001), in the control group this figure was 2677.14±28.91 mg/l. Thus, the study of the third stage of blood coagulation showed the presence of pronounced hypercoagulability relative to the control group in women with RPL.

Currently, one of the main markers of activation of the hemostasis system is an increase in the amount of D-dimer in the blood. The formation of fibrin D-dimer is one of the factors indicating both its breakdown and the development of thrombosis and is important in the diagnosis of DIC. A gradual increase in D-dimer in blood plasma begins in the early stages of pregnancy and ends 3-4 times higher than normal. Such changes are especially observed in preeclampsia.

Table 4. The amount of fibrinogen and D-dimer in women with recurrent miscarriage, M±m

Indicators	Physiological pregnancy, 9-10 weeks, n = 35	Habitual miscarriage 9-10 weeks, n = 35
Fibrinogen, mg/ml	2677,14±28,91	4334,2±148,7***
D-dimer, ng/ml	45,09±2,94	577,74±44,5***

Note: * - differences between the indicators of the studied control group and patients with APS are significant (R < 0.05), ** - R < 0.01 and *** - R < 0.001.

Therefore, we estimated the amount of D-dimer in the blood plasma of women with APS who had RPL. The study showed that the frequency in this group

of women was 12.81 (R<0.001) times higher than in the control group, and amounted to 577.74±44.5 ng/ml. In the control group, its content was 45.09±2.94 ng/ml.

Conclusion. Thus, based on the results obtained, women with RPL develop hypercoagulable syndrome in the blood at 8-9 weeks of gestation due to the presence of APS. This is due, in our opinion, to the fact that antibodies are formed not only against phospholipids and the b2-GP protein, but also against all proteins associated with negatively charged phospholipids. To date, antibodies to AF have also been shown to be present in prothrombin, thrombin, protein S, protein C, thrombomodulin, annexin II and annexin V. Most of them have procoagulant effects and have thrombogenic effects.

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INFORMATION AND COMMUNICATION TECHNOLOGY TOOLS AND THE POSSIBILITIES OF THEIR APPLICATION IN THE EDUCATIONAL PROCESS

Abstract:*In the modern era of digital transformation, information and communication technologies (ICT) play a crucial role in enhancing the quality and efficiency of the educational process. ICT tools — such as interactive multimedia systems, learning management platforms, virtual classrooms, and online assessment tools — have significantly changed the traditional models of teaching and learning. Their integration into education creates new opportunities for personalized learning, collaboration, and access to global educational resources.*

The use of ICT tools allows educators to create interactive learning environments that promote critical thinking, creativity, and student engagement. Digital technologies also support the development of innovative teaching methods, such as blended learning, distance education, and simulation-based training, which make education more flexible and accessible. However, the successful implementation of ICT in the educational process requires not only technical infrastructure but also pedagogical readiness, teacher competence, and institutional support.

This article explores the main ICT tools used in education, their pedagogical benefits, and the challenges associated with their practical application. The analysis highlights how ICT can contribute to developing digital literacy, improving learning outcomes, and fostering lifelong learning skills among students.

Keywords: *Information and Communication Technology (ICT); digital education; e-learning; blended learning; virtual classrooms; educational innovation; learning management systems; interactive teaching tools; pedagogy; digital literacy.*

Introduction

The development of information and communication technologies (ICT) has brought about a revolutionary transformation in various fields of human activity, and education is no exception. The integration of ICT into the educational process has reshaped the way knowledge is delivered, acquired, and managed. In today's digital society, the use of technological tools in education is no longer optional but essential for achieving high-quality teaching and learning outcomes. ICT enhances not only the effectiveness of education but also its accessibility, inclusiveness, and flexibility.

ICT tools include a wide range of technologies such as computers, mobile devices, the Internet, multimedia systems, interactive whiteboards, learning management systems (LMS), and virtual or augmented reality platforms. These tools facilitate interactive learning, enable access to digital resources, and support collaborative communication between teachers and students regardless of time or location. As a result, ICT has become a key driver in promoting lifelong learning and developing the digital competencies required in the 21st century.

Moreover, the application of ICT in education contributes to improving pedagogical practices. Teachers can use digital tools to design interactive lessons, monitor student performance, and adapt content to individual learning styles. At the same time, students gain opportunities to take a more active role in their own learning, develop problem-solving skills, and engage in self-directed study. The effective use of ICT also helps bridge the gap between theoretical knowledge and practical experience through simulation technologies and virtual laboratories.

Despite these advantages, the implementation of ICT in the educational process presents several challenges. These include insufficient infrastructure, lack of digital literacy among teachers and students, limited access to technological resources in some regions, and the need for continuous professional development. Therefore, the successful use of ICT requires a comprehensive approach that combines technological innovation with pedagogical strategy and institutional support.

In this context, studying the tools and possibilities of ICT in education is of great importance. It helps to identify the most effective methods of using digital technologies for improving learning outcomes and preparing students for the demands of the knowledge-based economy.

Discussion

The implementation of information and communication technology (ICT) tools in the educational process has led to profound changes in teaching methodology, learning strategies, and educational management. The growing digitalization of education encourages a shift from traditional teacher-centered models toward more interactive, learner-centered approaches. ICT tools such as multimedia presentations, digital textbooks, virtual laboratories, and online learning platforms create new forms of knowledge transfer that promote creativity, collaboration, and critical thinking among students.

One of the most significant advantages of ICT tools is the enhancement of accessibility and flexibility in education. Through online learning platforms and cloud technologies, students can access learning materials anytime and anywhere, overcoming geographical and time constraints. This is particularly valuable in higher education, where learners often require individualized and self-paced study options. Additionally, ICT facilitates inclusive education by providing adaptive technologies that support students with different learning abilities and needs.

Another major contribution of ICT is the improvement of communication and collaboration between educators and learners. Tools such as video conferencing, online discussion forums, and collaborative software (e.g., Google Classroom, Microsoft Teams, Moodle) allow real-time interaction, group work, and exchange of ideas beyond the physical classroom. Such environments foster teamwork and communication skills that are vital in both academic and professional contexts.

ICT also supports data-driven education management. Learning analytics tools enable educators to collect and analyze student performance data, identify learning gaps, and adjust teaching strategies accordingly. Moreover, administrative processes such as attendance tracking, grading, and resource management can be automated, thereby saving time and improving institutional efficiency.

However, the successful integration of ICT into the educational process depends on several critical factors. Technical infrastructure is fundamental — reliable Internet access, up-to-date equipment, and secure software are prerequisites for effective digital learning. Equally important is the digital competence of teachers, which includes not only technical skills but also pedagogical understanding of how to integrate technology meaningfully into the curriculum. Without adequate training and support, teachers may fail to fully exploit the potential of ICT tools.

Furthermore, there are challenges related to data privacy, cybersecurity, and digital ethics. As education becomes more connected, protecting students' personal information and ensuring safe online behavior become essential. Institutions must adopt clear policies and technical safeguards to prevent data breaches and misuse of information.

In summary, while ICT tools open vast opportunities for innovation and improvement in education, their effectiveness relies on balanced implementation — combining technological advancement with pedagogical, organizational, and ethical considerations.

Conclusion

The integration of information and communication technology (ICT) tools into the educational process has become a fundamental component of modern pedagogy. These technologies provide vast opportunities to improve the quality, accessibility, and efficiency of education at all levels. By enabling interactive learning, fostering collaboration, and supporting data-driven decision-making, ICT helps both teachers and students to reach higher educational outcomes.

ICT tools make it possible to design flexible and engaging learning environments that encourage independent study, creativity, and critical thinking.

The application of digital platforms, online courses, and multimedia resources allows learners to access global educational content and connect with instructors and peers regardless of location or time. Furthermore, ICT promotes inclusiveness by offering personalized learning opportunities for students with diverse needs and abilities.

However, the success of ICT implementation largely depends on several essential factors — adequate technical infrastructure, teacher competence, institutional support, and adherence to ethical and security standards. Without sufficient digital literacy and strategic planning, the potential benefits of ICT cannot be fully realized. Therefore, continuous professional development for educators, investment in technological infrastructure, and the establishment of clear policies on digital safety are crucial steps toward sustainable integration of ICT in education.

In conclusion, ICT tools represent powerful instruments for educational innovation and transformation. When used effectively and responsibly, they can bridge the gap between traditional and digital learning, preparing students for the demands of the modern knowledge-based society. The future of education will increasingly depend on how well institutions leverage ICT to create inclusive, dynamic, and technology-enhanced learning environments.

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DOCUMENT CIRCULATION ALGORITHM IN THE E-HOSPITAL SYSTEM

Abstract: *The automation of document circulation in the E-HOSPITAL system plays a key role in improving the efficiency, transparency, and reliability of healthcare management processes. The algorithm for document circulation ensures that medical, administrative, and financial documents move seamlessly between departments through digital workflows. By using electronic authentication, secure data exchange protocols, and automated verification mechanisms, the system minimizes human errors and delays in document processing. The E-HOSPITAL system integrates various hospital subsystems such as registration, laboratory, pharmacy, and accounting modules, enabling real-time document tracking and archiving. This study presents the logical structure and functional stages of the document circulation algorithm, including document creation, verification, routing, approval, and storage. The proposed algorithm enhances information accuracy, supports decision-making, and ensures compliance with medical data standards and security requirements.*

Keywords: *E-HOSPITAL System; Document Circulation; Workflow Automation; Medical Information System; Electronic Health Records; Data Management; Digital Signature; Information Security; Healthcare Informatics; Process Optimization.*

Introduction

In the modern era of digital transformation, healthcare institutions are increasingly adopting electronic systems to manage and optimize their internal processes. One of the key elements of this transformation is the automation of document circulation through integrated medical information systems such as E-

HOSPITAL. Efficient organization of document flow is essential for ensuring accuracy, security, and timely access to medical and administrative information.

The E-HOSPITAL system serves as a centralized platform that manages various hospital functions, including patient registration, diagnostics, laboratory results, billing, pharmacy management, and reporting. Within this environment, thousands of documents — such as medical records, prescriptions, laboratory reports, and financial statements — are generated and exchanged daily. Manual handling of such documents can lead to delays, duplication, and data inconsistency. Therefore, implementing a well-structured document circulation algorithm is crucial for automating and optimizing these workflows.

A properly designed document circulation algorithm defines the logical sequence of document processing, including creation, verification, routing, approval, and archiving. The algorithm ensures that each document passes through the required stages with controlled access and full traceability. Integration with digital signatures and secure communication protocols (such as HL7, FHIR, and XML-based formats) guarantees data integrity and confidentiality throughout the process.

The E-HOSPITAL document circulation algorithm also contributes to workflow transparency and decision support by providing real-time tracking of document status and enabling quick retrieval of archived records. Furthermore, it reduces administrative burden, minimizes human errors, and increases institutional productivity by standardizing information flow across departments.

In summary, the automation of document circulation in the E-HOSPITAL system represents a significant step toward digital governance in healthcare. It not only simplifies routine operations but also ensures that all medical documentation complies with legal, ethical, and security standards — ultimately leading to improved patient care and organizational efficiency.

Discussion

The document circulation algorithm in the E-HOSPITAL system serves as the backbone of digital information management in healthcare institutions. It determines the logical flow of documents across multiple functional modules, ensuring that information moves accurately, securely, and efficiently from creation to archiving. The algorithmic organization of document circulation eliminates redundancy, enhances coordination between departments, and supports the overall automation of hospital processes.

At the initial stage, documents are created and registered in the system by authorized users, such as physicians, laboratory staff, or administrative personnel. Each document is assigned a unique digital identifier, which enables precise tracking throughout its lifecycle. Following creation, the document undergoes verification and validation, where data integrity and authenticity are confirmed using digital signatures or access control mechanisms.

The next phase of the algorithm involves routing and approval. Depending on the document type (medical report, laboratory result, invoice, or prescription), it is automatically directed to the appropriate department or personnel for review and

confirmation. Workflow automation tools within the E-HOSPITAL system ensure that each document reaches the correct destination based on predefined routing rules, thereby minimizing manual intervention and delays.

Once approved, documents are securely stored and archived in the hospital's central database. Advanced indexing and search mechanisms enable quick retrieval, making the system not only a document repository but also a knowledge management tool. Furthermore, integration with Electronic Health Record (EHR) modules ensures that clinical data remains synchronized and accessible across different departments in real time.

An important aspect of the algorithm is information security. The E-HOSPITAL system employs encryption protocols, user authentication, and access control policies to protect sensitive medical data. Audit logs record every transaction, allowing administrators to monitor document activity and ensure compliance with privacy regulations such as GDPR and national healthcare data standards.

The algorithm also facilitates interoperability between hospital systems. By supporting data exchange protocols like HL7 and FHIR, E-HOSPITAL can communicate with external healthcare systems, laboratories, and insurance services. This integration improves coordination between institutions, promotes efficient data sharing, and supports evidence-based decision-making.

However, the effective operation of the document circulation algorithm depends on several critical factors, including system configuration, staff training, and adherence to standardized workflows. Users must possess digital literacy skills to ensure accurate data entry and document handling. In addition, periodic evaluation and optimization of the algorithm are necessary to adapt to technological changes and evolving healthcare requirements.

In summary, the document circulation algorithm in the E-HOSPITAL system plays a pivotal role in transforming healthcare document management. It supports transparency, traceability, and security while ensuring that medical data are processed efficiently and in compliance with legal standards.

Conclusion

The development and implementation of a document circulation algorithm within the E-HOSPITAL system mark a significant advancement in the digitalization of healthcare institutions. By automating the creation, verification, routing, approval, and storage of documents, the algorithm ensures efficient information flow, minimizes human errors, and enhances transparency across all stages of hospital management.

Through the integration of secure data exchange protocols, digital signatures, and authentication mechanisms, the E-HOSPITAL system guarantees the confidentiality and integrity of medical information. Its ability to support interoperability through international standards such as HL7 and FHIR further promotes seamless communication between different healthcare entities and external organizations.

The algorithm also contributes to improved decision-making and operational efficiency by providing real-time access to accurate and structured medical data. This digital workflow significantly reduces administrative burdens, accelerates document processing, and ensures compliance with legal and ethical data management requirements.

In conclusion, the document circulation algorithm in the E-HOSPITAL system serves as a foundation for the smart management of healthcare documentation. Its systematic approach not only streamlines internal hospital operations but also supports the broader goals of healthcare digital transformation — improving service quality, patient safety, and institutional accountability.

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THE ROLE AND IMPORTANCE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN MEDICAL HIGHER EDUCATION

Abstract: *The integration of Artificial Intelligence (AI) technologies in medical higher education is transforming the way future healthcare professionals acquire knowledge and develop clinical competencies. AI-driven systems enhance personalized learning, automate administrative tasks, and provide advanced simulation environments for medical training. Through machine learning algorithms and intelligent tutoring systems, students gain access to adaptive educational resources, virtual patients, and real-time feedback that foster critical thinking and diagnostic accuracy. Moreover, AI supports educators in analyzing learning outcomes, predicting student performance, and improving curriculum design. This paper explores the role and significance of AI in modern medical education, highlighting its potential to enhance the efficiency, accessibility, and quality of the learning process, while also addressing ethical and pedagogical challenges associated with its implementation.*

Keywords: *Artificial Intelligence (AI); Medical Education; Machine Learning; Intelligent Tutoring Systems; Virtual Simulation; Personalized Learning; Educational Technologies; Clinical Training; Higher Education; Digital Transformation.*

Introduction

In recent years, artificial intelligence (AI) has become one of the most influential technologies reshaping the global educational landscape. In the field of medical higher education, the adoption of AI tools and systems has created new opportunities for both teaching and learning. Traditional teaching methods are gradually being supplemented and, in some cases, replaced by intelligent systems

capable of providing personalized, data-driven, and adaptive educational experiences.

Medical education requires not only the transmission of theoretical knowledge but also the development of clinical reasoning, diagnostic skills, and decision-making abilities. AI technologies offer innovative ways to meet these demands through virtual simulations, intelligent tutoring systems, and predictive analytics. For example, AI-based virtual patients and diagnostic models allow students to practice clinical scenarios safely and repeatedly, while feedback systems powered by machine learning algorithms help identify strengths and weaknesses in individual learning paths.

Furthermore, AI assists educators by automating administrative tasks, such as grading and attendance tracking, and by analyzing student performance data to improve curriculum design. The integration of AI into medical education also supports research activities, enabling the processing of large biomedical datasets and facilitating evidence-based learning approaches.

However, while AI presents numerous advantages, its implementation in medical higher education also raises several ethical, technical, and pedagogical challenges. Issues related to data privacy, bias in algorithms, and the need for digital literacy among educators and students must be carefully considered.

Therefore, understanding the role and importance of AI in medical higher education is essential for designing effective, equitable, and future-oriented educational environments that prepare medical students for the digital era of healthcare.

Discussion

The introduction of Artificial Intelligence into medical higher education has significantly influenced the effectiveness and methodology of teaching and learning. AI technologies not only optimize educational processes but also provide new paradigms for knowledge acquisition, student assessment, and professional skill development.

One of the most important contributions of AI is personalized learning. By analyzing students' learning patterns, AI-powered systems can identify knowledge gaps and adapt educational materials to meet individual needs. Such adaptive learning platforms ensure that students progress at their own pace while achieving deeper understanding of medical concepts. This approach is particularly valuable in complex disciplines such as anatomy, physiology, and pathology, where conceptual clarity is crucial.

Another major impact of AI is observed in clinical simulation and virtual training. Virtual reality (VR) and augmented reality (AR) technologies integrated with AI create immersive, realistic environments for clinical practice. Medical students can perform virtual surgeries, diagnose simulated patients, and receive real-time feedback without any risk to real patients. These tools enhance procedural accuracy, confidence, and decision-making skills, making medical education more interactive and practice-oriented.

AI also plays a vital role in assessment and performance analysis. Intelligent systems can automatically grade tests, analyze case-based responses, and track student progress over time. This not only reduces educators' workload but also allows for more objective and data-driven evaluation. Moreover, predictive analytics can identify students at risk of poor performance and provide early interventions to improve learning outcomes.

From an institutional perspective, AI supports **administrative efficiency and curriculum development**. Data collected from AI systems can reveal trends in student engagement and achievement, helping educators revise curricula and teaching strategies. AI-based chatbots and virtual assistants enhance communication between students and instructors, providing 24/7 academic support.

Despite these benefits, the integration of AI into medical higher education is not without challenges. Ethical concerns such as data security, algorithmic bias, and the transparency of AI decisions remain pressing issues. Furthermore, there is a growing need to train educators to use AI tools effectively and to ensure that medical curricula include digital literacy and data ethics components.

In conclusion, AI technologies represent a transformative force in medical higher education. Their successful implementation depends on a balanced approach that combines technological innovation with pedagogical responsibility and ethical oversight.

Conclusion

Artificial intelligence technologies are revolutionizing medical higher education by enhancing the quality, efficiency, and accessibility of the learning process. Through AI-driven tools, medical students can experience adaptive learning, realistic clinical simulations, and data-based feedback that were previously impossible in traditional educational settings. These innovations contribute to the formation of competent, technologically literate, and analytically skilled healthcare professionals prepared for the demands of modern medicine.

Moreover, the integration of AI promotes more effective educational management and continuous curriculum improvement, allowing institutions to base their teaching strategies on real performance data. However, it is essential to recognize and address ethical issues such as data privacy, bias, and transparency in AI systems to ensure equitable and responsible implementation.

In the long term, AI will not replace medical educators but rather empower them to deliver more personalized, engaging, and research-oriented education. The future of medical higher education lies in a balanced collaboration between human expertise and intelligent technologies, fostering innovation and improving the overall quality of healthcare training and practice.

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ORGANIZATION OF DIGITAL MEDICAL RECORDS

Abstract: *The organization of digital medical records has become a fundamental component of modern healthcare systems. The transition from paper-based to electronic medical records (EMRs) ensures more efficient data storage, retrieval, and exchange among healthcare providers. Properly organized digital records improve the accuracy of patient information, enhance clinical decision-making, and support continuity of care. Moreover, digital medical record systems enable integration with diagnostic devices, telemedicine platforms, and data analytics tools, which contribute to personalized and evidence-based medicine. However, the implementation of such systems requires careful consideration of data security, interoperability, and user training. This paper examines the principles, technologies, and challenges involved in organizing digital medical records and highlights their importance in improving the quality and efficiency of healthcare delivery.*

Keywords: *Digital Medical Records; Electronic Health Records (EHR); Data Management; Health Information Systems; Interoperability; Data Security; Healthcare Technology; Patient Information; Medical Informatics; Digitalization in Healthcare.*

Introduction

The rapid development of information and communication technologies has led to a digital transformation in all areas of healthcare, including the management of medical documentation. The organization of digital medical records, often referred to as Electronic Medical Records (EMRs) or Electronic Health Records (EHRs), represents one of the most significant achievements in modern medical informatics. These systems enable healthcare institutions to collect, store, and

manage patient data electronically, replacing traditional paper-based records that are often inefficient, time-consuming, and prone to errors.

Digital medical records play a crucial role in ensuring the continuity and quality of patient care. They provide healthcare professionals with instant access to comprehensive patient information, including medical history, laboratory results, diagnostic imaging, and treatment plans. This accessibility supports accurate diagnosis, timely treatment, and coordinated care among multidisciplinary medical teams. Moreover, the use of digital records facilitates communication between healthcare providers, reduces duplication of tests, and improves decision-making through data-driven insights.

From a systemic perspective, organized digital medical records contribute to the creation of integrated health information systems that support hospital management, epidemiological monitoring, and healthcare policy planning. They also form the foundation for advanced technologies such as artificial intelligence, predictive analytics, and telemedicine, enabling the development of personalized and evidence-based medical approaches.

However, despite the numerous benefits, the implementation of digital medical record systems also presents several challenges. Issues related to data security, privacy protection, system interoperability, and user training remain critical. Therefore, the effective organization of digital medical records requires not only technological innovation but also adherence to legal, ethical, and organizational standards.

The study of digital medical record organization is thus essential for understanding how digitalization can enhance healthcare quality, optimize clinical workflows, and promote the sustainable development of health information systems.

Discussion

The organization of digital medical records represents a cornerstone in the modernization of healthcare systems worldwide. Properly structured and managed digital records not only improve data accuracy and accessibility but also play a vital role in enhancing patient safety and clinical efficiency. The success of these systems largely depends on the quality of data input, system interoperability, user competence, and adherence to security standards.

One of the main advantages of digital medical records is the improvement in data accessibility and continuity of care. Healthcare professionals can instantly access a patient’s medical history, laboratory results, imaging data, and prescriptions regardless of time or location. This seamless access reduces medical errors, prevents redundant testing, and facilitates collaboration among different specialists. Furthermore, digital record systems provide real-time data sharing between hospitals, laboratories, pharmacies, and insurance providers, leading to more coordinated and efficient healthcare delivery.

Another important aspect is data integration and interoperability. Modern healthcare institutions often use multiple digital systems for diagnostics, patient monitoring, and administrative processes. For effective operation, these systems

must communicate and exchange information seamlessly. Interoperability standards such as HL7 (Health Level Seven) and FHIR (Fast Healthcare Interoperability Resources) ensure that medical data can be transferred between systems without loss of meaning or structure.

The security and privacy of patient information are also critical factors in organizing digital medical records. Given the sensitivity of medical data, robust cybersecurity measures, data encryption, and access control mechanisms must be implemented. Compliance with international standards such as GDPR (General Data Protection Regulation) and HIPAA (Health Insurance Portability and Accountability Act) is essential to ensure ethical and legal use of patient data.

Additionally, user training and digital literacy play an important role in the successful adoption of digital medical record systems. Medical staff must be adequately trained to use these systems efficiently, ensuring data accuracy and maintaining patient confidentiality. Continuous professional development programs help healthcare workers adapt to technological changes and improve the overall efficiency of digital documentation.

Finally, digital medical records contribute significantly to health data analytics and research. Organized databases provide valuable insights for population health management, disease surveillance, and medical research. AI-based analytics can detect trends, predict outbreaks, and support clinical decision-making, transforming raw medical data into actionable knowledge.

In summary, the discussion highlights that while the organization of digital medical records offers enormous benefits for healthcare quality and efficiency, it also requires a strategic, multidisciplinary approach to address issues of interoperability, security, and user readiness.

Conclusion

The organization of digital medical records is a crucial step toward building an efficient, transparent, and patient-centered healthcare system. Properly managed electronic medical records ensure the accuracy, security, and accessibility of patient data, leading to improved diagnosis, treatment, and continuity of care. By integrating different healthcare units through interoperable digital systems, medical institutions can optimize their workflows, reduce administrative burdens, and enhance clinical decision-making.

The introduction of digital medical records also fosters innovation by supporting telemedicine, artificial intelligence, and data analytics applications in healthcare. These technologies transform traditional recordkeeping into a dynamic process that not only stores information but also generates valuable insights for medical research and policy planning.

However, the successful organization of digital medical records depends on addressing critical challenges such as data privacy, cybersecurity, interoperability, and staff training. Ensuring compliance with ethical and legal standards, as well as developing a culture of digital literacy among healthcare professionals, is essential for the long-term sustainability of these systems.

In conclusion, digital medical records form the backbone of modern healthcare infrastructure. Their effective organization promotes better patient outcomes, supports scientific progress, and lays the foundation for the future of intelligent, data-driven medicine.

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ADVANTAGES AND DISADVANTAGES OF ARTIFICIAL INTELLIGENCE CHATBOTS THAT PROVIDE MEDICAL ADVICE

Abstract: *Artificial intelligence (AI) chatbots have become increasingly common tools in digital healthcare, providing patients with medical information, symptom assessment, and health guidance through automated conversation systems. These technologies offer numerous advantages, such as 24/7 availability, rapid response time, scalability, and cost-effectiveness. AI chatbots can support healthcare professionals by handling routine inquiries, triaging patients, and promoting health education. Moreover, they enhance patient engagement and accessibility, especially in remote or resource-limited areas.*

However, despite their growing potential, AI chatbots in medicine also present several disadvantages. Limitations include the risk of misinformation, lack of emotional understanding, data privacy concerns, and the inability to replace professional medical judgment. Ethical issues related to accountability and patient safety remain significant challenges. This paper explores the main advantages and disadvantages of AI chatbots that provide medical advice, evaluating their impact on healthcare delivery, patient trust, and the future integration of artificial intelligence in medical practice.

Keywords: *Artificial Intelligence (AI); Chatbots; Medical Advice; Digital Healthcare; Telemedicine; Patient Interaction; Health Informatics; Ethics in AI; Data Privacy; Healthcare Technology.*

Introduction

The rapid advancement of artificial intelligence (AI) technologies has significantly transformed the landscape of modern healthcare. Among the most notable innovations are AI-powered chatbots, which serve as interactive systems designed to simulate human conversation and provide users with medical

information, symptom analysis, and personalized health recommendations. These tools combine natural language processing (NLP), machine learning (ML), and data analytics to deliver instant and accessible medical advice to millions of users worldwide.

AI chatbots have become an integral part of digital healthcare ecosystems, offering continuous communication between patients and healthcare systems. They can assist in a wide range of functions — from providing general health information and reminders about medication schedules to initial symptom checking and mental health support. Their ability to operate 24 hours a day, seven days a week, makes them an invaluable resource, especially in regions with limited access to healthcare professionals.

The implementation of AI chatbots provides several advantages for both patients and medical institutions. For patients, chatbots enhance convenience, privacy, and engagement, enabling them to receive immediate responses to health-related questions. For healthcare providers, chatbots reduce the workload of medical staff by automating repetitive administrative or informational tasks, allowing professionals to focus on more complex clinical cases.

However, despite their growing potential, AI chatbots also present a number of disadvantages and challenges. These include risks of incorrect or incomplete medical advice, lack of empathy in communication, issues related to patient data privacy, and the ethical question of responsibility when harm occurs due to automated recommendations. Moreover, chatbots are limited by the quality of their underlying algorithms and training datasets, which can lead to biases or inaccuracies in medical interpretation.

Therefore, a balanced evaluation of both the advantages and disadvantages of AI chatbots in providing medical advice is essential for understanding their true role in healthcare. This analysis helps to identify best practices for safe and effective integration of AI-based conversational systems into medical settings while maintaining trust, ethics, and quality in patient care.

Discussion

The use of artificial intelligence chatbots in healthcare represents one of the most dynamic intersections between technology and medicine. Their growing role in providing medical advice has brought both remarkable opportunities and notable challenges that must be carefully assessed.

Advantages

One of the primary advantages of AI chatbots is their constant availability and scalability. Unlike human healthcare workers, chatbots can operate 24/7 and simultaneously handle thousands of user requests. This feature is especially valuable in emergency situations or in areas with limited medical personnel, allowing patients to access timely health information without delay.

AI chatbots also offer significant cost-efficiency. They reduce administrative and operational expenses for healthcare institutions by automating routine tasks such as appointment scheduling, triage, and basic symptom assessment. As a result, physicians can devote more time to critical cases that require human expertise.

Another major benefit is the enhancement of patient engagement and health literacy. Chatbots can remind users to take medications, maintain a healthy lifestyle, and attend medical check-ups. They support self-care practices by providing personalized recommendations based on patient inputs and medical databases. Moreover, through interactive dialogue, chatbots encourage users to actively participate in managing their health conditions.

AI chatbots also play a key role in data collection and analytics. Every user interaction provides valuable insights into public health trends, common symptoms, and patient behaviors. When properly anonymized and secured, this data can help healthcare organizations improve their services and develop targeted prevention programs.

Disadvantages

Despite their advantages, AI chatbots in medicine also face serious limitations and risks. One of the main challenges is the potential for misinformation or misdiagnosis. Chatbots rely on pre-programmed algorithms and datasets; therefore, inaccurate or incomplete data may lead to incorrect medical advice, which could endanger patient safety.

Another disadvantage is the lack of empathy and human judgment. Chatbots, regardless of their sophistication, cannot fully understand emotions or contextual nuances that influence medical decisions. In mental health support, for instance, this limitation can affect patient trust and satisfaction.

Data privacy and security concerns are also critical. Since chatbots collect and process sensitive health data, any breach or misuse of this information can result in serious ethical and legal consequences. Ensuring compliance with standards such as GDPR and HIPAA is essential to maintaining user confidentiality and trust.

Additionally, the ethical and accountability issues surrounding AI chatbots remain unresolved. When an AI system gives inaccurate advice that harms a patient, determining responsibility — whether it lies with the developer, healthcare institution, or user — becomes complex.

Balancing the Benefits and Risks

To maximize benefits and minimize risks, it is crucial to establish strict quality control mechanisms, continuous monitoring, and validation of chatbot algorithms. Collaboration between medical experts and AI developers is necessary to ensure that chatbots deliver accurate, evidence-based information. Furthermore, implementing user education and feedback systems can help improve chatbot reliability and ethical use.

In summary, AI chatbots providing medical advice represent both a promising innovation and a potential risk. Their advantages in accessibility, efficiency, and education must be balanced with careful regulation, human oversight, and a strong ethical framework.

Conclusion

Artificial intelligence chatbots that provide medical advice have become an integral part of the modern healthcare ecosystem. They offer valuable opportunities to improve accessibility, efficiency, and patient engagement in medical services. By

providing instant responses, automating repetitive tasks, and promoting self-care, AI chatbots contribute significantly to reducing the workload of healthcare professionals and enhancing patient satisfaction.

However, the adoption of such technologies also introduces new challenges that cannot be overlooked. Issues related to data security, ethical responsibility, algorithmic bias, and the absence of human empathy remain critical concerns. Inaccurate or incomplete medical advice may pose potential risks to patient safety, underscoring the necessity for professional supervision and continuous quality control.

To ensure the safe and effective integration of AI chatbots into healthcare, it is essential to develop clear regulatory frameworks, maintain transparency in algorithmic design, and strengthen collaboration between medical and technological experts. Additionally, patient education regarding the appropriate use and limitations of chatbot systems should be prioritized.

In conclusion, while artificial intelligence chatbots hold enormous potential to revolutionize healthcare delivery, their success ultimately depends on ethical implementation, responsible use, and consistent human oversight. A balanced approach that combines technological innovation with professional judgment will be the key to ensuring that AI-driven medical chatbots truly serve humanity's best interests.

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KOMPYUTER LINGVISTIKASI NUQTAYI NAZARIDAN O‘ZBEK TILIDA NEGATSIYA VOSITALARINI AVTOMATIK ANIQLASH MASALALAR

Annotatsiya. *Maqolada o‘zbek tilida negatsiya vositalarining (morfologik, sintaktik, leksik, pragmatik) avtomatik aniqlanishi kompyuter lingvistikasi nuqtayi nazaridan tahlil qilinadi. Ingliz tilidagi NLP tajribalari bilan qiyosiy o‘rganilib, o‘zbek tiliga mos algoritmik yechimlar taklif etiladi. Natijada maxsus “O‘zbek tilining Negatsiya Korpusi”ni yaratish zarurligi asoslab beriladi.*

Kalit so‘zlar: *kompyuter lingvistikasi, negatsiya, tabiiy tilni qayta ishlash (NLP), affiksal inkor, sintaktik inkor, leksik inkor, pragmatik inkor, korpus lingvistikasi, mashinaviy o‘qitish, algoritmik tahlil*

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COMPUTATIONAL LINGUISTICS PERSPECTIVE ON THE AUTOMATIC IDENTIFICATION OF NEGATION MEANS IN THE UZBEK LANGUAGE

Abstract. *The article analyses the automatic identification of negation means (morphological, syntactic, lexical, pragmatic) in the Uzbek language from the perspective of computational linguistics. Comparative study with NLP practices in English is conducted, and algorithmic solutions adapted to the Uzbek language are proposed. As a result, the necessity of creating a specialised “Negation Corpus of the Uzbek Language” is substantiated.*

Keywords: *computational linguistics, negation, natural language processing (NLP), affixal negation, syntactic negation, lexical negation, pragmatic negation, corpus linguistics, machine learning, algorithmic analysis.*

So‘nggi yillarda kompyuter lingvistikasi va sun’iy intellekt texnologiyalari jadal rivojlanib bormoqda. Xususan, tabiiy tilni qayta ishlash (Natural Language Processing — NLP) yo‘nalishida mashina tarjimasi, matnni avtomatik tahlil qilish, sentiment tahlili va nutqni tanish kabi masalalar dolzarb ahamiyat kasb etmoqda. Ushbu jarayonlarda tilning asosiy grammatik kategoriyalaridan biri bo‘lgan inkor alohida o‘rin tutadi, chunki negatsiya gapning umumiy semantikasini o‘zgartiradi va matn mazmunini aniqlashda muhim rol o‘ynaydi. O‘zbek tilida negatsiya ko‘plab shakllarda ifodalanadi: -ma/-me qo‘shimchasi, emas, yo‘q, hech kim, hech qachon kabi leksik birliklar, shuningdek, pragmatik darajadagi inkor shakllari. Ingliz tilida

esa negatsiya asosan not va yordamchi fe’llar orqali amalga oshiriladi. Ushbu tafovutlar mashina tarjimasi va NLP tizimlari uchun muhim muammo tug‘diradi. Shu sababli tadqiqotning asosiy maqsadi o‘zbek tilida negatsiya vositalarini avtomatik aniqlash usullarini ilmiy-nazariy jihatdan asoslashdan iboratdir. Bu borada bir qator vazifalar belgilangan: negatsiya tushunchasini NLP kontekstida aniqlash, o‘zbek tilidagi negatsiya vositalarining tasnifini ishlab chiqish, ingliz tilidagi mavjud tajribalarni tahlil qilish, o‘zbek tiliga mos algoritmik yechimlar taklif etish va negatsiya tahlilining amaliy qo‘llanish sohalarini ko‘rsatish. Tadqiqot ob’ekti sifatida o‘zbek tilidagi negatsiya birliklari tanlandi, predmet sifatida esa negatsiyaning avtomatik tahlil mexanizmlari va algoritmlariga e’tibor qaratildi. O‘rganish jarayonida korpus lingvistikasi yondashuvi asosida o‘zbek tilidagi matnlar korpusidan keng ko‘lamli misollar keltirilib, ular negatsiya vositalari nuqtayi nazaridan tahlil qilindi. Morfologik tahlil yordamida fe’llarda uchraydigan negatsiya qo‘shimchasi -ma/-me ning shakllanish va qo‘llanish xususiyatlari aniqlashtirildi. Qiyosiy tahlil orqali ingliz tilidagi NLP tizimlarida negatsiyani aniqlash bo‘yicha mavjud tajribalar o‘rganilib, ularning o‘zbek tiliga mosligi baholandi. Algoritmik yondashuv asosida esa negatsiyani avtomatik belgilash uchun qoidaviy va mashinaviy o‘qitishga asoslangan modellar ishlab chiqish taklif etildi. Tadqiqot manbalari sifatida Google Translate, DeepL, HuggingFace modellaridagi amaliy tajribalar, shuningdek, O‘zbek til korpusi va ingliz tilidagi Brown Corpusdan foydalanildi. O‘zbek tilida negatsiya vositalarining turli darajalarda ifodalanishi tasnif qilinib, morfologik inkor fe’llarga qo‘shiladigan -ma/-me qo‘shimchasi orqali (bormadi, qilmaydi), sintaktik inkor emas va yo‘q birliklari yordamida (Bu to‘g‘ri emas), leksik inkor hech kim, hech qachon, hech narsa kabi birliklar orqali, pragmatik inkor esa kinoya va ironiyada yashirin shaklda amalga oshishi ko‘rsatib berildi. Ingliz tilida esa negatsiya ko‘proq not va yordamchi fe’llar orqali belgilanadi, masalan, sentiment tahlilida not good kabi ifodalar semantik inversiya orqali bad tarzida talqin qilinadi, ikki karra inkor (double negation) esa NLP tizimlari uchun murakkab hodisa sanaladi. O‘zbek tilida negatsiyani avtomatik aniqlashda esa bir qator amaliy muammolar mavjud: affiksal negatsiya (bor → bormadi)ni avtomatik ajratish qiyin, chunki negatsiya morfemasi fe’lning boshqa grammatik qo‘shimchalari bilan qo‘shilib ketadi; leksik negatsiya (hech kim, hech qachon) gapning boshqa qismlari bilan murakkab bog‘lanib, semantik noaniqlik keltirib chiqaradi; pragmatik negatsiya (ironik yoki evfemistik shakllar) esa avtomatik tahlilda deyarli aniqlanmaydi. Shu bois, negatsiyani aniqlash uchun bir nechta algoritmik yechimlar ishlab chiqilishi zarur: qoidaviy yondashuv morfologik negatsiyani aniqlashda maxsus affiks lug‘atini yaratishni talab etadi; mashina o‘rganishi sintaktik kontekst asosida negatsiyani belgilashga yordam beradi (masalan, emas bilan keluvchi predikativ konstruktsiyalarni aniqlash); semantik modellashtirish leksik negatsiya birliklarini turli vaziyatlarda avtomatik belgilash imkonini beradi; korpusga asoslangan yondashuv esa o‘zbek tilidagi matnlar asosida negatsiya belgilarini qamrab oluvchi maxsus korpus yaratishni taqozo etadi. Ayni paytda o‘zbek tilida negatsiyani avtomatik aniqlash masalasi hali to‘liq ishlab chiqilmagan. Ingliz tilidagi sentiment tahlili va mashina

tarjima tizimlari o‘zbek tiliga moslashtirilganda ko‘plab xatoliklar kuzatiladi. Masalan, Hech kim kelmadi gapini Nobody came tarzida to‘g‘ri tarjima qilish mumkin, biroq Nobody didn’t come kabi xatoliklar ham uchrab turadi. Bundan tashqari, o‘zbek tilidagi affiksal negatsiya NLP tizimlari uchun alohida murakkablik tug‘diradi, chunki bormadim so‘zida shaxs, zamon va negatsiya birgalikda ifodalanadi, ingliz tilida esa ular alohida so‘zlarga bo‘linadi: I did not go. Shu bois, mazkur muammolarni hal qilish uchun maxsus “O‘zbek tilining Negatsiya Korpusi”ni yaratish va uni mashinaviy o‘qitish modellarida qo‘llash zarur bo‘ladi.

Xulosa o‘rnida shuni ta’kidlash joizki, o‘zbek tilida negatsiya morfologik, sintaktik, leksik va pragmatik darajalarda ifodalanadi. Ingliz tilidagi NLP tajribalari negatsiyani aniqlashda samarali natija bergan bo‘lsa-da, ular o‘zbek tilining tuzilishiga to‘liq mos kelmaydi. Xususan, affiksal negatsiya (*–ma/-me*)ni avtomatik tahlil qilish murakkab bo‘lib, uni amalga oshirish uchun maxsus algoritmlar ishlab chiqilishi zarur. O‘zbek tilida negatsiya vositalarining to‘liq tasnifi va maxsus korpusi yaratilishi esa mashina tarjimasi, sentiment tahlili va nutqni avtomatik anglash sohalarida sezilarli yutuqlarga erishish imkonini beradi. Ushbu tadqiqot natijalari kompyuter lingvistikasi va tabiiy tilni qayta ishlash yo‘nalishida yangi ilmiy izlanishlarni shakllantirish uchun nazariy hamda amaliy asos bo‘lib xizmat qiladi.

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MIGRATION OF THE POPULATION OF SAMARKAND REGION AND ITS IMPACT ON THE DEMOGRAPHIC SITUATION

Annotation: *This article analyzes the processes of population migration in the Samarkand region, their causes, directions, and impact on demographic processes. The economic, social, and demographic consequences of migration, changes in the composition of labor resources, and regional development disparities have been examined.*

Keywords: *Migration, demographic situation, internal migration, external migration, labor resources, urbanization, population mobility, regional development, social balance.*

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SAMARQAND VILOYATI AHOLI MIGRATSIYASI VA UNING DEMOGRAFIK VAZIYATGA TA’SIRI

Annotatsiya: *Ushbu maqolada Samarqand viloyatida aholi migratsiyasi jarayonlari, ularning sabablari, yo‘nalishlari va demografik jarayonlarga ta’siri tahlil qilingan. Migratsiyaning iqtisodiy, ijtimoiy va demografik oqibatlari, mehnat resurslari tarkibidagi o‘zgarishlar hamda hududiy rivojlanishdagi tafovutlar o‘rganilgan.*

Kalit so‘zlar: *Migratsiya, demografik vaziyat, ichki migratsiya, tashqi migratsiya, mehnat resurslari, urbanizatsiya, aholi harakat-chanligi, hududiy rivojlanish, ijtimoiy muvozanat.*

Hozirgi davrda xalqaro migratsiyada eng katta ulushni mehnat migratsiyasi tashkil etadi. Chunki inson hayotida iqtisodiy omilning roli ortib bormoqda. Dunyo va uning ayrim hududlarida jamiyat taraqqiyotining turli bosqichlarida migratsion jarayonlarni o‘rganishda maxsus migratsiya ko‘rsatkichlari qo‘llaniladi. Ayniqsa, migratsiyani geografik nuqtayi nazardan tahlil etish bu jarayonlarni chuqurroq o‘rganishga imkon beradi. Mehnat bozori va kasb-hunar ta’limi tizimi o‘rtasidagi nomutanosiblik sharoitida ayrim mamlakat yoki mintaqalarda mehnat resurslarining samarasiz kasbiy tuzilmalari shakllanmoqda. Bu esa iqtisodiy va ijtimoiy o‘zgarishlarni amalga oshirish, kasbiy ta’limni davlat tomonidan tartibga solish mexanizmlarini takomillashtirish zarurligini ko‘rsatadi. Davlat siyosatining asosiy maqsadi — fuqarolarning bilim olish ehtiyojlarini hamda iqtisodiyotning malakali mutaxassislarga bo‘lgan talabini qondirishdir. Umuman olganda, migratsiya jarayonlari asosan iqtisodiy sabablar, ya’ni yaxshiroq yashash va ish sharoitlarini

izlash bilan bog‘liq. .Aholining ko‘chib yurish sabablari ko‘p qirrali bo‘lib, ularning eng muhimlari iqtisodiy va ijtimoiy omillar bilan belgilanadi. Ish o‘rinlarining yetishmasligi, daromadlar tafovuti, turmush sharoitlari o‘rtasidagi farqlar, ijtimoiy infratuzilmaning rivojlanmaganligi hamda urbanizatsiya jarayonlarining tezlashuvi migratsiyani kuchaytiruvchi asosiy sabablar qatoriga kiradi. Shu jarayonda O‘zbekiston Respublikasi ham o‘zining o‘ziga xos demografik xususiyatlari bilan ajralib turadi.Xususan, mamlakatimizning markaziy qismida joylashgan Samarqand viloyati iqtisodiy, madaniy va tarixiy jihatdan rivojlangan mintaqa bo‘lishiga qaramay, migratsiya oqimlari bu yerda ham jiddiy demografik o‘zgarishlarni yuzaga keltirmoqda. Shu bilan birga, migratsiya harakati viloyatda mehnat bozori tarkibining o‘zgarishiga, aholi sonining tabiiy o‘sish sur’atlariga va yosh-jinsiy tarkibda nomutanosiblik paydo bo‘lishiga olib kelmoqda.

Demografik rivojlanish bilan migratsiya jarayonlari o‘rtasidagi o‘zaro bog‘liqlik masalasi ko‘plab ilmiy tadqiqotlarda o‘rganilgan bo‘lsa-da, aynan Samarqand viloyatining geografik, iqtisodiy va ijtimoiy xususiyatlarini inobatga olgan holda olib borilgan kompleks tahlillar hali to‘liq shakllanmagan. Shu bois, mazkur maqola ushbu muammoni hududiy, demografik va iqtisodiy nuqtai nazardan chuqur tahlil qilishga bag‘ishlangan.

Samarqand viloyati o‘zining tabiiy-geografik joylashuvi, iqtisodiy salohiyati va ijtimoiy infratuzilmasi bilan respublika migratsiya tizimida alohida o‘rin tutadi.Samarqand viloyatida migratsiya jarayonlari ko‘p omilli va murakkab tizimni tashkil etadi. Aholining tabiiy o‘sish darajasining yuqoriligi, iqtisodiy faol aholi ulushining kattaligi va urbanizatsiya darajasining oshib borishi ichki migratsiyani kuchaytirayotgan asosiy omillardandir. Viloyat hududida qishloq joylardan shaharlarga ko‘chish holatlari kengayib, aholi zichligi bo‘yicha markaziy tumanlarda bosim ortgan. Ichki migratsiyaning kuchayishi shahar infratuzilmasiga, ijtimoiy xizmatlarga va mehnat bozoriga sezilarli ta’sir ko‘rsatmoqda. Aholi sonining tez o‘sishi natijasida transport, ta’lim, tibbiyot va uy-joy tizimlarida yuklama kuchaygan. Biroq qishloq hududlarida, ayniqsa tog‘li tumanlarda aholining kamayishi va mehnat resurslari yetishmovchiligi kuzatilmoqda.

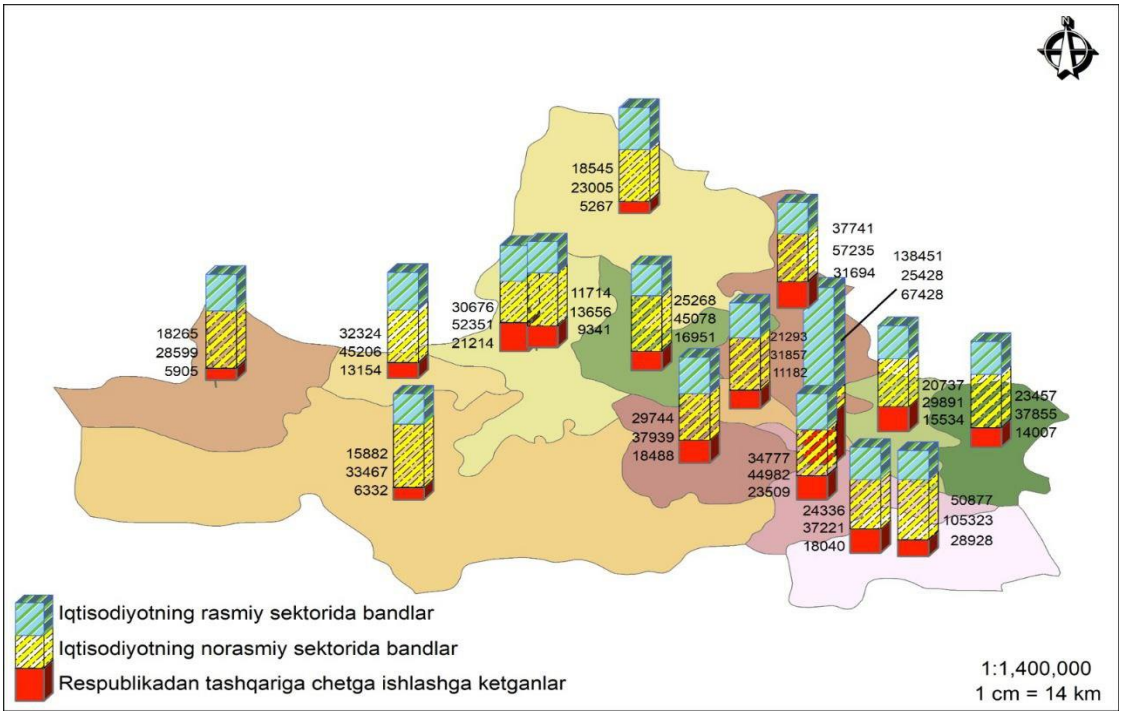
Tashqi migratsiya esa asosan iqtisodiy sabablarga ko‘ra yuz bermoqda. Ish o‘rinlarining yetishmasligi, daromadlar pastligi va xorijdagi ish haqi yuqoriligi viloyat mehnat resursi hisoblangan mehnat yoshidagi aholini chet elga ko’chishga undamoqda. Aholining asosan 20–40 yoshli erkak qatlami mehnat migratsiyasining asosiy ishtirokchisi hisoblanadi. Demografik jihatdan bunday jarayonlar viloyat tarkibida muvozanatsizlikni yuzaga keltiradi. Tug‘ilish darajasi saqlanib turgan bo‘lsa-da, yosh oilalarning chet elda bo‘lishi natijasida tabiiy o‘sish sur’atlari sekinlashmoqda. Shuningdek, erkaklar migratsiyasining ko‘pligi tufayli ayrim tumanlarda ayollar ulushi ortib, mehnatga yaroqli erkaklar soni kamaygan. Bu holat nafaqat iqtisodiy, balki ijtimoiy muammolarni ham keltirib chiqarmoqda. Masalan, oilalarning uzoq vaqt ajralib yashashi, bolalar tarbiyasidagi bo‘shliqlar, ijtimoiy adaptatsiya qiyinchiliklari jamiyatda yangi demografik muammolarni yuzaga keltiradi.

Migratsiya jarayonlari mehnat bozoriga ham kuchli ta’sir ko‘rsatmoqda. Ba’zi sohalarda, xususan qurilish, xizmat ko‘rsatish va qishloq xo‘jaligida ishchi kuchi tanqisligi sezilmoqda. Boshqa tomondan, chet elda mehnat qilayotgan fuqarolarning yuborayotgan pul o‘tkazmalari viloyat iqtisodiyotida muhim o‘rin tutadi. Mehnat migratsiyasiga ta’sir etuvchi omillar ikki katta guruhga — **iqtisodiy** va **noiqtisodiy** omillarga ajratiladi. Iqtisodiy omillar quyidagicha tasniflanadi:

- mamlakatning iqtisodiy rivojlanganlik darajasi — mehnat resurslari odatda o‘z yurtiga nisbatan iqtisodiy jihatdan yuqoriroq rivojlangan davlatlarga ko‘chishga intiladi;
- mehnat bozorining holati — iqtisodiyoti sust rivojlangan, aholisi zich mamlakatlarda ishsizlik yuqori bo‘lgani sababli aholining bir qismi chet elda ish izlashga majbur bo‘ladi;
- iqtisodiyotning erkinlashtirilishi — xalqaro hamkorlik va mehnat resurslari almashinuvining faollashuviga olib keladi.

Tadqiqotlarga ko‘ra, migrantlarning 23,9 foizi oliy, 68,4 foizi o‘rta maxsus, 7,7 foizi esa o‘rta ma’lumotga ega. Ulardan 45,9 foizi uchun o‘z yurtida yuqori maoshli ishning yo‘qligi migratsiyaning asosiy sababi hisoblanadi, 27,3 foizi past ish haqi, 11,2 foizi esa oila qurish istagi tufayli chet elga ketgan. Qolgan 15,6 foizi kambag‘allik, qarzni to‘lash yoki uy-joy xarid qilish zarurati kabi omillar bilan bog‘liq. Shu bilan birga, aholi bandligiga ko‘maklashish markazlari tomonidan o‘tkaziladigan ish yarmarkalarida taklif etilayotgan ish haqlarining pastligi ham mehnat migratsiyasini kuchaytirayotgan omillardan biridir.

Viloyatda urbanizatsiya jarayonining tezlashuvi migratsiya bilan uzviy bog‘liq. Yangi turar joy massivlari, xizmat ko‘rsatish tarmoqlari va infratuzilmaning kengayishi aholining shahar atrofiga to‘planishiga olib kelmoqda. Bu esa demografik zichlikni oshirib, ekologik yuklama va resurslar taqsimotini murakkablashtiradi. 2030-yilgacha bo‘lgan demografik prognozlarga ko‘ra, agar



migratsiya oqimlari hozirgi sur’atda davom etsa, viloyat aholisi tabiiy o‘sish sur’atining pasayishi bilan birga mehnat yoshidagi aholi ulushi 2–3 foizga kamayadi. Shu sababli migratsiyani boshqarish, ichki bandlikni oshirish va ijtimoiy muvozanatni saqlash viloyatning barqaror rivojlanishi uchun hal qiluvchi ahamiyatga ega. Migratsiyani ijobiy yo‘nalishda boshqarish uchun mehnat resurslarini qayta tayyorlash, yangi ish o‘rinlari yaratish, yoshlar uchun kasbga yo‘naltirish tizimini rivojlantirish zarur. Shu bilan birga, xorijdan qaytgan fuqarolarning tajribasini mahalliy iqtisodiyotga integratsiya qilish, ular uchun imtiyozli kreditlar va biznes qo‘llab-quvvatlash mexanizmlarini yo‘lga qo‘yish muhimdir. Hududlararo nomutanosiblikni kamaytirish uchun qishloq joylarda infratuzilma, ijtimoiy xizmatlar va investitsiya loyihalarini kengaytirish lozim. Bu orqali aholining migratsiyaga ehtiyoji kamayadi va demografik muvozanat barqarorlashadi.

Samarqand viloyati mehnat resurslari balansi va tashqi migratsiyaning hududiy tafovutlari karta-sxemasi

Umuman olganda, Samarqand viloyatida migratsiya jarayonlari iqtisodiy zarurat sifatida boshlangan bo‘lsa-da, vaqt o‘tishi bilan u demografik tuzilma, ijtimoiy muhit va hududiy rivojlanish yo‘nalishlarini belgilovchi asosiy omilga aylangan. Shu sababli migratsiyani boshqarish strategiyasi viloyat demografik siyosatining ajralmas qismiga aylanishi zarur.

Xulosa qilib shuni atish mumkinki, Samarqand viloyatida migratsiya jarayonlari demografik tizimning barcha tarkibiy qismlariga bevosita ta’sir ko‘rsatmoqda. Aholining ichki va tashqi harakatchanligi tufayli yosh tarkib o‘zgarib, mehnat resurslari taqsimotida nomutanosiblik yuzaga kelgan. Bu holat mehnat bozoridagi raqobatni kuchaytirgan bo‘lsa-da, ayrim tumanlarda ishchi kuchi tanqisligini keltirib chiqargan. Migratsiya tufayli demografik yuklama ortib, aholi sonining tabiiy o‘sish sur’atlari pasaygan. Shuningdek, oilaviy strukturadagi o‘zgarishlar, ayollar bandligining o‘sishi, yoshlar orasida tashqi mehnatga qiziqishning ortishi viloyat demografik siyosatini qayta ko‘rib chiqishni talab qilmoqda.

Samarqand viloyatida demografik barqarorlikni ta’minlash uchun quyidagi ilmiy asoslangan xulosalar ilgari suriladi:

1. Mehnat bozorini diversifikatsiya qilish – kichik sanoat zonalari, xizmat ko‘rsatish va turizm tarmoqlarida yangi ish o‘rinlarini yaratish orqali ichki migratsiyani kamaytirish.

2. Hududlararo tenglikni ta’minlash – chekka tumanlarda infratuzilmani modernizatsiya qilib, urbanizatsiya bosimini pasaytirish.

3. Migratsiyani monitoring qilish tizimini kuchaytirish – raqamli ma’lumotlar bazasi orqali doimiy kuzatuv va tahlil mexanizmini yo‘lga qo‘yish.

4. Qaytgan migrantlarni integratsiya qilish – xorijiy tajriba va mablag‘larni mahalliy iqtisodiyotga jalb etish uchun qo‘llab-quvvatlovchi dasturlar yaratish.

5. Demografik siyosatni takomillashtirish – migratsiya oqimlarini hisobga olgan holda aholi soni, yosh tarkibi va mehnat salohiyatini muvozanatlashtirish.

Ushbu chora-tadbirlar amalga oshirilganda migratsiya jarayonlari salbiy emas, balki ijobiy demografik va iqtisodiy omilga aylanishi, viloyatda barqaror ijtimoiy muvozanat va iqtisodiy o‘sish ta’minlanishi mumkin bo‘ladi.

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THE ROLE OF AGROCONSULTING IN DEVELOPING INNOVATIVE AGROTECHNOLOGIES

Abstract. *This study examines the central role of agroconsulting in the development, diffusion, and successful implementation of innovative agrotechnologies. The findings demonstrate that agroconsulting acts as the primary mechanism through which farmers understand modern technologies, adapt them to local conditions, and manage risks associated with technological change. Precision farming tools, smart irrigation systems, digital monitoring platforms, and advanced seed technologies become effective only when supported by structured agroconsulting services. Therefore, agroconsulting is not an auxiliary service but the core driver of innovation-based agricultural transformation.*

Keywords: *agroconsulting, innovative agrotechnologies, precision agriculture, smart irrigation, technology diffusion, sustainability.*

Introduction

The rapid advancement of innovative agrotechnologies has fundamentally transformed agricultural production systems; however, the success of these technologies depends heavily on the presence of strong and functional agroconsulting structures. In modern agriculture, farmers are expected to interpret digital soil data, calibrate smart irrigation systems, analyze satellite-based crop indicators, adjust fertilizer dosage scientifically, and apply climate-adaptive cultivation methods. Without agroconsulting, the gap between technological innovation and practical application widens. Agroconsulting provides farmers with the knowledge, guidance, and decision-making tools necessary to translate innovations into real productivity. Thus, agroconsulting is not separate from innovation it is the foundation upon which innovation becomes effective.

Literature review

Contemporary research widely emphasizes that the successful development of innovative agrotechnologies depends on strong advisory mechanisms that enable farmers to interpret, adapt, and operationalize new technologies. Klerkx, Schut, and Leeuwis argue that modern innovation systems are knowledge-intensive, requiring continuous expert support rather than one-time technological interventions. Their work demonstrates that advanced tools such as precision farming, digital soil diagnostics, and climate-smart cultivation cannot generate meaningful outcomes without embedded advisory structures guiding farmers through implementation. In the Central Asian context, the works of Yashnar Aliyev provide significant insight, particularly his monograph on agricultural modernization and technological renewal. Aliyev emphasizes that innovation does not begin with equipment but with

the farmer's ability to understand and correctly apply technology, which is made possible through well-organized advisory support structures. He argues that the introduction of innovations in crop production such as modern wheat varieties, resource-saving machinery, and water-efficient cultivation requires a sophisticated advisory ecosystem that bridges scientific knowledge and practical field conditions. His findings reinforce the idea that advisory services are an inseparable part of the innovation chain.

Results and discussion

The results reveal a clear pattern demonstrating that the speed of innovation implementation in agricultural production is strongly influenced by the level of consulting support provided to farmers. As illustrated in the chart "Effect of Consulting Support on Innovation Implementation Speed", farms operating without consulting support required an average of 14 months to fully adopt innovative agrotechnologies. This prolonged timeframe reflects the difficulties farmers face in interpreting technical requirements, adjusting to digital tools, and adapting innovations to local soil and climate conditions without professional guidance.

A moderate improvement is observed among farms receiving periodic consulting support, where the implementation period decreased to 9 months. This reduction indicates that even occasional expert assistance accelerates farmers' ability to understand and operationalize innovation protocols. Periodic guidance such as seasonal agronomic recommendations, basic training, or limited troubleshooting helps reduce uncertainty and prevents common technical mistakes, thereby speeding up the transition process.

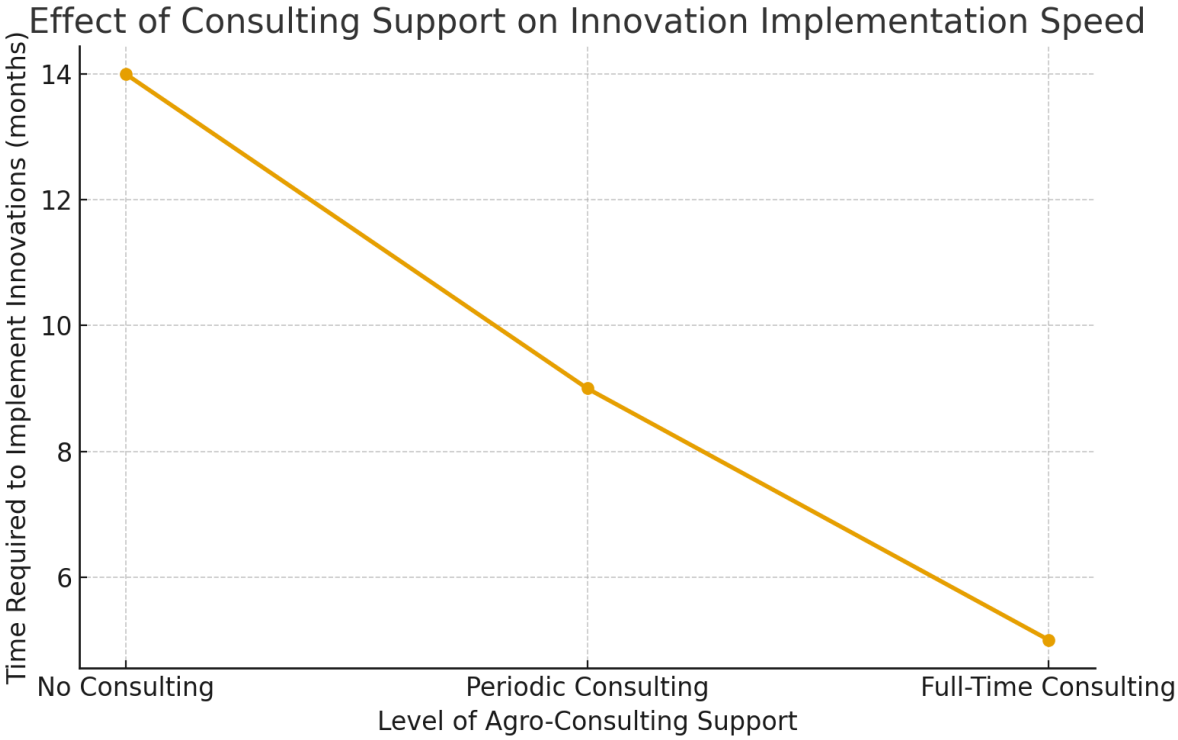


Figure 1. Effect of Consulting Support on the Speed of Innovation Implementation in Agricultural Production

(Compiled by the author based on statistical data)

The most significant improvement is seen among farms with full-time consulting support, where innovations were successfully implemented within 5 months. This substantial acceleration demonstrates the strong effect of continuous professional guidance. Full-time advisory interaction provides farmers with constant access to expert interpretation of digital sensor data, correct calibration of smart irrigation systems, real-time monitoring of crop conditions, and systematic adjustment of technological parameters. As a result, the entire innovation cycle becomes more efficient, predictable, and accurate. Overall, the results clearly show that the intensity of consulting support directly determines how quickly and effectively innovative agrotechnologies are adopted. Higher consulting engagement leads to faster technology assimilation, fewer operational errors, and more consistent integration of advanced practices into everyday farming activities. This evidence confirms that consulting is not an auxiliary service but an essential component of the innovation adoption process in modern agriculture.

The results clearly illustrate that the speed of innovation implementation in agriculture is strongly dependent on the level of consulting support integrated into the technological transition process. As the statistical data in Figure 1 demonstrate, farms lacking consulting support require the longest period to adopt innovative agrotechnologies, mainly due to limited technical literacy, higher uncertainty, and the absence of expert interpretation during technological adjustments. This finding aligns with Birner et al, who emphasize that innovation failures often occur not because technologies are inadequate, but because farmers lack continuous expert guidance throughout the adoption process.

The significantly faster implementation observed among farms receiving periodic and full consulting support reflects the importance of advisory mechanisms as part of the innovation ecosystem. These results support Klerkx, Schut, and Leeuwis, who state that innovation diffusion is effective only when supported by systems of learning, adaptation, and knowledge transfer. Furthermore, the sharp reduction from 14 months to 5 months in implementation time is consistent with FAO's conclusion that consulting services drastically reduce uncertainty and operational mistakes in technologically intensive environments. Regional studies, particularly those by Yashnar Aliyev, reinforce this pattern by showing that in Uzbekistan's agricultural sector, farmers adopt modern technologies more successfully when expert support is embedded at each adoption stage. J.Toshboev also stresses that consulting mechanisms play a decisive role in forming technology-compatible managerial decisions within agribusiness, which explains the superior performance of farms with continuous consulting access.

Conclusion

This study concludes that consulting support serves as the central driver of successful innovation implementation in agriculture. The empirical trends derived from statistical data show that the level of consulting engagement directly influences how quickly farmers can transition to modern agrotechnologies. Continuous expert support shortens the learning curve, reduces technical errors,

enhances resource-use efficiency, and significantly improves productivity outcomes.

The evidence demonstrates that innovations such as precision farming, smart irrigation systems, digital monitoring tools, and improved seed technologies cannot reach their full potential without structured, reliable, and ongoing advisory mechanisms. Consulting is therefore not an external component of innovation it is the operational core that enables technological transformation.

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METABALIK SINDIROMDA TALOQNING MORFOGENEZI

Annotatsiya: *Mazkur maqolada metabolik sindrom sharoitida taloqning morfogenez jarayonlari, uning gistologik tuzilishi va funksional o‘zgarishlari yoritiladi. Metabolik sindromda kuzatiladigan semirish, dislipidemiya, insulin rezistentligi va arterial gipertenziya taloq to‘qimalarining rivojlanishiga va morfologik qayta tuzilishiga sezilarli ta’sir ko‘rsatadi. Maqolada taloqdagi oq va qizil pulpa nisbati, limfoid follikulalardagi reaktiv giperplaziya, makrofag tizimining faollashuvi hamda qon shaklli elementlarining filtrasiyasi jarayonidagi buzilishlar morfogenez nuqtayi nazaridan tahlil qilingan. Shuningdek, oksidlovchi stress va yallig‘lanish mediatorlari ta’sirida taloq strukturasining bosqichma-bosqich o‘zgarishi ochib berilgan. Ushbu tahlil metabolik sindromda taloqning morfologik moslashuv mexanizmlarini tushunishda muhim ilmiy va amaliy ahamiyatga ega.*

Kalit so’zlar: *metabolik sindrom, taloq, morfogenez, oq pulpa, qizil pulpa, limfoid follikula, immun javob, dislipidemiya, insulin rezistentligi, oksidlovchi stress.*

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MORPHOGENESIS OF THE SPLEEN IN METABOLIC SYNDROME

Annotation: *This article describes the morphogenesis of the spleen in the context of metabolic syndrome. It analyzes structural and functional changes in white and red pulp under the influence of insulin resistance, dyslipidemia, obesity, and hypertension. The study highlights the role of oxidative stress, inflammatory mediators, and immune cell activation in the morphological remodeling of the spleen. The stages of morphogenesis, including lymphoid follicle hyperplasia, vascular dilation, macrophage activation, and subsequent fibrotic changes, are examined. These findings provide scientific and practical significance for*

understanding the pathogenesis of metabolic syndrome and for early prevention strategies.

Keywords: *spleen, morphogenesis, metabolic syndrome, white pulp, red pulp, lymphoid follicle, oxidative stress, insulin resistance, dyslipidemia, immune response, inflammatory mediators.*

Mavzuning dolzarbligi: metabolik sindrom bugungi kunda keng tarqalgan va yurak-qon tomir hamda endokrin kasalliklar rivojlanishiga asosiy sabab bo‘luvchi sindromdir. Bu holatda taloqning morfogenez jarayonlari sezilarli darajada buzilib, oq va qizil pulpada patologik o‘zgarishlar kuzatiladi. Shu bois metabolik sindromda taloq morfogenezini o‘rganish kasalliklarning rivojlanish mexanizmlarini tushunish va erta tashxislash uchun dolzarb hisoblanadi.

Taloqning tuzilishi. Taloq organizmning eng yirik limfoid a’zosi bo‘lib, immun tizim faoliyatida va qon shaklli elementlarni filtrlashda muhim rol o‘ynaydi. Taloq ikki asosiy qismdan iborat: oq pulpa va qizil pulpa.

Oq pulpa – taloqning limfoid to’qimasi bo’lib, u immun himoya jarayonlarida faol ishtirok etadi. Uning asosiy elementlari: limfotsitlar(B va T limfotsitlar),limfoid follikulalar (birlamchi va ikkilamchi), markaziy arteriya, periarteriolar limfoid qobiq. Metabolik sindrom holatida taloqdagi oq pulpa to‘qimasida yallig‘lanish hujayralarining (limfotsitlar va makrofaglar) miqdori sezilarli oshdi. Shuningdek, gipoksiya natijasida to‘qima nekrozi va fibroz rivojlanishi kuzatildi. Retikulyar to‘qima tolalari zichlashdi, qon tomirlar toraydi yoki shikastlanadi. Bu o‘zgarishlar taloq immun funksiyasining buzilishiga olib keladi. Shu bois, metabolik sindrom ta’sirida oq pulpaning gistamorfologik morfologiyasidagi o‘zgarishlarni o‘rganish zarurdir.

Qizil pulpa esa qon shaklli elementlarni saqlash, eritrotsitlarni utilizatsiya qilish va qisman yangi qon hujayralarini ishlab chiqarishda muhim ahamiyatga ega. Qizil pulpa o‘z nomini uning qon tomirlari bilan boy ta’minlanganligi va shu bois qizil rangga ega bo‘lishidan olgan. Bu pulpa juda zich qon tomirlar tarmog‘i bilan ta’minlangan yumshoq to‘qimadir. Kichik kapillyarlar va arteriyalar hamda venalar mavjud.

Taloq tashqi tomondan kapsula va trabekulalar bilan o‘ralgan bo‘lib, ular orqali qon tomirlari va nerv tolalari kirib boradi.

Metabolik sindrom va taloq morfogenezidagi o‘zgarishlar

Metabolik sindrom — bu semirish, insulin rezistentligi, dislipidemiya va arterial gipertenziya bilan tavsiflanadigan murakkab sindromdir. Ushbu sindrom immun tizim faoliyatini, shu jumladan taloq tuzilishini sezilarli darajada o‘zgartiradi.

Oq pulpada metabolik sindrom natijasida reaktiv giperplaziya (limfoid follikulalarning kattalashuvi) yoki atrofiya (kichrayishi va funksional pasayishi) kuzatiladi.

Qizil pulpada esa makrofag tizimi faollashadi, eritrotsitlar parchalanishi (gemoliz) tezlashadi va hemosiderin to‘planadi.

Dislipidemiya qonda xolesterin va triglitseridlar miqdorining ortishi orqali taloqdagi qon aylanishiga salbiy ta’sir ko‘rsatadi.

Insulin rezistentligi hujayralarning glyukozani o‘zlashtira olmasligiga olib keladi, natijada oksidlovchi stress ortadi.

Metabolik sindrom bilan kechadigan bemorlarda immun javob buzilishi infeksiyalarga moyillikni oshiradi, yallig‘lanishning surunkali kechishiga olib keladi hamda taloq morfogenezi orqali butun immun tizim faoliyatiga ta’sir ko‘rsatadi.

Oksidlovchi stress taloq hujayralarida membrana shikastlanishiga, yallig‘lanish mediatorlari (interleykinlar, TNF-α) ortiqcha ishlab chiqarilishiga sabab bo‘ladi.

Morfologik bosqichlar

Metabolik sindrom sharoitida taloqda bosqichma-bosqich morfologik o‘zgarishlar kuzatiladi:

Boshlang‘ich bosqich – oq pulpada limfotsitlar sonining ko‘payishi, immun faollik ortishi.

O‘rta bosqich – qizil pulpada qon tomirlarning kengayishi, makrofaglar va plazmatik hujayralar sonining oshishi.

Keyingi bosqich – limfoid follikulalarning atrofiya jarayonlari, retikulyar stromada fibrozlanish, qizil pulpada gemoliz va hemosiderin to‘planishi.

Xulosa: Metabolik sindrom taloq morfogenezida chuqur o‘zgarishlarga sabab bo‘ladi. Oq pulpa va qizil pulpa nisbatining buzilishi, limfoid follikulalarning reaktiv giperplaziyasi yoki atrofiyasi, makrofag tizimining faollashuvi hamda oksidlovchi stress ta’sirida yuzaga keladigan qayta tuzilishlar bu a’zoning immun va gematologik vazifalarini izdan chiqaradi. Ushbu holatlarni o‘rganish metabolik sindromda immun tizimning moslashuv mexanizmlarini yaxshiroq tushunish va kelgusida davolash strategiyalarini ishlab chiqishda muhim ahamiyatga ega.

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MUQOBIL ENERGETIKA VA ATROF MUHIT MUHOFAZASI

Annatotsiya: *Ushbu maqola hozirda butun dunyoda eng muhim masalaga aylangan energiya ta’minoti va uni hal etishda muqobil energetikaning ahamiyati yoritilgan. Bu boradagi davlatimiz rahbari tomonidan mamlakatimizni elektr ener giyasi bilan ta’minlash masalasi bo‘yicha o‘tkazilgan uchrashuvlaridagi dolzarb vazifalar, muqobil energetikaning atrof-muhitni muhofazazi va tabiiy resurslarni tejamkorligidagi o’rni haqida ma’lumotlar berilgan.*

Kalit so‘zlar: *muqobil energetika, aloqa, elektr va issiqlik energiyasi, transport, iqtisodiyot, monokristallik, kremniy, quyosh panellari.*

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ALTERNATIVE ENERGY AND ENVIRONMENTAL PROTECTION

Abstract: *This article covers energy supply, which has become the most important issue in the world, and the importance of alternative energy in solving it. In this regard, the head of our state gave information about the current tasks of the meetings held on the issue of providing our country with electricity, the role of alternative energy in environmental protection and saving natural resources.*

Key words: *alternative energy, communication, electric and thermal energy, transport, economy, monocrystalline, silicon, solar panels.*

Kirish: Davlat iqtisodiyoti va insonlar hayot tarzining asosini energiya tashkil qilishi hech kimga sir emas. Ayniqsa, inson tomonidan iste’mol qilinayotgan umumiy energiya miqdori tarixiy rivojlanish bosqichlariga bog‘liq. Masalan,

ibtidoiy jamoa davrida, inson tomonidan bir kunda iste'mol qilinadigan o'rtacha quvvat, ya'ni ularning yashashini ta'minlovchi metabolik energiya oziq-ovqatlar hisoblangan. Uning miqdori taxminan 2,4 kVt soatdan iborat bo'lsa, bugungi rivojlangan g'arb mamlakatlarining yashash darajasida bu ko'rsatkich ibtidoiy jamoa tuzimiga qaraganda 10 martadan ko'p va u 250 kVt soatni tashkil qilmoqda. Bu ko'rsatkich insonning nafaqat tirikligini ta'minlovchi metabolik energiyani, balki uning barcha zamonaviy ehtiyojlari: aloqa, elektr va issiqlik energiyasi, transport kabilarni o'z ichiga oladi. Jahon mamlakatlari miqyosida fuqarolarning bunday talablarini uzilishlarsiz qondirish uchun albatta katta miqdordagi energiya zarur bo'ladi.

Keyingi yuz yil ichida insoniyat energetika boyliklari ehtiyojini misli ko'rilmagan darajada ko'paytirdi, bu esa unga tabiatga jiddiy va oqibatlari uzoqqa cho'ziladigan ta'sir o'tkazish imkonini berdi. Fan-texnika taraqqiyoti davrida bu ko'rsatkichlar yanada o'sib boradi.

Rivojlangan mamlakatlarda tovarlar va xizmatlarning umumiy hajmi endilikda har 15 yilda ikki baravarga oshmoqda. Shunga muvofiq ravishda atmosferani, suv havzalari va tuproq ekologiyasini buzuvchi xo'jalik faoliyatidagi chiqindilar miqdori ham ikki baravar ko'paymoqda. Rivojlangan mamlakatlarda tabiatdan har yili jon boshiga 30 tonna modda chiqarib olinadi, shundan ayrim hollarda 1-1,5 foizga yetar-yetmas qismi iste'mol qilinadigan mahsulot shakliga kiradi, qolgani esa ko'pincha tabiat uchun juda xavfli bo'lgan chiqindiga aylanadi. Hozirgi texnik taraqqiyot davrida, istalgan mamlakatda iqtisodiy o'sish yoqilg'i energetika kompleksining faoliyati bilan mustahkam bog'langan. Bunda energiya resurslaridan maksimal hajmda va yuqori darajada samaradorlik bilan foydalanayotgan mamlakatlar ko'proq raqobatbardosh bo'ladilar. Jumladan, AQSh, Yaponiya, Xitoy, Rossiya, Germaniya va yana shunga o'xshash sanoati rivojlangan jahon mamlakatlarining iqtisodiyoti ham qayta tiklanmaydigan uglevodorod yoqilg'i energetik resurslariga tayanadi. Energetika muammosi jahonda global muammo sifatida energiya manbalaridan foydalanish tizimini takomillashtirish hamda energetika tizimida muqobil, ekologik toza energiya manbalaridan foydalanish, energiya ta'minoti uzluksizligi va sifatini yuqori pog'onaga ko'tarishga xizmat qilishi lozim.

Oxirgi 10 yillikda Yer yuzida energiya tanqisligini oldini olish hamda atrof-muhit musaffoligini saqlash maqsadida energiyaning boshqa manbalari: yer osti issiqlik energiyasi, shamol va quyosh energiyasidan foydalanish dolzarb ahamiyat kasb etmoqda. Oziq-ovqat, atrof-muhit muhofazasi va energetik muammolar uyg'unlashib borayotgan hozirgi vaqtda tabiatni asrab-avaylash, energiya manbalaridan oqilona foydalanish talab etiladi. Hozirgi vaqtda, qazib olinadigan yoqilg'ilar, asosan, organik yoqil'gilar hisoblangan – ko'mir, neft, tabiiy gaz va uran zahirasi dunyo energetika balansining asosi hisoblanadi. Energoresurslarning hozirgi darajada iste'mol qilinishida dunyodagi neft zahirasi –45-50 yilga, tabiiy gaz – 70-75 yilga, toshko'mir – 165-170 yilga yetishi mumkin.

Iqtisodiyotning kelajakda rivojlanishi, aholi sonining o'sishi va mavjud an'anaviy energiya ta'minoti hisobga olinsa, energiya ta'minoti mutanosib ravishda

ortib boradi. Undan tashqari, qazib olingan yoqilg‘ilarning ishlatilishi atrof-mihitga salbiy ta’sir ko‘rsatadi. Respublikada energetika sektorining faoliyati tufayli tashlanadigan zaharli moddalar miqdori 80 foizdan ko‘proqqa to‘g‘ri keladi. Bu tur energiya manbalaridan foydalanishning o‘ziga xos qulay va noqulay tomonlari mavjud. Birinchidan, bu turdagi energiya manbalarining yerdagi zahiralari chegaralangan bo‘lib, u vaqt o‘tishi bilan kamayib boradi. Ikkinchidan, bu turdagi energiya manbalaridan foydalanish natijasida atrof-mihitga turli chiqindilar chiqarib tashlanadi. Mutaxassislarning ta’kidlashlaricha, har yili tabiiy yoqilg‘ilarning ishlatilishi natijasida atmosferaga 200 million tonnaga yaqin qattiq zarrachalar, 200 million tonna oltingugurt gazi, 700 millionn tonna uglerod oksidlari, 150 million tonna azot oksidlari chiqarib tashlanmoqda. Buning natijasida tabiatda turli xildagi iqlim o‘zgarishlari sodir bo‘lishiga olib kelmoqda. Yer yuzida hozirgi vaqtda aholi tomonidan foydalanib turilgan energetik manbalarning tahlili ko‘rsatishicha, toshko‘mir 51,1 foizni, gaz 13,5 foizni, neft mahsulotlari 12,5 foizni, atom elektrostansiyalarida foydalaniladigan uran energiyasi 10,7 foizni, muqobil energiya manbalari (MEM) 13 foizdan ortiqroqni tashkil qilar ekan.

Aholisi soni 10 million atrofida bo‘lgan Shvetsiya qirolligida yiliga o‘rtacha 169,9 TVt soat (teravatt-soat) elektr energiyasi ishlab chiqarilsa, aholisi salkam 38 million bo‘lgan mamlakatimizda 70,01 TVt soat, ya’ni 2,4 marta kam elektr energiyasi ishlab chiqariladi. Kishi boshiga to‘g‘ri keladigan elektr energiya miqdorini solishtirilsa, bu ko‘rsatkich Shvetsiya qirolligida bu ko‘rsatkich o‘rtacha 13480 kVt soatni, mamlakatimizda esa 1645 kVt soat (8 marta kam)ni tashkil qiladi. Demak, mamlakatning yoki jamiyatning rivojlanish darajasi qancha yuqori bo‘lsa, shuncha ko‘p elektr energiyasi iste’mol qilinadi. O‘zbekiston iqtisodining katta sur’atlar bilan rivojlanishi, yangi zavod va fabrikalarning qurilishi hamda ishga tushirilishi, transport va infrastrukturalardagi o‘zgarishlar, aholi sonining katta tezlik bilan o‘sishi mamlakatimizda elektr energiyasiga bo‘lgan talabning keskin ortishiga olib kelmoqda. Mavjud elektr energiyasi manbalarining quvvati bu talablarni qondirishga yetarli bo‘lmagani avvalgi yilgi qishda yaqqol sezildi. Yaqin vaqtlargacha O‘zbekistonda ishlab chiqarilayotgan elektr energiyasi asosan issiqlikdan (85 foiz) va gidroelektrostansiyalaridan (13 foiz) olinar edi. Muqobil energiyalardan olinadigan energiyaning miqdori turli manbalardan olingan ma’lumotlarga asosan 1,5-2 foizni tashkil qilgan, xolos. Oxirgi yillarda bu ko'rsatkich yil sayin ortib bormoqda. Bu boradagi davlat siyosati o‘z samarasini bermoqda.

Mamlakatimiz rahbarining sa’y-harakatlari bilan ma’nan eskirgan energiya ishlab chiqaruvchi qurilmalar samaradorligi yuqori bo‘lganlari bilan almashtirildi, ichki imkoniyatlardan foydalanib yangi quvvatlar olish yo‘lga qo‘yilmoqda. Shunga qaramasdan, bugungi kun rivojlanish darajasini elektr energiyasi bilan ta’minlash masalasi qiyin kechmoqda. Bunga sabab, tabiiy uglevodorod manbalari zaxiralarining kamayib borishi, mamlakatimizda katta daryolarning yo‘qligi va dengiz hamda okeanlardan uzoqligi bo‘lib, bu omillar issiqlik va gidroelektrostansiyalar quvvatini oshirishni cheklaydi. Shu jihatlarni hisobga olgan

xolda, mamlakatimizda qayta tiklanuvchi energiya resurslaridan foydalanish borasida keng ko‘lamli ijobiy ishlar amalga oshirilmoqda. Xorijlik hamkorlar hisobiga respublikamizning Samarqand, Navoiy, Surxandaryo, Buxoro, Namangan viloyatlarida davlat-xususiy sherikchiligi asosida Quyosh va shamol elektr stansiyalari qurilmoqda.

Mamalakatimizdagi quyoshli kunlar miqdorini 300 kundan ziyod deb oladigan bo‘lsak, bu soxadagi tabiiy imkoniyatlarimizning boshqa davlatlarga nisbatan o‘ta yuqoriligini ko‘rish mumkin.

Davlatimiz rahbari tomonidan mamlakatimizni elektr energiyasi bilan ta’minlash masalasi bo‘yicha o‘tkazilgan uchrashuvlardan birida Jizzax politexnika institutining professori Urushboy Yo‘ldoshev Jizzax shahrida kremniy asosidagi quyosh elementlarini (QE) ishlab chiqarishni yo‘lga qo‘yishni ilgari surdi va bu taklif Prezidentimiz tomonidan qo‘llab-quvvatlandi. Bu borada Andijon Davlat Universitetida ham texnika fanlari doktori, professor R.Aliyev rahbarligidagi ilmiy laboratoriyada ham samarali ishlar amalga oshirilmoqda.

Prezidentimizning davlat korxonalarining elektr energiyasiga bo‘lgan ehtiyojlarining 30 foizini muqobil energiya manbalaridan qoplash to‘g‘risidagi qarori e’lon qilindi va 2030-yilga borib mamlakat ehtiyojlari uchun kerak bo‘lgan elektr energiyasining 25 foizini muqobil energiya manbalari hisobidan qoplash masalasi ilgari surildi. Ijtimoiy soxa ob’yektlari, jumladan, ta’lim muassasalari binolariga quyosh panellarini o‘rnatish jadal sur’atlar bilan olib borilmoqda.

Andijon viloyatidagi qator oliy ta’lim muassasalari (AndDU, ADPI, ADChTI, ADTI) bu borada ilg‘orlik qilib, binolarning asosiy qismida energiya ist’emolining katta qismini qayta tiklanuvchi energiya (quyosh panellari) orqali qoplamoqda. Mamalakatimizdagi boshqa qator oliy ta’lim muassasalarida ham bu borada jadal ishlar olib borilmoqda. Jumladan, Samarqand davlat universiteti ham binolari ustiga qiymati 15 milliard so‘mlik quyosh panellarini tezlik bilan o‘rnatishni rejalashtirgan. Yuqorida keltirilgan misollar, albatta, mamlakatimizda muqobil energiya manbalaridan foydalanish bo‘yicha qo‘yilgan dadil qadamlardan hisoblanadi.

Xulosa.

Bizning nazarimizda, ushbu sohadagi muammoga katta e’tibor qaratilayotganligi o‘ta jiddiy, zarur va quvonarli hol. Shu o‘rinda, ayrim taklif va mulohazalarni bildirib o‘tish zarur. Yaqin istiqbolda quyosh panellarini binolar tomi ustiga o‘rnatish haqiqatdan ham dolzarb masala. Buning yechimi sifatida xorijdan quyosh panellari sotib olinib mamlakatimizda yig‘ilsa, xarajatlarning biroz kamayishiga olib keladi. Keyingi galdagi vazifalarga quyosh panellarini o‘zimizda ko’plab miqdorda ishlab chiqarishni kun tartibiga qo‘yish kerak. Hozirgi kunda quyosh panellarini ishlab chiqarish texnologiyalarining top-10 taligiga kiruvchi texnologiyalar bilan tanishib, mamlakatimiz uchun eng qulay bo‘lganini tanlab, shu sohada ilmiy-tadqiqot hamda konstruktorlik izlanishlarini kuchaytirish lozim.

Monokristallik kremniy asosidagi quyosh panellari eng ko‘p tarqalgan bo‘lishiga qaramay, ularda tannarxning qimmatligi, elementlarning mo‘rtligi, temperaturaga chidamsizligi kabi kamchiliklar ham bor. Hozirgi paytda bu

kamchiliklardan holi bo‘lgan Top-10 talik texnologiyalarga kiradigan bir qancha yangi texnologiyalar mavjud. Masalan, kremniy asosidagi geteroo‘tishli quyosh panellarini ishlab chiqarish mumkin. Buning uchun, shu sohada ishlarni yo‘lga qo‘ygan respublikamizdagi biror bir ilmiy tekishirish instituti yoki oliy ta’lim muassasalarida ilmiy tadqiqot hamda konstruktorlik ishlarini rag‘batlantirish va kuchaytirish zarur hisoblanadi. Undan tashqari, elektr va issiqlik energiyasini tejash masalasida tranformatsiyani kuchaytirish, xalq xo‘jaligi turli tarmoqlarida energiya tejamkor texnologiyalarga o‘tish alohida e’tibor qaratilsa ayni muddao bo‘lar edi.

Foydalanilgan adabiyotlar:

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IQLIM O`ZGARISHINING EKOTIZIMLARGA TA`SIRI XUSUSIDA (QASHQADARYO VILOYATI MISOLIDA)

Annotatsiya: *Maqolada iqlim o‘zgarishini yuzaga keltiradigan ba`zi omillar turlari, inson faoliyati hamda shu jarayon asosida geotizimlarda kuzatilishi mumkin bo`ladigan sharoitilar, jumladan qurg‘oqchilik oqibatida ekologik vaziyatning yomonlashishi va boshqalar xususida bayon etiladi. Ayniqsa, arid hududlarda iqlimning anomal vaziyatlari, suv tanqisligi, sel, chang bo`ronlari kabi jarayonlarni yuzaga kelishi va ularning salbiy ta’siri bilan bog‘liq ba’zi muammolar haqida mulohaza yuritiladi.*

Kalit so‘zlar: *iqlim o`zgarishi, geotizim, anomal, arid, qurg‘oqchilik, suv tanqisligi, cho’llashish, degredatsiya, sel, chang bo`ronlari.*

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ON THE IMPACT OF CLIMATE CHANGE ON ECOSYSTEMS (Using the Kashkadarya region as an example)

Abstract: *The article describes in detail some types of factors causing climate change, human activity, and conditions that can occur in geosystems based on this process, including environmental degradation due to drought, etc. In particular, in arid areas, some problems related to abnormal climatic situations, water scarcity, the occurrence of processes such as floods, dust storms, and their negative effects are being considered.*

Keywords: *climate change, Geosystem, anomaly, drought, drought, water scarcity, desertification, degradation, floods, dust storms.*

Kirish. Hozirgi zamonda butun dunyo bo`ylab, insoniyat oldidagi turgan eng katta sinov, bu -Xalqaro iqlim òzgarishi bo`lib, bugungi kun uchun eng katta global muammodir. Iqlim òzgarishi tabiy muhit holatining tubdan o`zgarishiga olib kelmoqda. Sir emaski, iqlim o`zgarishi - keng tarqalayotgan, jadal va tezlashib borayotgan jarayondir. Iqlim o‘zgarishi atrof-muhit, iqtisodiyot, qishloq

xòjaligining barcha sohalari qatori, insonlar salomatligiga ham katta xavf tug`dirmoqda. Global iqlim o'zgarishi bu sayyoramizda faqat haroratning o'rtacha yillik ko'tarilishi emas, balki barcha geotizimning o'zgarishidir. Biz bu holatni Qashqadaryo viloyati misolida tadqiq qilishga harakat qildik.

Asosiy qism. Keyingi yillarda dunyo bo`ylab qurg'oqchilik xavfining davriyligi va ko'lami kengayib hamda murakkablashib borayotganligi hech kimga sir emas. Zero, butun yer yuzasini qamrab olgan xalqaro iqlim o`zgarishiga olib keladigan asosiy omillar ilmiy jihatdan tahlil qilingan bo`lib, ushbu muammolarni yuzaga kelishidagi omillarning asosida inson faoliyati turadi.

Mutaxassislar tomonidan olib borilgan tadqiqotlarda transport, sanoat va qishloq xo`jalik tarmoqlaridan chiqadigan har xil chiqindilari natijasida atmosfera tarkibining o`zgarishiga olib kelishi isbotlangan. Bu esa issiqxona gazlarining ko`paytiradigan hamda yer atmosferasida to`planishi va Quyoshdan keladigan issiqlikni tutib qolishi tufayli global isishga olib keladi.

Qashqadaryo viloyati iqlimi uchun keskin kontinental, qish qisqa va beqaror, yoz uzoq va jazirama, qurg`oqchil, yog`in kamligi xosdir. Hudud meteostansiyalarida olib borilgan tadqiqotlar shuni ko`rsatadiki, eng katta mutlaq haroratlar 1944-yilda: Muborakda 48.6°C, G'uzorda 48.1°C, Qarshida 47.4°C bo`lganligi kuzatilgan. Eng kichik mutlaq haroratlar 1935–yilda Dehqonobod -27,2°C, 1969-yilda Qarshida -28,7°C, Chimqo'rg'on -27.4°C, 1984–yilda Muborakda -27,2°C, 2008-yilda esa Ko`lda -24.2°C bo`lganligi kuzatilgan. **1991-2023 yillar uchun maksimal harorat** Qarshida **45,6** °C **(**2022), **Muborak (cho'l hududi) 47,4** °C **(**2022), **2024 yil iyun oyi maksimal harorati 40,8**°C (27.VI), **Muborak (cho'l hududi) 42,9** °C (27.VI) ni tashkil etgan. Ma`lumotlarni tahlil qilish davomida 1944-yildagi **iyun** oyining mutlaq maksimal harorati Muborakda 48.6°C bo'lib qoldi.

2024 yil iyun oyi Qashqadaryo viloyatining tog' oldi va tog'li hududlarida qisqa muddatli yomg'irlar va ba`zida bir necha soat davomida (**10-20mm)** kuchli yog`in kuzatildi. Viloyatning baland tog'li hududlarida esa yog`in **60-100 mm** gacha bo'lishi kuzatildi. Meteostansiyalardan olingan ma`lumotlar shuni ko`rsatadiki, o`rtacha yillik yog`in miqdori **2024 yilda** Minchuqurda 683,3 mm, Ko`lda esa 742,5 mm bo`lgan, kuchli yog`inlar miqdori esa Minchuqurda bir sutkada 92.3 mm (I.2006 y.), Ko`lda esa bir sutkada 68.1 mm (III.2004 y.) yog`in tushgani kuzatilgan.

Eng ko`p yog`in tekisliklarda mart oyiga, tog` etaklarida va tog`larda aprel-mayga to`g`ri keladi. Yoz oylarida yillik yog`in miqdorining atigi 2-2,5% i tushadi. Viloyatda eng ko`p yog`in 1992-yilda 370 mm, 2018 yilda eng kam 140 mm yog`in tushgan (1-rasm).



1-rasm.Qashqadryo viloyati yog`in miqdori, mm.hisobida (1990-2020 yillar)
Ma`lumotlar asosida R.Usmanova R. tomonidan tuzildi.

Yog`in miqdorining bunday notekis taqsimlanishi bahor oylarida tuproq yuvilishi, jarlar hosil bo`lishining kuchayishiga sabab bo`ladi. Qarshi, Nishon dashtlarida janubi-g‘arbdan Sandiqli cho‘lining ta’siri seziladi, yillik yog‘inlar miqdori 146-190 mm. Yoz faslining uzoq davom etishi oqibatida bug‘lanish 1700 mm ga yetadi, bu esa o‘z navbatida namlik taqchilligini vujudga keltiradi.

Keyingi yillarda hududda tabiiy va antropogen omillar ta`sirida iqlim o`zgarishi, yog`in miqdorinig hamda qor va muzliklar hajmining kamayishi tufayli daryolarda suv tanqisligi sezilmoqda. Qashqadaryo gidrografik to‘rini (Jinnidaryo, Oqsuv, Tanxozdaryo, Katta va Kichik Uradaryo, Yakkabog‘daryo, G‘uzordaryo va b.) yuzaga keltiradi. Qashqadaryo havzasidagi muzliklar Oqsuv va Yakkabog‘daryo manbalarida joylashgan. Global iqlim o‘zgarishi jarayoni kuzatilayotgan hozirgi kunda dunyoda suv resurslari muammosi kun sayin ortib bormoqda. Jumladan, Qashqadaryo viloyatida ham suv tanqisligi, muzliklarning erishi, yog’in miqdorining kamayishi, iqlimning beqarorligi bilan bog’liq o’zgarishlar, daryolar oqimi rejimining o’zgarishiga va suv resurslarining ifloslanishiga olib kelmoqda. Masalan, Kitob ip-yigiruv kombinati va Shahrisabz shahar oqova suv tozalash inshootidan chiqayotgan oqova suvlar Qashqadaryoning ifloslanishiga sabab bo‘lmoqda. Bu inshootlardan chiqayotgan chiqindi suvlarning daryoga oqizilishi, daryo suvining kuchli ifloslanishiga sabab bo‘ladi [202-204 b]. Qashqadaryo havzasi quyi qismidagi Qarshi gidropostining ko‘p yillik (O‘zgidromet, 1938-2014 yy.) ma’lumotlariga asosan, vegetatsiya bo‘lmagan davrda oqimning hajmi 200 mln.m3 ga teng. Bu oqim sun’iy ko‘llarga tashlanmoqda va atrof muhitni ifloslantirmoqda [195-196 b.].

Qashqadaryo viloyatining tog‘ oldi va tog‘li hududlarida iqlim o`zgarishi tufayli jala yomg‘irlar hisobiga sel-suv toshqin hodisalari kuchayishi yuzaga keldi. Qashqadaryo viloyatining tog‘ oldi hududlari va unga tutash tekisliklarida sel xavfi nisbatan yuqori. Masalan, 2024 yil bahorida Qashqadaryo viloyatining Shaxrisabz, Kitob,Yakkabog, Qamashi, Dehqonobod tumanlarida kuchli sel hodisalari kuzatildi. Sel xavfi bor joylardagi daryo o‘zanlari, suv omborlari, kanallar qirg‘oqlarini mustahkamlash zarur, bunday inshootlar bo‘lmagan joylarda sel oqimi to`siqlari yoki oqimni aholiga zarari tegmaydigan joylarga

yo‘naltiruvchi tarmoqlar tashkil etish lozim.

Global iqlim o`zgarishi natijasida chang bo’ron hodisalari - qurg’oqchil va yarim qurg’oqchil hududlarda keng tarqalgan xavfli meteorologik hodisadir. Keyingi yillarda iqlim o`zgarishi natijasida chang bo’ronlari ko`p kuzatilmoqda. Jumladan, Qashqadaryo viloyatining ayrim joylarida shamolning kuchayishi **22-25 m/s** ga yetdi. Qashqadaryo viloyatidagi Qarshi, Muborak, Shahrisabz meteorologik stansiyalarda 2015-2024-yillarda qayd etilgan chang bo’ronlari ma’lumotlari tahlil qilindi va Muborak stansiyasida 10 yil davomida 148 marta chang bo’roni hodisalari kuzatilgan. Yillar kesimida Qarshida 2018-yilda 18 marta, atrofi arid cho’llar bilan o’ralgan Muborakda esa eng ko’p 2011-yilda 31 marotaba va 2018-yilda 25 marotaba chang bo’ronlari kuzatilgan. Iqlimning qurg’oqchiligi, tez-tez kuzatiladigan kuchli shamollar, o’simlik qoplamining siyrakligi, tuproq namligining yetarli emasligi, havo nisbiy namligining kamligi, tuproq va atmosfera qurg’oqchiligining tez-tez takrorlanishi va tuproq tarkibining o’zgarishi chang bo’ronlar rivojlashining asosiy omillari hisoblanadi.

Iqlimshunos olimlarning fikricha, O‘zbekistonda 2030-yilga borib havo harorati doimgidan 2-2,5°C, 2040-yillarda 4°C, 2080-yillarda 6°C gacha ko‘tarilishi mumkin. Olimlarning qayd etishicha, 2024 yil 175 yillik kuzatishlar tarixidagi eng issiq yil bo‘lgan. Tog‘li hududlarda qor qoplami Qashqadaryo viloyatining tog‘li hududlarida 30-50 santimetrni tashkil etdi, ammo 2023-yil yilning fevral oyi oxiriga nisbatan 15−25 foizga kam bo‘ldi.

Qashqadaryo viloyatida tekisliklarda yog`inning juda kamligi, tuproqdan namning ko`p bug`lanishi tuproqlarni sho`r bosishini kuchaytiradi. Havo haroratining sutka va yil davomida keskin o`zgarib turishi nurashni kuchaytirib, tog`oldi rayonlarida sel oqimining hosil bo`lishiga yordam beradi. Biogen omillar o`simlik qoplami, tuproqlar va hayvonot dunyosi tabiiy geografik jarayonlarning rivojlanishiga birgalikda ta`sir ko`rsatadi. Tuproq yuvilishi, cho`llarda deflyatsiyaning intensivligi o`simlik qoplamining degradatsiyasini yuzaga keltirgan. Yuqoridagi barcha muammolarning samarali tarzda yechish muhim ahamiyatga ega.

Xulosa. Iqlim o‘zgarishining ekotizimlarga ta’siri, ular oqibatida yuzaga kelgan geoekologik muammolar yildan-yilga jiddiylashib bormoqda, bu esa Qashqadaryo viloyatida keng qamrovli ilmiy tadqiqotlarni olib borish taqozo etadi.

Shu o`rinda, iqlim o`zgarishi sharoitida, arid hududlarda dehqonchilikda, yaylovlarda chorva boqishda va yaylov o‘simliklarini muhofaza qilish oqilona tashkil etish zarur. Turlar va ekotizmlar allaqachon iqlim o’zgarishiga javob berishni boshlagan bu davrda, tabiiy senozlarni tiklash va saqlash orqali ekotizimlarning xilma-xilligi va barqarorligini ta’minlash maqsadga muvofiq.

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O'QUVCHILARNING CHET TILI KO'NIKMALARINI YANGI KOGNITIV TEXNOLOGIYALAR YORDAMIDA RIVOJLANTIRISH

Rezyume: *Maqolada bloglar, vikilar, podkastlar va lingvistik korpuslar kabi zamonaviy kognitiv va kommunikativ texnologiyalarning chet tillarini o'qitishda qo'llanilishi tahlil qilinadi. Web 2.0 vositalari orqali talabalar yozma muloqot, ijtimoiy-madaniy kompetentsiya va kognitiv ko'nikmalarini interaktiv va hamkorlikdagi o'quv muhitlarida rivojlantirishga alohida e'tibor qaratiladi. An'anaviy chiziqli matnlardan dinamik gipermatnli resurslarga o'tish til o'rganishda chuqurroq ishtirok va reflektiv o'qishni rag'batlantiradi.*

Kalit so'zlar: *Kognitiv texnologiyalar, Web 2.0 vositalari, chet tillarini o'qitish, bloglar, vikilar, podkastlar, kommunikativ kompetentsiya, ijtimoiy-madaniy ko'nikmalar, hamkorlikdagi o'qish.*

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ADVANCING STUDENT'S FOREIGN LANGUAGE SKILLS WITH NEW COGNITIVE TECHNOLOGIES

Summary: *This article analyzes the integration of modern cognitive and communicative technologies such as blogs, wikis, podcasts, and linguistic corpora into foreign language education. It highlights how Web 2.0 tools enhance students' written communication, socio-cultural competence, and cognitive skills through interactive and collaborative learning environments. The study emphasizes the shift from traditional linear texts to dynamic hypertextual resources, fostering deeper engagement and reflective learning in language acquisition.*

Keywords: *Cognitive technologies, Web 2.0 tools, foreign language teaching, blogs, wikis, podcasts, communicative competence, socio-cultural skills, collaborative learning.*

The informatization of education, particularly within the domain of linguistic instruction, has significantly facilitated the systematic integration of modern information and communication technologies (ICTs) into pedagogical practices. An examination of the historical trajectory of educational informatization reveals that

the emergence of successive generations of Internet technologies has consistently informed the development of innovative methodologies for foreign language instruction.

In particular, the proliferation of Internet access during the late 20th and early 21st centuries, along with the expansion of online resources in foreign languages that address diverse cultural and societal dimensions of target language communities, has served as a catalyst for the creation of instructional Internet-based tools by language education specialists.

The availability of first-generation web technologies (Web 1.0), including electronic mail, web forums, and chat platforms, combined with the pedagogical interest in their application, stimulated the formulation of instructional strategies aimed at developing students' written communicative competence as well as enhancing their sociocultural and intercultural proficiency through the use of email discussion groups [1; 157] and online forums [2; 145].

Within the scope of the present study, particular attention is directed toward blog platforms, wiki environments, podcasts, and linguistic corpora. The implementation of these technologies within project-based foreign language pedagogy has demonstrated considerable potential in fostering students' academic engagement and the formation of cognitive-educational competencies.

A detailed analysis of each technology is warranted in order to delineate the typology of learning strategies and cognitive abilities that are cultivated through their pedagogical deployment in the contemporary digital environment.

Blog technology, classified under Web 2.0 tools, provides learners with the capacity to create personalized digital spaces, such as online journals or diaries. According to P.V. Sysoev, blogs possess a distinct set of didactic characteristics that differentiate them from other Web 2.0 applications, including:

According to P.V. Sysoev [3; 115], blog technology exhibits several pedagogically significant characteristics that distinguish it from other Web 2.0 tools. These include:

a) Public accessibility – blogs are available to all participants of a given project, irrespective of geographical location;

b) Chronological structuring – entries and updates are organized in a sequential, time-based manner, with new content appended below previous posts;

c) Authorship and self-moderation – content creation is attributed to a single author who also assumes responsibility for moderating interactions;

d) Multimedia functionality – blog platforms support the integration of diverse media formats including textual, visual (graphics and photographs), video, and audio content.

Within scholarly discourse, three primary types of blogs are identified based on their instructional functions: the teacher's blog, students' individual blogs, and the group blog established for collective learning purposes. The teacher's blog simultaneously functions as a model for students' personal blogging practices and as a repository of course-specific information, encompassing thematic syllabi and task assignments.

Conversely, students' individual blogs and group blogs function as digital platforms for the cultivation of written communicative competence. These blog types differ primarily in terms of interactional structure and instructional content. In personal blogs, each student is the sole author of the written submissions, which may include essays, reflective compositions, or film critiques. These entries are subsequently reviewed by peers, who are expected to provide structured feedback concerning both form and content. Typically organized into small peer groups of three to four members, students engage in reciprocal commentary, fostering critical engagement and collaborative learning. Authors may, in turn, respond to peer evaluations, enabling dialogic reflection.

In contrast, the group blog facilitates a shared discursive space wherein students collectively engage in discussions on thematic materials such as viewed films, literary texts, or contemporary social issues. This format encourages collaborative knowledge construction and the application of language skills in interactive, real-world contexts.

An analysis of the theoretical foundations related to the application of blog technologies in foreign language instruction has enabled the identification of key characteristics associated with the development of written communication skills through this medium. These competencies include:

- the ability to employ appropriate linguistic resources for effective self-representation in written form;
- the capacity to utilize relevant language tools to present one's native country (e.g., city, educational institution) and cultural background within a foreign language context, assuming the role of blog author;
- the skill of summarizing and conveying the content of foreign language texts—whether read or heard—through concise theses or brief informational entries;
- the effective expression of personal viewpoints, including agreement or disagreement, using tactful and context-appropriate language forms;
- the ability to substantiate one's position through coherent argumentation supported by suitable linguistic structures, as exemplified in peer commentary on written assignments;
- the use of linguistic means to establish analogies, make comparisons, and conduct cross-contextual evaluations.

In the course of implementing internet-based projects that incorporate blog technologies, students actively draw upon and apply their pre-existing educational and cognitive competencies. The principal distinction in this instructional approach lies in the medium of instruction: rather than engaging with traditional linear texts (e.g., printed educational materials), learners interact with and navigate hypertextual content drawn from online informational and reference sources.

Wiki technology represents another widely utilized Web 2.0 tool that facilitates collaborative authorship, enabling groups of individuals to remotely co-construct shared content, particularly written academic materials. This technology

is characterized by distinct didactic properties and methodological functions that set it apart from other digital educational platforms. Specifically, wiki technology exhibits the following features [4; 141]:

a) Public accessibility – participation is open to all members of the project, regardless of physical location;

b) Nonlinear structure – participants can modify any portion of the content, including earlier iterations of the collaborative document;

c) Version tracking – all revisions are systematically archived on the server, allowing any contributor to revert to previous versions and trace the nature and authorship of modifications over time;

d) Multimedia integration – wiki platforms support the incorporation of various digital content formats;

e) Hypertext architecture – the creation of both internal and external hyperlinks is supported, enhancing navigability and intertextuality.

Within the scientific and pedagogical literature, a substantial body of research has been dedicated to the application of wiki platforms in foreign language instruction. The predominant focus of these studies lies in the enhancement of students' socio-cultural competence and written language proficiency through collaborative engagement in wiki-based environments.

A notable contribution in this domain is presented by E.D. Koshelyaeva [Koshelyaeva, 2010], who developed a targeted methodology aimed at cultivating socio-cultural skills among students enrolled in linguistics programs. According to her framework, such competencies include:

- the capacity to critically evaluate culturally salient events and phenomena in the target language society through the lens of its value system;
- the ability to identify similarities and differences in cultural practices between native and foreign language communities;
- the recognition of temporal shifts and transformations within both native and target cultures;
- the skill of extracting socio-cultural insights from textual sources;
- the provision of appropriate socio-cultural commentary;
- and the accurate interpretation of culturally embedded references and precedent phenomena in both the learner's own and the target culture [5; 210].

Furthermore, pedagogical models incorporating podcasts and instructor-managed blogs continue to evolve, contributing to the broader integration of emerging information and communication technologies (ICTs) in language education. These innovations are anticipated to play an increasingly significant role in fostering learners' foreign language communicative competence.

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BUXORO VILOYATINING AYRIM EKOGEOGRAFIK MUAMMOLARINING ILMIY NAZARIY ASOSLARI

Annotatsiya: *Ushbu maqola Buxoro viloyatining ayrim ekogeografik muammolarining ilmiy-nazariy asoslarini tahlil qilishga bag‘ishlangan. Unda hududning tabiiy-geografik xususiyatlari, iqlim o‘zgarishlari, suv resurslarining tanqisligi, tuproq degradatsiyasi, cho‘llanish jarayonlari va biologik xilma-xillikning kamayishi kabi dolzarb ekologik muammolar atroflicha ko‘rib chiqiladi. Maqolada ushbu muammolarning kelib chiqish sabablari, ularning viloyat ijtimoiy-iqtisodiy rivojlanishiga ta’siri hamda ularni bartaraf etish bo‘yicha ilmiy-asoslangan yondashuvlar va amaliy tavsiyalar ilgari suriladi.*

Kalit so‘zlar: *Buxoro viloyati, ekogeografik muammolar, cho‘llanish, suv tanqisligi, tuproq degradatsiyasi, biologik xilma-xillik, iqlim o‘zgarishi, barqaror rivojlanish.*

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SCIENTIFIC AND THEORETICAL FOUNDATIONS OF CERTAIN ECOGEOGRAPHICAL PROBLEMS OF THE BUKHARA REGION

Abstract: *This article is devoted to the analysis of the scientific and theoretical foundations of some ecogeographic problems of the Bukhara region. It comprehensively examines such urgent environmental problems as the natural and*

geographical features of the territory, climate change, water resource scarcity, soil degradation, desertification processes, and biodiversity loss. The article presents the causes of these problems, their impact on the socio-economic development of the region, and puts forward scientifically-based approaches and practical recommendations for their elimination.

Keywords: *Bukhara region, ecogeographic problems, desertification, water scarcity, soil degradation, biodiversity, climate change, sustainable development.*

Kirish

Buxoro viloyati o‘zbekistonning janubi-g‘arbiy qismida joylashgan bo‘lib, o‘zining qadimiy tarixi, madaniy merosi va noyob tabiiy landshaftlari bilan ajralib turadi. Biroq, mintaqaning quruq iqlim sharoitlari, global iqlim o‘zgarishlari va inson faoliyatining salbiy ta’sirlari natijasida viloyat jiddiy ekogeografik muammolarga duch kelmoqda. Ushbu muammolar nafaqat hududning ekologik barqarorligiga, balki uning ijtimoiy-iqtisodiy taraqqiyotiga ham sezilarli darajada ta’sir ko‘rsatadi. Suv resurslarining cheklanganligi, tuproqlarning sho‘rlanishi va eroziyasi, cho‘llanish jarayonlarining kuchayishi, biologik xilma-xillikning kamayishi kabi masalalar viloyat aholisining turmush darajasi, qishloq xo‘jaligi mahsuldorligi va umumiy ekologik salomatligiga bevosita ta’sir ko‘rsatadi. Shu sababli, buxoro viloyatining ekogeografik muammolarini chuqur ilmiy-nazariy jihatdan tahlil qilish, ularning kelib chiqish sabablari va oqibatlarini aniqlash, shuningdek, ularni hal etish bo‘yicha samarali yechimlarni ishlab chiqish bugungi kunning dolzarb vazifalaridan hisoblanadi. Ushbu maqola aynan shu jihatlariga qaratilgan bo’lib, mintaqaviy ekologik barqarorlikni ta’minlashga xizmat qiladigan ilmiy-nazariy asoslarni shakllantirishda muhim ahamiyat kasb etadi.

Adabiyotlar tahlili va metodologiya

Buxoro viloyatining ekogeografik muammolariga oid ilmiy adabiyotlar tahlili shuni ko‘rsatadiki, bu borada bir qator tadqiqotlar olib borilgan bo‘lsada, ularni kompleks va tizimli ravishda o‘rganishga yetarli darajada e’tibor qaratilmagan. Xususan, o‘zbekistonning qurg‘oqchil hududlaridagi ekologik holat, suv resurslaridan foydalanish samaradorligi, tuproq degradatsiyasi va cho‘llanish jarayonlari bo‘yicha ko‘plab ilmiy ishlar nashr etilgan. Jumladan, sh.z. Zokirovning "o‘zbekistonning suv resurslari va ulardan foydalanish muammolari" asarida mamlakatimizdagi suv tanqisligi sabablari va irrigatsiya tizimlarining holati keng yoritilgan [1]. Suv havzalari va yerlarning meliorativ holatiga ekogeoegrafik jihatlari to’liq qamrab olinmagan. Ushbu tadqiqotda tizimli yondashuv (systemic approach) metodologiyasi qo‘llanilgan bo‘lib, unda buxoro viloyatining ekogeografik muammolari alohida komponentlar sifatida emas, balki o‘zaro bog‘liq va bir-biriga ta’sir qiluvchi elementlar majmui sifatida ko‘rib chiqilgan. Komparativ tahlil (comparative analysis) metodi yordamida buxoro viloyatidagi ekologik holat boshqa qurg‘oqchil hududlar bilan taqqoslanib, muammolarning o‘ziga xos xususiyatlari aniqlangan. Kartografik usul (cartographic method) yordamida hududning ekologik xaritalari tahlil qilinib, muammolarning fazoviy taqsimoti o‘rganildi. Shuningdek, statistik tahlil (statistical analysis) yordamida mavjud

ma’lumotlar to‘plami qayta ishlanib, ekologik ko‘rsatkichlardagi o‘zgarishlar dinamikasi aniqlandi. Tadqiqotda buxoro viloyati ekologik holatiga oid rasmiy statistik ma’lumotlar, geoinformatsion tizimlar (gis) ma’lumotlari, masofaviy zondlash (remote sensing) natijalari hamda mavjud ilmiy adabiyotlar va hisobotlar asosiy manba sifatida foydalanilgan. Bu metodologiya viloyat ekogeografik muammolairning murakkabligini va ularni hal etish bo‘yicha asoslangan tavsiyalar berishda ekogeoegrafik baholash e’tirof etilmagan.

Muhokama va natijalar

Buxoro viloyatining ekogeografik muammolari, asosan, uning tabiiy-geografik sharoitlari, inson faoliyatining intensivligi va global iqlim o‘zgarishlari bilan bevosita bog‘liq. Viloyatda kuzatilayotgan eng dolzarb muammolardan biri bu suv resurslarining tanqisligidir. Zarafshon va amudaryo suvlaridan sug‘orishga bo‘lgan talabning ortishi, suvdan oqilona foydalanmaslik, eski sug‘orish tizimlarining samaradorligining pastligi suv taqchilligiga olib kelmoqda. Natijada, sho‘rlangan yerlar maydoni oshib, qishloq xo‘jaligi ekinlari hosildorligi pasayishiga sabab bo’lib kelmoqda..

1-jadval.

Buxoro viloyatida sug‘oriladigan yerlar maydoni va ularning sho‘rlanish darajasi [2]

Yil	Sug‘oriladigan yer maydoni (ming ga)	Sho‘rlangan yerlar ulushi (%)
2010	280.5	35.2
2015	290.0	38.5
2020	295.8	41.3
2023	298.2	43.7

Manba: O‘zbekiston Respublikasi Qishloq xo‘jaligi vazirligi ma’lumotlari asosida tayyorlangan.

Jadvaldan ko‘rinib turibdiki, 2010- yilda sug‘oriladigan yerlar maydoni 280,5 ming gani tashkil etgan. Bu ko’rsatkich 2023-yilga kelib 298,2 ming ga ga oshgan. Sho‘rlangan yerlar ulushi 2010-yilda 35,2 % ga teng bo’lgan. 2023-yilda 43.7% ni tashkil etib, sezilarli darajada ortgan. Ko’rinib turibdiki, 13 yil ichida viloyatda sug‘oriladigan yerlar maydoni 17.7 ming ga ko’paygan, sho‘rlangan yerlar ulushi esa 8,5 % ga ortgan,. Bu esa o’z navbatida ekogeografik muvozanatning barqarorligiga salbiy ta’sir ko’rsatib, suvdan foydalanish samaradorligini oshirish va melioratsiya choralarini kuchaytirish zarurligini ko‘rsatadi.

Ikkinchi muhim muammo – bu cho‘llanish jarayonlarining kuchayishi. Buxoro viloyati Qizilqum cho‘liga yaqin joylashganligi sababli, iqlim o‘zgarishlari, suv tanqisligi va chorvachilikning haddan tashqari rivojlanishi natijasida cho‘llanish jarayonlari tezlashmoqda. Bu esa yaylovlar degradatsiyasiga, qum ko‘chishlariga va biologik xilma-xillikning kamayishiga olib keladi.

2-jadval.

Buxoro viloyatida cho‘llanishdan zarar ko‘rgan maydonlar va ularning o‘zgarish dinamikasi [3]

Yil	Cho‘llanishdan zarar ko‘rgan maydon (ming ga)	Yillik o‘sish sur’ati (%)
2010	120.0	-
2015	135.5	2.5
2020	150.0	2.1
2023	160.0	1.8

Jadval ma’lumotlariga ko‘ra, 2010-yilda viloyatda cho‘llanishdan zarar ko‘rgan maydon 120,0ming gani tashkil etadi. 2023-yilda bu ko’rsatkich 160,0 ming ga yetgan. O’tgan 13 yil ichida 40 ming ga oshgan. Yillik o’sish sur’ati esa 2015-yilda 2,5 % ni tashkil etib, 2023-yilda 1,8% ga, ya’ni 8 yil davomida 0,7% ga kamayishga erishilgan. Bu esa cho‘llanishga qarshi olib borilayotgan choralarining qisman samaradorligini ko‘rsatadi, ammo muammoning jiddiyligi hali ham saqlanib qolmoqda.

Shuningdek, biologik xilma-xillikning kamayishi ham viloyat uchun muhim muammo hisoblanadi. Cho‘llanish, tabiiy yashash muhitlarining yo‘q qilinishi va ifloslanish natijasida ko‘plab o‘simlik va hayvon turlari yo‘qolib borayotganligi kuzatilmoqda. Bu holat ekotizimlarning buzilishiga va ularning regeneratsiya qobiliyatining pasayishiga olib keladi. Muhokama natijalari shuni ko‘rsatadiki, Buxoro viloyatidagi ekogeografik muammolar o‘zaro bog‘liq bo‘lib, ularni hal etish uchun kompleks yondashuv talab etiladi. Xususan, suvdan foydalanish samaradorligini oshirish, suvni tejaydigan texnologiyalarni (tomchilatib sug‘orish, yomg‘irlatib sug‘orish) keng joriy etish, drenaj tizimlarini yaxshilash orqali tuproq sho‘rlanishini kamaytirish, cho‘llanishga qarshi kurashishda ixota daraxtlarini ekish, o‘rmonzorlar barpo etish, yaylovlardan oqilona foydalanish va biologik xilma-xillikni saqlash bo‘yicha choralarni kuchaytirish va “Yashil qalqon” dasturini izchillik bilan amalga oshirib borishni taqozo etadi.

XULOSA

Buxoro viloyatining ekogeografik muammolarini ilmiy-nazariy jihatdan tahlil qilish shuni ko‘rsatadiki, bu muammolar o‘zaro chambarchas bog‘liq bo‘lib, mintaqaning barqaror rivojlanishiga jiddiy tahdid solmoqda. Asosiy muammolar qatoriga suv resurslarining tanqisligi va ulardan samarasiz foydalanish, tuproqlarning sho‘rlanishi va degradatsiyasi, cho‘llanish jarayonlarining kuchayishi hamda biologik xilma-xillikning kamayishini oldini olish maqsadida ilmiy asoslangan dasturlar yaratish hamda mutassaddi tashkilot xodimlari va soha olimlarining hamkorligini keng yo’lga qo’yish lozim.

Tadqiqot natijalari shuni ko‘rsatadiki, Buxoro viloyati qurg‘oqchil iqlim zonasida joylashganligi sababli, suv resurslariga bo‘lgan talab juda yuqori, ammo mavjud suvdan foydalanish samaradorligi past darajada saqlanib qolmoqda. Bu esa sug‘oriladigan yerlarning sho‘rlanishiga va unumdorligining pasayishiga olib kelmoqda, natijada qishloq xo‘jaligi mahsulotlari hosildorligi kamaymoqda. Shuningdek, cho‘llanish jarayonlari ham hududning ekologik barqarorligiga salbiy ta’sir ko‘rsatmoqda, bu esa yaylovlar degradatsiyasiga va qum-chang bo‘ronlarining kuchayishiga olib kelmoqda.

Ushbu muammolarni hal etish uchun kompleks va ko‘p tarmoqli yondashuv zarur. Birinchi navbatda, suvdan foydalanish samaradorligini oshirish maqsadida zamonaviy, suvni tejaydigan sug‘orish texnologiyalarini (tomchilatib va yomg‘irlatib sug‘orish) keng joriy etish lozim. Shu bilan birga, mavjud irrigatsiya va drenaj tizimlarini modernizatsiya qilish, suv taqsimotini optimallashtirish va suv resurslarining hisobini yuritishni takomillashtirish muhim ahamiyatga ega. Ikkinchidan, tuproq degradatsiyasi va sho‘rlanishiga qarshi kurashish uchun agro-meliorativ tadbirlarni kuchaytirish, jumladan, almashlab ekish, organik o‘g‘itlardan foydalanish va sho‘rga chidamli ekin navlarini ekish orqali tuproq unumdorligini oshirish kerak. Uchinchidan, cho‘llanishga qarshi kurashishda samarali yo‘l – bu o‘rmonzorlar barpo etish, qum ko‘chishini oldini oluvchi fitomeliorativ tadbirlarni amalga oshirish va yaylovlardan oqilona foydalanishni ta’minlashdir. Bu choralar tuproq eroziyasini kamaytirishga, qurg‘oqchilik ta’sirini yumshatishga va hududning ekologik holatini yaxshilashga yordam beradi.

To‘rtinchidan, biologik xilma-xillikni saqlash va tiklash maqsadida qo‘riqlanadigan tabiiy hududlar maydonini kengaytirish, noyob va yo‘qolib borayotgan o‘simlik hamda hayvon turlarini muhofaza qilish bo‘yicha dasturlarni amalga oshirish zarur. Jamiyatda ekologik madaniyatni oshirish, aholining ekologik ta’lim-tarbiyasiga e’tibor qaratish ham muhim ahamiyat kasb etadi. Mazkur ilmiy-nazariy asoslar mintaqaviy ekologik siyosatni ishlab chiqishda ekogeografik muammolarga bag’ishlangan va uni amaliyotga tatbiq etishda muhim yo‘l-yo‘riq bo‘lib xizmat qilishiga umid qilamiz.

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KOMPOZITSION MATERIALLAR: ULARNING TURLARI VA ISHLAB CHIQARISH ASOSLARI

Annotatsiya: *Mazkur maqolada kompozitsion materiallarning mohiyati, ularning tuzilishiga ko'ra turlari, ishlab chiqarish texnologik jarayonlari hamda qurilish sohasida qo'llanilish imkoniyatlari yoritilgan. Shuningdek, turli strukturali kompozitsion materiallar ishlab chiqarish asoslari va ularning afzalliklari tahlil qilinadi. Maqolada kompozitsion materiallarning zamonaviy qurilish sanoatidagi o'rni va istiqbollari haqida ilmiy asoslangan ma'lumotlar berilgan.*

Kalit so'zlar: *kompozitsion material, matritsa, armatura, strukturaviy kompozit, polimer kompozit, qurilish materiallari, texnologiya, sintez.*

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COMPOSITE MATERIALS: THEIR TYPES AND PRINCIPLES OF PRODUCTION

Abstract: *This article highlights the essence of composite materials, their types according to structure, technological production processes, and application possibilities in the field of construction. The fundamentals of producing composite materials with various structures and their advantages are also analyzed. The article provides scientifically grounded information about the role and prospects of composite materials in the modern construction industry.*

Keywords: *composite material, matrix, reinforcement, structural composite, polymer composite, building materials, technology, synthesis.*

Dolzarbligi: Bugungi kunda qurilish sanoatida yuqori mustahkamlikka, yengillikka, chidamlilikka va energiya tejamkorlikka ega materiallarga talab ortib bormoqda. Shu nuqtai nazardan kompozitsion materiallar eng istiqbolli yo'nalishlardan biri hisoblanadi. Kompozitsion materiallar — bu ikki yoki undan ortiq komponentlardan tashkil topgan, natijada yangi xossalarga ega bo'lgan sun'iy materiallardir. Ularning asosiy maqsadi — har bir komponentning ijobiy jihatlarini birlashtirib, yaxlit tizim sifatida yuqori samaradorlikka erishishdir.

Kompozitsion materiallarning mohiyati: Kompozitsion materiallar

(kompozitlar) matritsa va mustahkamlovchi elementlardan tashkil topgan. Matritsa — bu asosiy muhit bo‘lib, u mustahkamlovchi elementlarni o‘zida birlashtiradi va yuklamani bir tekis taqsimlaydi. Armatura (mustahkamlovchi komponent) esa materialning mexanik mustahkamligini oshiradi.

Zamonaviy qurilish sohasi ilmiy-texnik taraqqiyotning jadal rivojlanishi bilan chambarchas bog‘liq bo‘lib, turli maqsadlar uchun mo‘ljallangan, kompleks xossalarga ega yangi va samarali qurilish materiallaridan foydalanishni talab etadi.

Tarixan yog‘och, sopol, po‘lat, beton va temir-beton asosiy qurilish materiallari sifatida xizmat qilib kelgan. Ammo sanoat va texnologiyaning rivojlanishi natijasida XX asrning ikkinchi yarmidan boshlab, qurilish amaliyotiga yangi avlod materiallari — kompozitsion materiallar keng joriy etila boshlandi. Bugungi kunda sanoat, fuqaro va turar-joy infratuzilmasini qurishda bunday materiallarsiz samarali natijaga erishish deyarli imkonsiz.

Kompozitsion qurilish materiallari — bu ikki yoki undan ortiq turli fizik va kimyoviy xossalarga ega monomateriallardan tashkil topgan ko‘p fazali tizimlar bo‘lib, ularning o‘zaro uyg‘unlashuvi natijasida yangi, yaxlit va yaxshilangan xossalarga ega material hosil bo‘ladi. Shu bilan birga, har bir tarkibiy komponent o‘zining asosiy individual xususiyatlarini ma’lum darajada saqlab qoladi.

Bunday materiallarni yaratishdan maqsad — dastlabki komponentlarning mexanik, issiqlik-texnik, kimyoviy barqarorlik va chidamlilik kabi xossalarini yaxshilash, shuningdek, sanoat chiqindilaridan foydalanish orqali ishlab chiqarish tannarxini pasaytirishdir.

Kompozitsion qurilish materiallariga turli xil aralashmalar, beton turlari, sopol mahsulotlar, lok-bo‘yoq materiallari, shishaplastiklar, fibrobeton, asbestotsement, yog‘och-tolali va yog‘och-qipiqli plitalar, hamda boshqa ko‘p komponentli materiallar kiradi.

Aslida, kompozitsion material yaratish g‘oyasi insoniyatga qadimdan ma’lum. Ilk davrlardanoq qurilishda loy, somon va poholdan tayyorlangan aralashmalar ishlatilgan. Bunday aralashmada loy bog‘lovchi (matritsa), somon esa mustahkamlovchi (armatura) komponent sifatida xizmat qilgan.

Eng ko‘p qo‘llaniladigan matritsalar turiga qarab kompozitsion materiallar quyidagicha bo‘linadi:

Polimer asosli kompozitlar – eng yengil va ishlov berish oson turlari (masalan, plastmassa asosidagi kompozitlar).

Metall asosli kompozitlar – yuqori haroratga chidamli va mustahkam materiallar.

Keramika asosli kompozitlar – issiqlikka bardoshli, lekin mo‘rt materiallar.

Uglerod asosli kompozitlar – aerokosmik sohada keng qo‘llaniladi.

2. Kompozitsion materiallar klassifikatsiyasi

3. Turli strukturali kompozitsion materiallarni ishlab chiqarish asoslari

Kompozitsion materiallarni ishlab chiqarish jarayoni tanlangan

komponentlar turiga, ularning fizik-kimyoviy xossalariga va qo‘llanilish sohasiga bog‘liq. Asosiy bosqichlar quyidagilardan iborat:

Komponentlarni tanlash va tayyorlash – matritsa va armatura materiali aniqlanadi.

Aralashtirish yoki joylashtirish – mustahkamlovchi element matritsaga kiritiladi.

Qattiqlashtirish (polimerizatsiya, sinterlash, presslash) – tuzilmani mustahkamlovchi texnologik bosqich.

Sovutish va shakllantirish – tayyor kompozit shakli hosil qilinadi.

Zamonaviy texnologiyalar orasida vakuumli infuziya, autoklavli presslash va 3D-kompozit sintezi usullari keng tarqalgan.

4. Kompozitsion materiallarning afzalliklari va qo‘llanilish sohasi

Kompozitsion materiallar quyidagi afzalliklarga ega:

Yuqori mexanik mustahkamlik;

Kichik og‘irlik;

Korroziyaga chidamlilik;

Termik barqarorlik;

Dizayn moslashuvchanligi.

Ular qurilishda (beton armaturalari, fasad panellari, issiqlik izolyatsiyasi), transportda, aerokosmik sanoatda, tibbiyotda va energetika sohalarida keng qo‘llanilmoqda.

O‘zgaruvchan harorat sharoitida kompozitsion materiallardan foydalanilganda, ularning uzoq muddatli barqarorligi ko‘p jihatdan tarkibiy qismlarning issiqlik ta’sirida chiziqli kengayish koeffitsientlari o‘zaro yaqin bo‘lishiga bog‘liq. Masalan, temir-beton materiallarining harorat ta’sirida deformatsiyalanishga nisbatan yuqori chidamliligi bunga yaqqol misoldir: αbet= $(10–14)\cdot10^{-6}$, αarmatura= $(11–12)\cdot10^{-6}$.

Kompozitsion materiallar samaradorligini ta’minlash uchun ularning tarkibidagi komponentlar shunday o‘zaro ta’sirlashishi zarurki, bunda har birining ijobiy xususiyatlari namoyon bo‘lib, salbiy jihatlari esa minimallashtiriladi yoki butunlay bartaraf etiladi. Bunday natijaga erishishda ratsional texnologik yondashuv tamoyili muhim ahamiyat kasb etadi, chunki u belgilangan xossalarga ega material olish imkonini beradi.

Zamonaviy qurilish materialshunosligida professor V.I. Salomatov tomonidan ilgari surilgan polistruktura nazariyasi muhim o‘rin tutadi. Ushbu nazariyaga ko‘ra, kompozitsion materiallar “struktura ichidagi struktura” tamoyili asosida tashkil topgan bo‘lib, ular atom va molekulalardan tortib, to yirik (dag‘al) tuzilmagacha bo‘lgan turli darajadagi bog‘langan struktura elementlaridan iborat tizim sifatida qaraladi.

Injenerlik masalalarini yechishda kompozitsion materiallarni odatda ikki darajada — mikrostruktura va makrostruktura darajalarida o‘rganish kifoya qiladi. Mikrostruktura darajasi asosan matritsaning (bog‘lovchi moddaning) fizik-kimyoviy xossalari bilan belgilanadi, makrostruktura esa butun kompozitning umumiy mexanik va texnologik xususiyatlarini

ifodalaydi.

Polistruktura nazariyasiga asoslanib, kompozitsion aralashmalarni tayyorlashda maxsus texnologik yondashuv talab qilinadi. Ya’ni, dastlab bog‘lovchi komponent (mineralli yoki polimer asosli) alohida texnologiya bo‘yicha tayyorlanadi, so‘ngra u to‘ldirgich hamda mustahkamlovchi elementlar bilan birlashtiriladi. Bunday yondashuv material yoki buyum tayyorlash jarayonini soddalashtiradi, vaqt va xarajatlarni kamaytiradi hamda tayyor aralashmaning bir xilligini ta’minlaydi.

Xulosa: Kompozitsion materiallar zamonaviy texnologiyalar rivojlanishining ajralmas qismi bo‘lib, ular yordamida yuqori sifatli, mustahkam va ekologik xavfsiz qurilish mahsulotlarini ishlab chiqarish imkoniyati yaratilmoqda. Turli strukturali kompozitsion materiallar ishlab chiqarish jarayonlari hozirgi kunda sanoatning barcha yo‘nalishlarida jadal rivojlanmoqda. Kelgusida yangi avlod kompozitlarining yaratilishi barqaror va energiya tejamkor qurilish tizimlarini shakllantirishda muhim o‘rin tutadi. Kompozitsion materiallari tayyorlashning zamonaviy texnologiyalari quyidagi asosiy prinsiplarga tayanadi:

1.Bog‘lovchi modda sarfini qisqartirish va kompozitlarning fizikaviy-mexanik, texnologik va ekspluatatsion xossalarini yaxshilash maqsadida, bog‘lovchini tayyorlash davrida kimyoviy qo‘shimchalardan (modifikatorlar, plastifikatorlar, sirt-faol moddalardan) keng foydalanish;

2.Talab etiladigan disperslik, granulometrik tarkib va fizik-kimyoviy faol mayda kukun to‘ldirgichlardan foydalanish;

3.Kukun va yirik to‘ldirgichlarni fizikaviy va kimyoviy usullar bilan faollashtirish;

4.Kompozitlarni xossalarini yaxshilash uchun binar kukun to‘ldirgichlardan foydalanish;

5.Mustahkamlovchi qo‘shimchalar sifatida armaturalovchi tolalardan foydalanish;

6.Kompozitlarnining vazifasidan kelib chiqqan xolda ularni optimal to‘ldirish;

7.Mikro- va makrodarajada struktura hosil bo‘lishini ta’minlashni xisobga olgan xolda qorishmalarni tayyorlash texnologik rejimini – qorishmani aralashtirish, issiqlik ishlovi berish, zichlash va boshqalarni tayinlash. XX asr oxirlarida ko‘plab turli asosli kompozitsion qurilish materiallarining yaratilishi, ularni turli belgilari bo‘yicha tizimlashtirish va klassifikatsiyalashni talab etadi.

Shunita’kidlash zarurki ko‘plab klassifikatsiyalar etarli darajada shartli xisoblanadi.

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MAKTABGACHA TA’LIM TASHKILOTIDA KUZATISH MASHG‘ULOTLARINI SAMARALI TASHKIL ETISH METODIKASI

Annotatsiya: *Ushbu maqolada maktabgacha ta’lim tashkilotida kuzatish mashg‘ulotlarini samarali tashkil etish masalalari yoritilgan. Maqolada kuzatishning ta’limiy va tarbiyaviy ahamiyati, uni o‘tkazish bosqichlari, bolalarda kuzatuvchanlik, tafakkur va nutqni rivojlantirishdagi o‘rni tahlil qilinadi.Kuzatishning turlari haqida batafsil yoritiladi.*

Kalit so‘zlar*: maktabgacha ta’lim, kuzatish mashg‘uloti, tabiat, bilish faoliyati, ekologik tarbiya, kuzatuvchanlik.*

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METHODOLOGY FOR EFFECTIVE ORGANIZATION OF OBSERVATION ACTIVITIES IN PRESCHOOL EDUCATIONAL INSTITUTIONS

Annotation: *This article discusses the issues of effective organization of observation sessions in a preschool educational organization. The article analyzes the educational and educational significance of observation, the stages of its implementation and their role in the development of observational thinking and speech in children. The types of observation are discussed in detail.*

Keywords: *preschool education, observational training, nature, cognitive activity, ecological education, observation.*

Maktabgacha ta’lim tizimida bolalarning atrof-muhit, tabiat va hayot hodisalari haqida dastlabki tushunchalarini shakllantirishda kuzatish mashg‘ulotlari muhim o‘rin tutadi. Bola o‘z ko‘zi bilan ko‘rgan, qo‘li bilan ushlagan, bevosita kuzatgan narsasini tezroq eslab qoladi va uni ongida mustahkam tasavvur sifatida saqlab qoladi. Shu bois kuzatish mashg‘ulotlari maktabgacha yoshdagi bolalarda

bilish faoliyatini, tafakkurini, diqqat va nutqini rivojlantirishning samarali vositasi hisoblanadi.

Bungi kunda ta’lim jarayonini zamonaviy metodlar asosida tashkil etish, bolalarni faol ishtirokchi sifatida jalb etish, ularning tabiat hodisalarini idrok etish va tahlil qilish ko‘nikmalarini rivojlantirish maktabgacha ta’limning asosiy vazifalaridan biridir. Kuzatish mashg‘ulotlarini to‘g‘ri tashkil etish nafaqat bolalarning bilim doirasini kengaytiradi, balki ularda tabiatga mehr, ekologik madaniyat va estetik didni ham shakllantiradi.

Shu sababli mazkur maqolada kuzatish mashg‘ulotini samarali tashkil etishning bosqichlari, usullari hamda tarbiyachining bu jarayondagi o‘rni haqida fikr yuritiladi.

Metod bu- bilimlarni egallash malaka va ko‘nikmalarni hosil qilish hamda qobiliyatlarni o‘stirish, axloqiy sifatlar xulq- atvorlarni shakllantirishga erishish uchun yóllangan hamkorlikdagi faoliyati hisoblanadi. Maktabgacha ta’lim tashkiloti bolalar hayotida metod muhim ôrin egallaydi.Metodlar oğzaki,amaliy ko‘rgazmali metodlarga bôlinadi.Kôrgazmali metod turlari kuzatish,rasmlarni ko‘rish,Diyafilm va kino film, ekskursiya turlari mavjud.Kuzatish muddatiga qarab ikki turli bóladi:qisqa muddatli kuzatish,uzoq muddatli kuzatish.Kuzatish-murakkab bilish faoliyati bôlib bolalarda idrok,taffakur,nutqni rivojlantirishga va barqaror diidqatni shakllantirishga xizmat qiladi.Bolarni tabiat bilan tanishtirishda doimiy kuzatishlar olib boriladi, mantiqiy fikr yuritishda ğoyat katta ahamiyat kasb etadi.

Maktabgacha yoshdagi bolalarni ekologik tarbiyalashning turli usullari orasida kuzatuvga muhim o'rin berilishi kerak. Uning mohiyati tabiiy ob'ektlarni hissiy bilishda, ularni idrok etishning turli shakllari - ko'rish, eshitish, taktil, kinestetik, hid bilish va boshqalar orqali bilishdadir.Tabiatni hissiy bilishning to'g'ri tashkil etilishi bolalarda turli xil g'oyalarning shakllanishi va rivojlanishini ta'minlaydi, hayvonlar va o'simliklar haqida, tabiatning mavsumiy hodisalari haqida. Kuzatishlarga rahbarlik qilish maktabgacha yoshdagi bolalarni tabiiy ob'ektlarning eng xilma-xil xususiyatlarini aniqlashga va eng muhimlarida harakat qilishga, ular orqali o'simliklar va hayvonlarning jonsiz tabiat hodisalari bilan aloqasini aniqlashga o'rgatish imkonini beradi.

Taniqli psixolog S.L.Rubinshtyn "kuzatishni mazmunli idrok etishning natijasi" deb hisoblaydi .

U idrok va kuzatishning turli shakllarining rivojlanishini mazmun bilan bog'laydi. Bir tomondan, kuzatish bilim manbai bo'lsa, ikkinchi tomondan, uning o'zi kuzatishlar haqida ma'lum bilimlarni talab qiladi. Ob'ektlarni mazmunli idrok etish erta tug'iladi. Biroq, kichkina bolaning kichik tajribasi va bilimi unga ob'ektlarning muhim tomonlarini ko'rishga imkon bermaydi. Idrok vosita va hissiy reaksiyalar bilan o'zaro bog'liqdir Boshqa tomondan, kuzatish o'zining eng yuqori ko'rinishida kuzatuvchining o'zi tomonidan mustaqil ravishda tashkil etilgan faoliyatdir. Lekin bu mahorat, S.L.Rubinshteynning fikricha, ozmi-ko’pmi keng bilimlar tizimiga asoslanadi.

Kuzatishni boshqarish. Tarbiyachi kuzatishni birinchi marotaba o'tkazayotgan bo'lsa, dastlab bolalarda hosil bo'lgan qiziqishlarini qondirish hamda kuzatilayotgan narsa haqida birinchi taassurot hosil qilish uchun ularni kamida 1-2 daqiqa tomosha qildirib turadi. Kuzatishni boshqarish jarayonida tarbiyachi xilma-xil usullardan bolalarning yoshlariga mos savol va topshiriqlar, narsani ushlab ko'rish, qiyoslash, o'yin harakatlaridan foydalanadi. Tarbiyachi kuzatishni tashkil qila turib, kerakli maiumotlarni aytishi, kuzatiladigan obyektning muhim xususiyatlarini ajratishi zarur. Bolalarda kuzatishga nisbatan qiziqish uyg'otish, kuzatilayotgan narsalarni estetik idrok etish uchun tarbiyachi she'rlardan, topishmoqlardan, katta yosh guruhlarda esa badiiy asarlarni o'qishdan foydalanadi.

Ilm-fan va tabiat markazlarida tarqatma materiallardan foydalanib kuzatish bolalarning intelektual rivojlanishida juda muhim sanaldi. Kuzatishlarning bu turi o'rta yosh guruhlardan boshlab o'tkaziladi. Bunday kuzatishni tashkil etish birgina obyektni kuzatishdan ko'ra ancha murakkabroq bo’ lib hisoblanadi. Bu o'rinda tarbiyachi o'z diqqat e'tiborini taqsimlay bilishi, bolalardagi harakatni uyushtira olishi talab qilinadi, bolalar esa tarbiyachining barcha ko'rsatmalariga aniq rioya qilishlari bir-birlarini tinglashlari, boshqalarning kuzatishlarini o'zlarining kuzatishlari bilan taqqoslashlari kerak bo'lad

Xulosa qilib aytganda, maktabgacha ta’lim tashkilotida kuzatish mashg‘ulotlarini samarali tashkil etish bolalarning bilish faoliyatini faollashtiradi, ularning tafakkuri, kuzatuvchanligi, nutqi va mustaqil fikrlash qobiliyatini rivojlantiradi. To‘g‘ri yo‘lga qo‘yilgan kuzatish faoliyati bolalarda tabiat va atrof-muhitga nisbatan mehr, qiziqish hamda mas’uliyat hissini shakllantiradi.

Tarbiyachi kuzatish jarayonida bolalarga yo‘l-yo‘riq ko‘rsatib, ularning faol ishtirokini ta’minlasa, mashg‘ulotning samaradorligi yanada oshadi. Shunday qilib, kuzatish faoliyati maktabgacha ta’lim tizimida nafaqat bilish jarayonini rivojlantirish, balki bolalarni hayotni idrok etishga, mustaqil fikr yuritishga va tabiat bilan uyg‘un yashashga o‘rgatadigan muhim pedagogik vositadir**.**

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LANDSAT SURATLARIDA O‘SIMLIKLAR QOPLAGAN YERLARNI ALOHIDA YERDAN FOYDALANISH SINFI SIFATIDA TASVIRLASH MUAMMOLARI

Annotatsiya: *Mazkur maqolada Landsat sun’iy yo‘ldosh suratlari asosida o‘simliklar bilan qoplangan yerlarni alohida yerda foydalanish sinfi sifatida ajratish va tasniflashda uchraydigan asosiy muammolar ko‘rib chiqiladi. Raqamli tasvirlarni tahlil qilishda NDVI (Normalized Difference Vegetation Index) ko‘rsatkichidan foydalanish samaradorligi, spektral o‘xshashliklar, fazoviy rezolyutsiya cheklovlari, mavsumiy o‘zgaruvchanlik va antropogen omillar ta’siri tahlil qilinadi. Tadqiqot natijalariga ko‘ra, Landsat ma’lumotlarini to‘g‘ri oldindan qayta ishlash (preprocessing) va sinf chegaralarini dinamik belgilash orqali aniqlikni oshirish mumkinligi aniqlangan.*

Kalit so‘zlari: *Landsat, NDVI, o‘simlik qoplami, tasniflash, masofadan zondlash, spektral tahlil.*

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PROBLEMS IN DEPICTING VEGETATED AREAS AS A SEPARATE LAND USE CLASS IN LANDSAT IMAGES

Abstract: *This article examines the main challenges encountered in identifying and classifying vegetated areas as a separate land use class based on Landsat satellite images. It analyzes the effectiveness of using the NDVI (Normalized Difference Vegetation Index) in digital image analysis, as well as the impact of spectral similarities, spatial resolution limitations, seasonal variability, and anthropogenic factors. The research results indicate that accuracy can be improved through the correct preprocessing of Landsat data and the dynamic definition of class boundaries.*

Key words: *Landsat, NDVI (Normalized Difference Vegetation Index), vegetation cover, classification, remote sensing, spectral analysis.*

Kirish.

So‘nggi yillarda masofadan zondlash (MZ) texnologiyalari yordamida tabiiy resurslardan foydalanish holatini o‘rganish geografiya, ekologiya, geoinformatika va agronomiya fanlarida keng qo‘llanilmoqda. Ayniqsa, Landsat dasturi 1972-

yildan buyon Yer sirtining muntazam kuzatuvini olib borayotgan eng uzoq muddatli platformalardan biridir. O‘simliklar bilan qoplangan yerlarni aniqlash, ularning holatini baholash, vaqt bo‘yicha o‘zgarishini monitoring qilish jarayonlarida Landsat suratlarining spektral diapazonlari (asosan qizil, yaqin infraqizil va qisqa to‘lqinli infraqizil) muhim manba hisoblanadi.

Yer yuzasidagi voqea va hodisalarni davriy o’zgaruvchanligini o’rganish bugungi kunda ilm fan, asosan, geografik fanlarda keng qo’llanilmoqda. Bu jarayonda masofadan olingan sur’atlarning ahamiyati katta bo’lib, afsuski muayyan masalalar kesimida ularni tahlil qilish va tegishli natijalar olishning imkoniyatlari cheklangan. Masalan, Landsat sur’atlarida o’simlik qoplagan yerlarni tasvirlash muammosi shular jumlasidandir. Ko’pchilik bahslar o’simlik qoplagan yerlarni tasvirlashda mukammaliroq, jumladan 2-5 metr aniqllika ega sun’iy yo’ldosh ma’lumotlaridan foydalanishni tavsiya qilish bilan yakunlansa, ayrim holatlarda tayyor vektor o’lchamlarni ishlatish tavsiya qilinadi.

Tadqiqot natijasi

Tahlil uchun Landsat 8 OLI/TIRS va Landsat 9 ma’lumotlaridan foydalanildi. Ushbu sun’iy yo‘ldoshlar 30 metrli fazoviy aniqlikka ega bo‘lib, 11 ta spektral diapazonni qamrab oladi. Tadqiqot uchun o‘simlik qoplamining mavsumiy o‘zgarishi yaqqol ifodalanadigan 2023-yil bahor–yoz davri tasvirlari tanlab olindi.

O‘simlik indekslarini hisoblash

O‘simlik qoplamini ajratishda NDVI (Normalized Difference Vegetation Index) ko‘rsatkichi asosiy mezon sifatida tanlandi: NDVI = (NIR - RED) / (NIR + RED). Bu yerda NIR – yaqin infraqizil diapazon (B5), RED – qizil diapazon (B4). NDVI qiymatlari –1 dan +1 gacha bo‘lib, yuqori qiymatlar zich o‘simlik qoplamini bildiradi.

O‘simlik qoplamlari orasidagi spektral o‘xshashlik, fazoviy aniqlikning cheklanganligi, mavsumiy o‘zgaruvchanlik va bulutlilik kabi omillar Landsat suratlarida o‘simlik sinflarini aniq ajratishni qiyinlashtiradi. Shu bilan birga, mashina o‘rganish asosidagi algoritmlar (Random Forest, SVM, CNN) bu muammolarni qisman bartaraf etishga yordam beradi.

- Hududlarning (davlat, viloyat, tuman va h.k.) yerdan foydalanish holati o’rganilayotganda transport yo’llari alohida sinf sifatida ko’rsatilmasa u boshqa sinflarga qo’shilib ketishi va shu sababli hisoblashlarda xatoliklarni keltirib chiqarishi mumkin. Yoki aksincha nol sinf sifatida qolib ketishi oqibatida karta sifatini yomonlashtiradi yoki kartada noaniqliklarni keltirib chiqaradi. Albatta, tadqiqot maqsadidan kelib chiqib uni qandaydir umumiy sinfga birlashtirish ham mumkin. Masalan tanlangan hududga qarab shahar va shaharsozlik ob’ektlari sifatida.

- Ayrim hollarda transport yo’llariga oid bo’lgan ma’lumotlar mavhum yoki o’zgargan bo’lishi, vektor ma’lumotlar sifati pastligi, eski manbalarga asoslanganligi, barcha turdagi yo’llar haqidagi kamchiliklarning mavjudligi va h.k.

Yuqoridagi muammolar echimini topish uchun quyidagi usullarni taklif qilish mumkin:

- Filterlash – sur’atning tusini o’zgartirish jarayoni bo’lib, uning sifatini tanlangan yo’nalish bo’yicha atrofdagi ranglarni hisobga olgan holda oshiradi. Ranglar raqamlarda ifodalanishini nazarda tutgan holda filterlash jarayonida raqamlar qiymati turlicha o’zgartiriladi va bu o’zarishlar alohida-alohida filterlash usullari bilan ifodalanadi. Filterlashning quyidagi keng tarqalgan ikki yondashuvi mavjud. 1) Fazoviy xususiyatlariga ko’ra svertkali (convolution) filterlash. Convolution filterlash – berilgan shartli (yoki kernel) funksiya (rangni ifolalovchi raqamlarning arifmetik hisoblash tartibi) va asosiy funksiya yordamida uchinchi bir rang holatini keltirib chiqarish. Bu o’z ichiga o’rtacha (mean),markaziy (median), Sobel, Laplas va h.k. filterlash usullarini oladi. 2) Takrorlanish hususiyatlariga ko’ra Fourier tahliliy filterlash yondashuvi

Yo’llarning qumli o’simlik kam va binolar yo’q hududlarini Landsat sur’atlarida ko’rish mumkin. Biroq quyidagilar bu aniqlikka salbiy ta’sir qilishi ham mumkin:

- Yo’lning qanday tuproq hududidan o’tkazilganligi va uning sifati. Quyosh nurining tushish burchagiga bog’liq holda va tuproqning nurni yutishi yoki aks etishi juda kuchli bo’lganda yo’llarning spektrdagi tavsirlanishi sifatini pasaytirishi mumkin. Avtomobil yo’li yuqori qoplaming qalinligi ham turli hildagi spektrial tasvirlarni keltirib chiqaradi.

Muammolarni hal etish bo‘yicha takliflar

1. Integratsiyalashgan ma’lumotlardan foydalanish: Landsat va Sentinel-2 ma’lumotlarini birlashtirish.

2. Bulutli tasvirlarni filtrlash: GEE platformasida bulutsiz kompozitlar yaratish.

3. Mavsumiy indekslar: NDVI bilan bir qatorda EVI yoki SAVI indekslaridan foydalanish.

4. Mashina o‘rganish yondashuvlari: Random Forest, SVM, CNN algoritmlarini qo‘llash.

5. Yerda o‘lchangan verifikatsiya ma’lumotlarini kengaytirish.

Xulosa

Landsat suratlarida o‘simliklar bilan qoplangan yerlarni alohida yerda foydalanish sinfi sifatida aniqlashda bir qator muammolar mavjud bo‘lsa-da, ularni to‘g‘ri oldindan qayta ishlash, mos indekslar tanlash va zamonaviy algoritmlar yordamida bartaraf etish mumkin. NDVI asosidagi tasniflash amaliy jihatdan qulay bo‘lsa-da, yuqori aniqlik uchun qo‘shimcha ma’lumotlar bilan integratsiya zarur.

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KONTRIBUTSIYA MARJININI HISOBLASH TARTIBI

Annotatsiya: *Ushbu maqolada kontributsiya marjinining mohiyati, uni hisoblash tartibi hamda boshqaruv qarorlarini qabul qilishdagi ahamiyati yoritilgan. Kontributsiya marjini menejerlarga mahsulotlarning foydalilik darajasini aniqlash, ishlab chiqarish hajmini rejalashtirish va narx siyosatini shakllantirish imkonini beradi. Maqolada kontributsiya marjini hisoblashning formulalari, zararsizlik nuqtasini aniqlash usuli hamda amaliy misollar orqali tahlil yondashuvlari ko‘rsatib berilgan. Tadqiqot natijalariga ko‘ra, kontributsiya marjini tahlili korxonalarda resurslardan samarali foydalanish, foydani optimallashtirish va boshqaruv hisobi tizimini takomillashtirishga xizmat qiladi.*

Kalit so‘zlar: *Kontributsiya marjini, o‘zgaruvchan xarajatlar, doimiy xarajatlar, zararsizlik nuqtasi, foyda, boshqaruv hisobi, marjinal tahlil, “nima bo‘lsa” tahlili, narx siyosati, ishlab chiqarish samaradorligi.*

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CALCULATION PROCEDURE OF CONTRIBUTION MARGIN

Annotation: *This article highlights the essence of the contribution margin, the procedure for its calculation, and its significance in managerial decision-making. The contribution margin enables managers to determine the profitability level of products, plan production volumes, and develop pricing policies. The article presents formulas for calculating the contribution margin, methods for determining the break-even point, and analytical approaches illustrated through practical examples. According to the research results, the analysis of the contribution margin contributes to the efficient use of resources in enterprises, profit optimization, and improvement of the management accounting system.*

Key words: Contribution margin, variable costs, fixed costs, break-even point, profit, management accounting, marginal analysis, "what-if" analysis, pricing policy, production efficiency.

Kirish: Bozor iqtisodiyoti sharoitida korxonalar faoliyatini samarali boshqarish, xarajatlarni nazorat qilish va foydalilikni oshirish uchun moliyaviy tahlil vositalaridan oqilona foydalanish muhim ahamiyat kasb etadi. Shunday vositalardan biri — kontributsiya marjini (yoki hissa marjasi) bo‘lib, u korxonaning mahsulot, xizmat yoki faoliyat turi bo‘yicha daromad va o‘zgaruvchan xarajatlar o‘rtasidagi farqni ifodalaydi. Kontributsiya marjini hisoblash orqali menejerlar mahsulotlarning foydalilik darajasini aniqlash, ishlab chiqarish hajmini rejalashtirish va narx siyosatini shakllantirishda asosli qarorlar qabul qilish imkoniga ega bo‘ladilar.

Asosiy qism

1. Kontributsiya marjini mohiyati

Kontributsiya marjini — bu mahsulotni sotishdan tushgan tushumdan o‘zgaruvchan xarajatlarni ayirgandan so‘ng qolgan summa bo‘lib, u korxonaning doimiy xarajatlarini qoplash va foyda olish uchun xizmat qiladi.

Formulada ifodalaydigan bo‘lsak:

Kontributsiya marjini=Sotishdan tushum−O‘zgaruvchan xarajatlar\text{Kontributsiya marjini} = \text{Sotishdan tushum} - \text{O‘zgaruvchan xarajatlar}Kontributsiya marjini=Sotishdan tushum−O‘zgaruvchan xarajatlar

Yoki nisbiy ko‘rinishda:

Kontributsiya marjinining foizda ifodasi=Kontributsiya marjiniSotishdan tushum×100%\text{Kontributsiya marjinining foizda ifodasi} = \frac{\text{Kontributsiya marjini}}{\text{Sotishdan tushum}} \times 100\%Kontributsiya marjinining foizda ifodasi=Sotishdan tushumKontributsiya marjini×100%

Mazkur ko‘rsatkich yordamida korxona har bir mahsulot birligidan qancha mablag‘ doimiy xarajatlarni qoplashga va foyda olishga "hissa qo‘shayotganini" aniqlaydi.

2. Kontributsiya marjini tahlilining ahamiyati

Kontributsiya marjini menejerlarga quyidagi yo‘nalishlarda muhim axborot beradi:

- **Narx siyosatini shakllantirishda** – mahsulot narxining o‘zgarishi foyda hajmiga qanday ta’sir qilishini baholash imkonini beradi.
- **Mahsulot assortimentini boshqarishda** – foydasi past mahsulotlarni kamaytirib, yuqori marjinali mahsulotlarga e’tiborni kuchaytirish imkonini beradi.
- **Ishlab chiqarish hajmini rejalashtirishda** – "zararsizlik nuqtasi"ni aniqlashda asosiy ko‘rsatkich sifatida xizmat qiladi.
- **Xarajatlarni boshqarishda** – o‘zgaruvchan va doimiy xarajatlar tuzilmasini tahlil qilib, tejamkorlik choralarini ko‘rish imkonini beradi.

3. Hisoblash tartibi va amaliy misol

Faraz qilaylik, “Samarqand Textiles” korxonasida bitta mahsulot birligini ishlab chiqarish uchun xarajatlar quyidagicha:

- Sotish narxi – 120 000 so‘m,
- O‘zgaruvchan xarajat – 80 000 so‘m,
- Doimiy xarajatlar – 200 000 000 so‘m,
- Sotilgan mahsulot hajmi – 10 000 dona.

Kontributsiya marjini quyidagicha aniqlanadi:

120000−80000=40000 so‘m (har bir dona uchun)120 000 - 80 000 = 40 000 \text{ so‘m (har bir dona uchun)}120000−80000=40000 so‘m (har bir dona uchun)

Umumiy kontributsiya marjini:

40000×10000=400000000 so‘m40 000 \times 10 000 = 400 000 000 \text{ so‘m}40000×10000=400000000 so‘m

Kontributsiya marjinining foizda ifodasi:

40000120000×100%=33,3%\frac{40 000}{120 000} \times 100\% = 33,3\%12000040000×100%=33,3%

Demak, korxona har bir mahsulot birligidan tushgan har 1 so‘mdan 0,333 so‘mini doimiy xarajatlarni qoplash va foyda olish uchun sarflaydi.

Zararsizlik nuqtasini (Break-even point) aniqlash uchun doimiy xarajatlar kontributsiya marjini koeffitsientiga bo‘linadi:

Zararsizlik hajmi=20000000040000=5000 dona\text{Zararsizlik hajmi} = \frac{200 000 000}{40 000} = 5 000 \text{ dona}Zararsizlik hajmi=40000200000000=5000 dona

Ya’ni korxona 5 000 dona mahsulot sotgandan so‘ng foyda ko‘ra boshlaydi.

4. Tahlil yondashuvlari

Kontributsiya marjini tahlilida uchta yondashuv keng qo‘llaniladi:

1. **Mahsulotlar bo‘yicha tahlil** – har bir mahsulot turi uchun marjinal foydani aniqlab, yuqori daromad keltiradigan mahsulotlarni tanlash.
2. **Bo‘limlar yoki segmentlar bo‘yicha tahlil** – korxona tarkibidagi ishlab chiqarish bo‘limlari, filiallar yoki savdo segmentlarining samaradorligini solishtirish.
3. **“Nima bo‘lsa” tahlili (What-if analysis)** – narx, xarajat yoki hajm o‘zgarishining kontributsiya marjini va foydaga ta’sirini modellashtirish.

Xulosa: Kontributsiya marjini — bu menejerlar uchun qaror qabul qilishda eng muhim tahliliy ko‘rsatkichlardan biridir. U foydani rejalashtirish, zararsizlik nuqtasini aniqlash, narx siyosatini belgilash va ishlab chiqarish samaradorligini oshirishda keng qo‘llaniladi. Kontributsiya marjini tahlili korxona faoliyatining ichki rezervlarini aniqlash, resurslardan samarali foydalanish va foyda darajasini optimallashtirish imkonini beradi. Shu bois, bu usul zamonaviy boshqaruv hisobi tizimining ajralmas elementi sifatida barcha turdagi ishlab chiqarish va xizmat ko‘rsatish korxonalarida joriy etilishi zarur.

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KORXONALARDA BUYURTMALI KALKULYATSIYANING MOHIYATI VA HISOBGA OLINISHI

Annotatsiya:*Ushbu maqolada buyurtmali kalkulyatsiya tizimining mohiyati, ishlab chiqarish xarajatlarini hisobga olishdagi ahamiyati hamda bosh kitob va yordamchi registrlar o‘rtasidagi o‘zaro bog‘liqlik tahlil qilingan. Buyurtmali kalkulyatsiya korxonalarda har bir buyurtma bo‘yicha alohida xarajatlarni hisobga olish va nazorat qilish imkonini beradi. Maqolada, shuningdek, buyurtma kartochkalari, tannarxni shakllantirish bosqichlari, umumishlab chiqarish xarajatlarini taqsimlash usullari va buxgalteriya hisobi registrlarining ishlab chiqarish jarayonidagi roli yoritilgan. Tadqiqot natijalariga ko‘ra, bosh kitob va yordamchi registrlar o‘rtasidagi uzviy aloqadorlik korxona buxgalteriya tizimini shaffof, ishonchli va samarali yuritish imkonini beradi.*

Kalit so‘zlar:*Buyurtmali kalkulyatsiya, bosh kitob, yordamchi registr, buyurtma kartochkasi, ishlab chiqarish xarajatlari, tannarx, ustama xarajatlar, ishlab chiqarish nazorati, buxgalteriya hisobi, moliyaviy natijalar.*

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THE ESSENCE AND ACCOUNTING OF JOB ORDER COSTING IN ENTERPRISES

Annotation: *This article analyzes the essence of the job order costing system, its importance in recording production costs, and the interrelation between the general ledger and subsidiary registers. Job order costing allows enterprises to record and control costs separately for each specific order. The article also highlights job order cards, the stages of cost formation, methods of allocating overhead costs, and the role of accounting registers in the production process. According to the research results, the close connection between the general ledger*

and subsidiary registers ensures transparency, reliability, and efficiency in maintaining the enterprise's accounting system.

Key words: *Job order costing, general ledger, subsidiary register, job order card, production costs, cost price, overhead costs, production control, accounting, financial results.*

Kirish: Buyurtmali (job-order) kalkulyatsiya ishlab chiqarish va xizmat ko‘rsatish jarayonlarida har bir buyurtma yoki ish bo‘yicha alohida xarajatlarni aniqlash va nazorat qilish usulidir. Bu hisoblash tizimi korxona uchun mahsulot yoki xizmatning aniq tannarxini hisoblash, narx belgilash va foyda tahlili o‘tkazishda asosiy vosita vazifasini bajaradi. Buyurtma asosida ishlab chiqarishda xarajatlar turli buyurtmalar o‘rtasida to‘g‘ri taqsimlanishi hamda har bir buyurtma bo‘yicha material, mehnat va umumiy ishlab chiqarish xarajatlari alohida qayd etilishi zarur. Bosh kitob va yordamchi registrlar buyurtmali kalkulyatsiya tizimida hisob-kitobning asosiy elementlaridan hisoblanadi. Bosh kitob korxonaning umumiy moliyaviy holatini aks ettiruvchi, hisob hisobvarag‘lari bo‘yicha konsolidatsiyalangan ma’lumotlarni beradi; yordamchi registrlar esa har bir buyurtma, mijoz yoki joylashuv bo‘yicha batafsil xarajatlar va hisoblar tarixini saqlaydi. Yordamchi registrlar orqali bosh kitobdagi umumiy ko‘rsatkichlar aniqroq, shaffof va tekshiriladigan bo‘ladi — bu esa hisobdorlik, ichki nazorat va qaror qabul qilish sifatini oshiradi. Ushbu maqolada buyurtmali kalkulyatsiya asoslari, bosh kitob va yordamchi registrlarning o‘rni hamda ularning o‘zaro bog‘liqligi, amaliy tashkil etilishi va samarali foydalanish usullari tahlil qilinadi. Maqolaning maqsadi — nazariy asoslarni amaliy misollar bilan bog‘lab, korxonalarda xarajatlarni to‘g‘ri hisoblash va nazorat qilish uchun aniq va foydalanishga qulay tavsiyalar berishdir.

Korxonada ishlab chiqarilayotgan maxsulot (ish, xizmat) birligining tannarxini aniqlashda quyidagi to‘rtta usulning biridan foylalaniladi:

- Oddiy usul
- Buyurtmali usul
- Jarayonli usul
- Normativ usul.

Ba’zi bir mamlakatlarda bu usullardan tashqari yana boshqa, xususan o‘rtacha tannarx, koeffisiyentlar usulida ham foydalaniladi.

Korxonada boshqaruv hisobini tashkil qilish va yuritish uchun eng samarali ishlatilishi mumkin bo‘lgan usullar-bu tannarxni xisoblashning **buyurtmali** va **jarayonli** usullaridir.

Xarajatlarning xisobga olishning va maxsulot tannarxini hisolashning buyurtmali usuli-bu faqat bir maxsulot turini ishlab chiquvchi shuningdek, maxsus buyurtma asosida ishlovchi korxonalar tomonidan foydalniladigan usuldir. Bu usulda barcha xarajatlar alohida bo‘linmalar yoki xisobot davri uchun emas, har bir buyurtma bo‘yicha yig‘iladi.

Ishlab chiqarish korxonalarida xarajatlar hisobini turli usullar bilan tashkil etish mumkin:

1) xarajatlarni baholash usuli bo’yicha;

2) ishlab chiqarishning texnologik jarayonlariga nisbatan xarajatlar nisbati bo’yicha;

3) xarajatlarni mahsulot tannarxiga kiritishning to’liqligi bo’yicha.

Xarajatlarini baholash usuli bo’yicha haqiqiy, normativ va rejaviy (taxminiy) tannarx bo’yicha xarajatlar hisobi usullarini ajratib olish zarur.

Buyurtmalar bo’yicha usul mohiyati shundan iboratki, xarajatlar hisobi bir buyum yoki bir xildagi buyumlarning uncha katta bo’lmagan turkumini tayyorlashda buyurtmalar bo’yicha amalga oshiriladi.

Buning uchun har bir buyurtmaga buxgalteriyada alohida kartochka ochiladi, unda buyurtma bo’yicha xarajatlar uni bajarishning butun muddati mobaynida hisobga olinadi. Xarajatlarni hisobga olish va tannarxni kalkulatsiya qilishning buyurtmali usuli quyidagi o’ziga xos xususiyatlarga ega:

– alohida buyurtmalar bo’yicha, shuningdek, bir martalik mahsulot turi ishlab chiqarilayotganda qo’llaniladi;

– bu usulda xarajatlar muayyan hisobot davri (bir oy, chorak, yil) oralig’ida emas, balki bajarilayotgan buyurtma davri bo’yicha aniqlanadi.

– qo’shimcha analitik ma‘lumotlarni yig’ib borish uchun buyurtmalar kartochkasidan foydalanish mumkin.

Ushbu buyurtmalar kartochkasidan xarajatlar tegishli javobgarlik markazlari bo’yicha yig’ib boriladi. Bu usulda barcha bevosita xarajatlar ishlab chiqarilgan yoki buyurtma birligiga olib boriladi. Buyurtmali usulda umumishlab chiqarish xarajatlari maxsus usullar bo’yicha aniqlanadi va mahsulot tannarxiga olib boriladi.

Umumishlab chiqarish xarajatlari taqsimlanishining eng muqobil usuli normativ koeffitsiyentlar usulidir.

Koeffitsiyentlar hisoblash uch bosqichda amalga oshiriladi:

– umumishlab chiqarish xarajatlari rejasining yillik budjeti tuziladi;

– xarajatlarining umumiy summasi rejalashtirilayotgan ishlab chiqarish hajmida qarab aniqlanadi. *(Bunda xodimlarning mehnat haqi sarflangan kishi-soat, sarflangan mashina-soat va hokazo)*;

– rejalashtirilayotgan hisobot davri uchun aniqlangan umumishlab chiqarish xarajatlari summasi rejalashtirilgan ishlab chiqarish hajmiga bo’linadi.

Buyurtmalar bo’yicha kalkulatsiyalar yakka tartibda ishlab chiqarishda mahsulotning takrorlanmaydigan yoki kamdan kam takrorlanadigan turlarini ishlab chiqarishda qo’llaniladi. Bu usulda barcha xarajatlar alohida bo’linmalar yoki hisobot davri bo’yicha emas, balki har bir buyurtma bo’yicha to’planadi.

Korxonada bitta «Tugallanmagan ishlab chiqarish» hisobvarag’i yuritiladi va shu hisobvaraq bo’yicha detallashtirish (tafsillashtirish) hamda tahliliy axborot buyurtmalar kartochkalarida olib boriladi. Aniq bir buyurtmani bajarishga barcha bo’linmalar bo’yicha xarajatlar ayni shu kartochkalarda to’planadi.

Buyurtmali kalkulatsiya qilishning asosiy vazifalari:

– ko’p buyurtmalar belgilangan davr davomida bajariladi;

– ishlab chiqarish materiallariga, ishlab chiqarishda band bo'lgan ishchilarning mehnatiga haq to'lashga xarjatlar va ishlab chiqarish ustama xarajatlari har bir buyurtma bo'yica yig'iladi;

– buyurtma bo'yicha kartochka asosiy hujjat hisoblanadi;

– xarajatlar buyurtmalar bajarilishiga qarab hisobdan chiqariladi.

Xarajatlarni aniq bir buyurtmaga o'tkazish uchun quyidagi amallarni ko'rsatish mumkin:

1. Buyurtmani xarajatlar obyekti sifatida aniqlash.
2. Buyurtma bilan bog'liq xarajatlarni (materiallar, asosiy mehnat) aniqlash.
3. Buyurtmaga ustama xarajatlarni taqsimlash uchun bazani tanlash.
4. Ustama xarajatlarni taqsimlash bazasiga kiritish.
5. Ustama xarajatlarni taqsimlash stavkasini hisoblash.
6. Ustama xarajatlarni taqsimlash stavkasidan foydalanib, ustama xarajatlarni buyurtmaga o'tkazish.
7. Buyurtma bo'yicha umumiy xarajatlarni (materiallar, mehnat, ishlab chiqarish ustama xarajatlarini) aniqlash.

Mehnat va materiallar kabi to'g'ridan to'g'ri qilinadigan xarajatlar mahsulot yoki xizmatning aniq bir turiga bevosita o'tkazilishi mumkin. Umumiy ishlab chiqarish xarajatlari faqat maxsus sun'iy usullar yordamida mahsulot turlariga taqsimlanishi mumkin. Ularni hisobdan chiqarish chog'ida umumiy ishlab chiqarish xarajatlarining har bir bo_linma yoki faoliyat yuritayotgan obyekt uchun belgilangan me'yoriy stavkalaridan foydalaniladi.

Buyurtmalar bo'yicha kalkulatsiya poligrafiya sanoati, kemasozlik, konsalting kompaniyalarida qo'llaniladi.

Taqsimlash stavkasini aniqlash:

1. ***Yillik budjet, umumiy ishlab chiqarish xarajatlari rejasini tuzish***. Umumiy ishlab chiqarish xarajatlarining taxmin qilingan miqdorini hisoblash xarajatlar dinamikasi va ishlab chiqarishning nazarda tutilgan hajmi asosida amalga oshiriladi. Bu operatsiyani kelgusi hisobot davriga har bir ishlab chiqarish bo'linmasi uchun bajarish zarur.

2. ***Umumiy ishlab chiqarish xarajatlarini taqsimlash bazasini tanlash***. Buning uchun ishlab chiqarish faoliyatining biror o'lchagichidan (mezonidan), masalan, ishlangan kishi soat soni, mashina-soat miqdori, ishlab chiqarishda band bo'lgan ishchilarga hisoblangan ish haqi summasidan foydalanib, ishlab chiqarish umumiy xarajatlari bilan tayyor mahsulot hajmi o'rtasidagi bog'liqlik aniqlanadi. Tanlangan baza ishlab chiqarishning umumiy xarajatlarini ishlab chiqarilgan mahsulotning hajmi bilan bog'liq qilishi kerak.

3. ***Kelgusi davrga prognoz qilingan ishlab chiqarish umumiy xarajatlari miqdorini ishlab chiqarishning prognoz qilingan va tanlangan taqsimlash bazasi ko'rsatkichlarida (soatlar, pulda) ifodalangan miqdoriga taqsimlash***. Bu operatsiya natijasida ishlab chiqarish umumiy xarajatlarini taqsimlashning me'yoriy stavkasi olinadi.

So'ngra ishlab chiqarish umumiy xarajatlari ana shu stavkadan foydalanib, mahsulotning har bir turiga o'tkaziladi, buning uchun taqsimlash bazasi

ko’rsatkichininig haqiqiy qiymati taqsimlashning me‘yoriy stavkasiga ko’paytiriladi. Bu summa materiallar sarfiga va ishlab chiqarish ishchilariga hisoblangan mehnat haqiga qo’shiladi.

Natijada mahhsulotning hisoblangan tannarxi kelib chiqadi, unda faqat ikkita haqiqiy element bo’ladi, ishlab chiqarish umumiy sarflari taqsimlashning me‘yoriy bazasi asosida mahsulotga o’tkazilgan bo’ladi. Hisobot davri oxirida umumiy ishlab chiqarish xarajatlari hisobvarag’ida oxirgi qoldiq ma‘lum bo’ladi, ya‘ni haqiqatan qilingan ishlab chiqarish umumiy xarajatlari bilan mahsulot tannarxiga o’tkazilgan xarajatlar o’rtasidagi tafovut aniqlanadi.

Ortiqcha taqsimlangan ishlab chiqarish umumiy ustama xarajatlari «Sotilgan mahsulot tannarxi» debet hisobvarag’iga o’tkaziladi. Haqiqiy kalkulatsiyalashda haqiqiy xarajatlar: bevosita materiallar, bevosita mehnat va ishlab chiqarish ustama xarajatlaridan foydalaniladi.

Me‘yoriy kalkulatsiyalashda haqiqiy xarajatlar: bevosita materiallar, bevosita mehnatdan foydalaniladi, ishlab chiqarish ustama xarajatlari esa ustama xarajatlar baza mezonining haqiqiy miqdoriga ko‗paytirilib, ustama xarajatlarni taqsimlashning reja stavkasidan foydalanib, buyurtmalarga o’tkaziladi. Mahsulot (ish xizmat)lar tannarxini hisoblashning buyurtmali usulida kalkulatsiya obyekti muayyan miqdordagi mahsulotni ishlab chiqarish (ishlar bajarish, xizmatlar ko‗rsatish)ga olingan buyurtma hisoblanadi. Mahsulotni ishlab chiqarish (ish bajarish, xizmat ko‗rsatish)da buyurtmachi va ishlab chiqaruvchi o‗rtasida tuzilgan shartnoma asosiy buxgalteriya hisobi hujjati hisoblanadi.

Mazkur shartnomada quyidagilar o’z ifodasini topadi:

shartnoma obyekti,

shartnoma su‘bektlari va ularning manzillari,

mahsulot (ish, xizmat)ning hajmi va yuklab jo’natish (qabul qilib olish) muddati,

shartnoma bahosi,

to’lov shakllari va hokazo.

Buyurtmali usulda mahsulot tannarxini hisoblash yakka va turkumli ishlab chiqarishlarda qo’llaniladi. Buyurtmalar bo’yicha material, mehnat haqi va shu kabi xarajatlar alohida taqsimlash jadvallarida guruhlanadi. Buyurtma obyektining tannarxi ochilgan kundan boshlab amalda ishlab chiqarish xarajatlarining yig’indisi summasi orqali aniqlanadi.

Buning uchun har bir buyurtmaga buxgalteriyada alohida kartochka ochiladi, unda buyurtma bo’yicha xarajatlar buyurtma bajarishning butun muddati mobaynida hisobga olinadi. Bevosita xarajatlar birlamchi hujjatlar asosida sexlar va buyurtmalar nuqtayi nazaridan hisobga olinadi. Bunday xarajatlar hisobi bo’yicha birlamchi hujjat har bir buyurtmaga alohida rasmiylashtiriladi.

Bevosita xarajatlar korxonada mutanosib ravishda qabul qilingan taqsimot bazasida taqsimlash yo’li bilan tannarxga kiritiladi. Buyurtmani bajarish muddati davomida xarajatlar tugallanmagan ishlab chiqarish (mahsulot) sifatida hisobga olinadi. Ishlar tugagandan keyin kartochka yopiladi va buyurtmani bajarishga ketgan xarajatlar chiqiladi.

Bu xarajatlar qaytib kelgan chiqindilar, mutlaqo yaroqsiz va foydalanilmagan materiallar omborga qaytarish xarajatlari chiqarib tashlangach, buyurtma bo‗yicha ishlangan mahsulotning haqiqiy tannarxi bo‗lib qoladi. Bordi-yu, buyurtmaga muvofiq bir necha xil buyum tayyorlansa, birlik tannarx xarajatlar summasini ishlab chiqilgan mahsulot miqdoriga kalkulatsion moddalari bo'yicha bo'lish bilan aniqlanadi.

Sut va sut mahsulotlarida buyurtma bo'yicha usul sut mahsulotlari korxonasida, savdo va texnologik jihozlar va h.k. ishlab chiqarishda qo'llaniladi. Ko'pgina hollarda tashkilot, korxona amaliy faoliyatida qayta ishlov bo'yicha usul bilan bir qatorda buyurtma bo'yicha usulning unsurlarini qo'shib yuboruvchi aralash tizimlardan foydalaniladi.

Bunday tizimlardan turkumli va oqimli ishlab chiqarishlarda foydalaniladi: qandolatlar ishlab chiqarish, sut va sut ishlab chiqarish sanoati va h.k. Jumladan, operatsiyalar bo'yicha usul eng istiqbolli aralash tizimlardan biri hisoblanadi, undan foydalanishda xarajatlarni kiritishning asosiy obyekti operatsiya hisoblanadi. Har bir operatsiyaga xarajatlar mazkur operatsiyadan o'tgan mahsulotlar birliklari bo'yicha qo'shimcha xarajatlarning o'rtacha salmog'iga mutanosib ravishda taqsimlanadilar.

Asosiy materiallarga ketgan xarajatlar buyurtma bo'yicha usulga o'xshab mahsulotning muayyan turiga kiritiladi. Operatsiyalar bo'yicha usulning afzalligi kalkulatsiyani texnologik sharoitga —tirkashdan iborat.

Ishlab chiqarish korxonalari xarajatlarni mahsulot tannarxi to'lanishiga bog'liq holda xarajatlar hisobini to'liq yoki cheklangan tannarx (marjinal usul) bo'yicha tashkil etish mumkin.

To'liq tannarx bo'yicha xarajatlar hisobi usulida mahsulot tannarxi doimiy va o'zgaruvchan bevosita va bilvositaga bo'linishdan qat'i nazar korxonaning barcha chiqimlari kiritiladi. Bevosita mahsulotga kiritib bo'lmaydigan xarajatlarni avvaliga ular kelib chiqqan javobgarlik markazlari bo'yicha taqsimlanadi, keyin esa tanlangan bazaga mutanosib ravishda mahsulot tannarxi olib o'tiladi.

Ko'pincha taqsimlash bazasi sifatida ishlab chiqarish ishchilarining ish haqi, ishlab chiqarish tannarxi va h.k. lar hisoblanadi. To'liq tannarx bo'yicha xarajatlar hisobi usuli birgina buyumni chiqarish va sotish munosabati bilan korxona qiladigan barcha xarajatlar haqida tasavvurga ega bo'lish imkonini beradi.

Doimiy xarajatlar marjinal daromadni kamaytirishga hisob qilingandan keyin operatsion foyda-netto foydasi olinadi. Marjinal daromad butun mahsulot kabi alohida buyum rentabelligining umumiy darajasi haqida darak beradi.

Binobarin, buyumlar sotuv bahosi va o'zgaruvchan xarajatlar summasi o'rtasidagi farq qancha baland bo'lsa, marjinal daromad va rentabellik darajasi ham shuncha baland bo'ladi. Bundan tashqari xarajatlarning doimiy va o'zgaruvchanlarga bo'linishi korxona faoliyatini boshqarish va tahlil qilishda muhim ahamiyat kasb etadi, jumladan, assortiment siyosati, shuningdek, zararli faoliyat yuritish holda yopib qo'yish yoki kasod topganligini e'lon qilish haqida qaror qabul qilish uchun ham kerak.

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PERIOD COSTS AND THEIR CHARACTERISTICS IN CONSTRUCTION ENTERPRISES

Abstract: *This article discusses the nature, composition, and specific features of period costs in construction enterprises. Unlike production costs, period costs are not included in the cost of production but directly affect the overall financial results of the enterprise. The article examines the economic essence of management, sales, and administrative costs, as well as methods for their planning and analysis. Furthermore, it analyzes effective ways to optimize period costs in construction enterprises and the possibilities of monitoring them through digital technologies. The results of the study contribute to ensuring financial stability and increasing competitiveness in the construction sector.*

Keywords: *period costs, construction enterprises, management costs, administrative costs, sales costs, cost analysis, optimization, financial result.*

Introduction: In a market economy, every enterprise must manage its costs efficiently to operate effectively, remain competitive, and maintain financial stability. This issue is particularly significant in the construction industry, where production processes are complex, long-term, and resource-intensive. The financial results of construction enterprises largely depend on their ability to classify and manage costs properly. Period costs are those not directly related to the production process but necessary for running, managing, marketing, and supporting the enterprise's operations. They are not included in the cost of production but directly influence the company's periodic financial results—namely, profit or loss.

In construction enterprises, period costs typically include administrative and management expenses (management salaries, accounting, legal services, office rent, etc.), marketing and sales expenses (advertising, participation in tenders, communication with clients), and other general business costs. Correct accounting and control of these costs play an important role in determining the profitability of the enterprise.

In recent years, with the rapid development of the construction sector in Uzbekistan, the expansion of new infrastructure projects, and increasing competition, optimizing period costs has become one of the most pressing challenges. Therefore, a thorough study of the economic essence of period costs and the development of effective management mechanisms are of great practical importance.

Literature Review

There are various approaches to the concept and management of period costs in economic literature. Economists generally define them as expenses related to the overall activities of an enterprise but not directly included in the production process.

For example, M. Porter, in his book *"Competitive Advantage"*, emphasizes that cost management strategy is a key factor in ensuring the enterprise's long-term competitiveness. According to him, analyzing and reducing period costs allows a company to gain a pricing advantage in the market.

R. Kaplan and D. Norton, in their *"Balanced Scorecard"* concept, also stress the importance of managing costs at a strategic level. They argue that period costs should be analyzed not only through financial indicators but also in connection with internal process efficiency, customer satisfaction, and innovation capacity.

Uzbek economists R. Qodirov and S. Rakhimov have demonstrated in their studies that properly defining the structure of period costs in construction enterprises is crucial for accurate accounting and financial result analysis. According to them, the correct accounting of administrative and management expenses enables the determination of a company's real profit level.

G.P. Shatunova has written about automated systems for managing period costs in construction enterprises, emphasizing that modern digital technologies simplify cost monitoring and control.

Similarly, N. Murodova, in her work *"Improving the Mechanisms of Cost Management in Construction Enterprises"*, shows that period cost reduction can be achieved through remote management, digital accounting systems, and optimized marketing policies.

In general, literature analysis shows that effective management of period costs is essential for increasing profitability, stabilizing financial results, and ensuring competitiveness. Particularly in the construction sector, organizing this process based on a strategic approach significantly impacts the economic stability of enterprises.

Research Methodology

In studying the analysis and management of period costs in construction enterprises, both theoretical and practical research methods were applied. The research object consisted of large and medium-sized construction enterprises in the Republic of Uzbekistan. Their financial statements for 2022–2024 were analyzed to identify trends in period cost changes. The results can be practically used to improve management systems, control costs, and enhance financial outcomes in construction enterprises.

Analysis and Results

The analysis of period cost composition in construction enterprises shows that these costs occupy a significant share in the overall cost structure and directly affect financial results. Period costs usually include administrative, marketing (sales), and other general business expenses.

Structure of Period Costs in a Medium-Sized Construction Enterprise

Table 1.

Type of Cost	2023 (million UZS)	2024 (million UZS)	Growth (%)
Administrative expenses	820	940	14.6%
Marketing and sales expenses	460	510	10.9%
General business expenses	310	355	14.5%
Total period costs	**1,590**	**1,805**	**13.5%**

As seen from the table, period costs increased by 13.5% in 2024. The main reasons for this growth include higher administrative expenses (office rent, salaries, business trips) and increased advertising costs due to expanded marketing activities.

The enterprise's net profit rose from 1.2 billion UZS in 2023 to 1.35 billion UZS in 2024. However, the share of period costs relative to revenue increased from 17.8% to 18.2%. This means that costs grew faster than profits. Therefore, it is necessary to introduce an efficient cost management system.

Based on the analysis, the following directions were identified for improving efficiency:

- Introducing **digital management systems** to automate accounting and cost monitoring, potentially reducing administrative expenses by 8–10%.
- Implementing **remote work systems** to reduce office space, energy, and service expenses.
- **Reallocating marketing costs**, replacing traditional advertising with digital marketing tools (social media, SEO, SMM) to improve efficiency.
- Developing a **competitive pricing policy** in tenders based on accurate cost and period expense calculations.

Conclusion

The research results revealed the structure, types, and impact of period costs on the financial performance of construction enterprises. The analysis shows that period costs, while outside the production process, play a vital role in ensuring efficient enterprise operations and are a key factor in increasing profitability.

Period costs include administrative, marketing, and general business expenses essential for effective operations. In construction enterprises, most period costs are related to administrative management and marketing, which significantly affect financial results.

To manage period costs efficiently, it is necessary to implement modern planning, control, and analysis mechanisms. The use of digital technologies, automated accounting systems, and remote management methods can significantly reduce period costs.

Based on the results, the following recommendations are proposed:

- Implement an integrated information system for cost management in construction enterprises to track all administrative and marketing expenses in real time.
- Prepare a quarterly analysis report of period costs and compare them with profit indicators to assess financial efficiency.

- Reduce administrative costs by adopting remote work and online management formats**.**
- Develop a digital marketing strategy (social media, online advertising, brand image) to ensure effective use of marketing budgets.
- Improve the qualifications of accountants and economists in cost analysis and introduce best international practices into accounting processes.

Overall, the rational management of period costs is crucial for ensuring financial stability, increasing profitability, and strengthening competitiveness in construction enterprises. Therefore, by adopting modern analytical methods and digital management mechanisms, enterprises can further enhance their economic potential.

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KORXONALARDA BOSHQARUV XARAJATLARINI TAKOMILLASHTIRISH

Annotatsiya: *Muallif tomonidan ushbu ilmiy maqolada mamlakatimizda tashkil etilgan farmatsevtika korxonalarida boshqaruv xarajatlarini takomillashtirishto‘g‘risida ma’lumotlar berilgan.*

Kalit so`zlar: *boshqaruv xarajatlari, farmatsevtika korxonalari, menejment, tahlil, optimallashtirish, samaradorlik, innovatsion boshqaruv, resurs tejamkorlik, raqamlashtirish, strategik rejalashtirish.*

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IMPROVING MANAGEMENT EXPENSES IN ENTERPRISES

Abstract: *In this scientific article, the author provides information on improving management costs in pharmaceutical enterprises established in our country.*

Keywords: *Management costs, pharmaceutical enterprises, management, analysis, optimization, efficiency, innovative management, resource saving, digitalization, strategic planning.*

Hozirgi globallashuv va raqobat kuchaygan iqtisodiy sharoitda korxonalar faoliyatining samaradorligi bevosita xarajatlarni oqilona boshqarish bilan bog‘liq. Ayniqsa, farmatsevtika sanoatida bu masala alohida dolzarblik kasb etadi. Chunki ushbu sohada mahsulot sifati, texnologik jarayonlarning aniqligi va me’yoriy talablarning yuqoriligi xarajatlarning to‘g‘ri rejalashtirilishini talab etadi. Farmatsevtika korxonalari sog‘liqni saqlash tizimining asosiy bo‘g‘ini sifatida iqtisodiy va ijtimoiy barqarorlikni ta’minlashda muhim o‘rin tutadi. Shu sababli ularning boshqaruv xarajatlarini kamaytirish, ichki jarayonlarni avtomatlashtirish va resurslardan samarali foydalanish bugungi kundagi strategik vazifalardan biridir.

Maqolaning maqsadi — farmatsevtika korxonalarida boshqaruv xarajatlarini tahlil qilish, ularni optimallashtirishning samarali yo‘llarini aniqlash hamda innovatsion yondashuvlar orqali ularni takomillashtirish bo‘yicha amaliy tavsiyalar ishlab chiqishdan iborat.

Boshqaruv xarajatlari — bu tashkilot yoki kompaniyaning ma’muriy va boshqaruv faoliyatini amalga oshirish uchun sarflanadigan barcha xarajatlardir. Ular korxonaning asosiy ishlab chiqarish yoki xizmat ko‘rsatish faoliyatidan tashqari, boshqaruv jarayonlarini qo‘llab-quvvatlashga yo‘naltirilgan. Boshqaruv xarajatlariga rahbariyat maoshlari, ma’muriy ofis xarajatlari, konsultatsiya xizmatlari, kadrlarni tayyorlash, huquqiy va moliyaviy xizmatlar, ofis jihozlari xaridi, yuridik va audit xarajatlari, shuningdek, boshqa ma’muriy xarajatlar kiradi. Farmatsevtika sohasida boshqaruv xarajatlari kompaniyaning boshqaruv va ma’muriy faoliyatini qo‘llab-quvvatlash uchun zarur bo‘lgan barcha xarajatlarni o‘z ichiga oladi. Ushbu xarajatlar tarmoqning o‘ziga xos xususiyatlari hisobga olinib, quyidagi asosiy elementlardan iborat bo‘ladi:

1. **Rahbariyat va ma’muriy xodimlarning maoshlari va ijtimoiy to‘lovlari**

Farmatsevtika kompaniyalarida rahbarlar, boshqaruv bo‘limlari xodimlari va ma’muriy personalning ish haqi, shuningdek, ularga to‘lanadigan soliqlar va ijtimoiy sug‘urta to‘lovlari asosiy xarajatlarni tashkil etadi.

2. **Ofis jihozlari, materiallari va kommunikatsiya xarajatlari**

Ofisda ishlash uchun zarur kompyuter texnikasi, telefon, internet, kseroks va boshqa ma’muriy jihozlar xarajatlari. Shuningdek, ofis materiallari, qog‘oz, qalam va boshqa kundalik ehtiyojlar uchun sarflar ham kiradi.

3. **Kadrlarni tayyorlash va malakasini oshirish**

Farmatsevtika sohasida doimiy yangilanish va o‘quv jarayonlari muhim hisoblanadi. Xodimlarning malakasini oshirish, treninglar, seminarlar, sertifikatlash kurslari uchun ajratilgan mablag‘lar boshqaruv xarajatlarining bir qismidir.

4. **Huquqiy, moliyaviy va audit xizmatlari**

Sertifikatlash, litsenziyalash, qonunchilikka muvofiqlikni ta’minlash uchun yuridik maslahatlar va huquqiy xizmatlarga, shuningdek, moliyaviy hisob-kitoblar va tashqi audit xizmatlariga sarflanadigan xarajatlar.

5. **Tashkiliy va boshqaruv xizmatlari**

Konsalting, marketing bo‘yicha maslahatlar, biznesni rivojlantirishga yo‘naltirilgan xizmatlar xarajatlari, shu jumladan boshqaruv jarayonlarini takomillashtirish uchun jalb qilingan mutaxassislar to‘lovlari.

6. **Ichki va tashqi nazorat tizimlari**

Ichki audit, sifat nazorati, xavfsizlik va standartlarga muvofiqlikni ta’minlash uchun tashkil etilgan tizimlarning faoliyatiga ketadigan xarajatlar.

7. **Kommunal xizmatlar va ta’mirlash**

Ma’muriy binolar uchun elektr energiyasi, suv, isitish, tozalash xizmatlari, shuningdek, bino va uskunalarning texnik xizmat ko‘rsatish va ta’mirlash xarajatlari.

8. **Axborot texnologiyalari va raqamlashtirish**

ERP tizimlari, ma’lumotlar bazasi, elektron hujjatlar aylanishi, kiberxavfsizlik va boshqa IT xizmatlari uchun xarajatlar.

9. **Sertifikatlash va standartlarga muvofiqlik**

Farmatsevtika mahsulotlarini sertifikatlash, sifat standartlariga moslikni ta’minlash uchun zarur bo‘lgan barcha xarajatlar, jumladan, laboratoriya tekshiruvlari va sinovlar.

10. **Xodimlarni motivatsiya qilish va samaradorlikni oshirish dasturlari**

Bonuslar, mukofotlar, ijtimoiy dasturlar, sog‘liqni saqlash va dam olish imkoniyatlari uchun ajratilgan mablag‘lar.

So‘nggi yillarda bu xarajatlarning ulushi farmatsevtika korxonalarining umumiy xarajatlarida 15–25 foiz atrofida shakllanmoqda. Shu sababli ularni to‘g‘ri nazorat qilish korxonaning foyda ko‘rsatkichiga sezilarli ta’sir ko‘rsatadi. Boshqaruv xarajatlarini optimallashtirish kompaniya resurslarini samarali boshqarish, ortiqcha sarflarni kamaytirish va biznes rentabelligini oshirishga qaratilgan muhim jarayondir. Bu maqsadda birinchi navbatda barcha boshqaruv xarajatlarini batafsil tahlil qilib, ortiqcha yoki samarasiz sarflarni aniqlash va moliyaviy ko‘rsatkichlarni muntazam kuzatib borish zarur. Shuningdek, qo‘lda bajariladigan ishlarni avtomatlashtirish va raqamlashtirish inson xatolarini kamaytiradi, vaqtni tejaydi hamda ERP kabi zamonaviy boshqaruv tizimlarini joriy etish orqali jarayonlarni tezlashtiradi hamda xarajatlarni kamaytirishga yordam beradi. Resurslarni – ishchi kuchi, materiallar, vaqt va moliyaviy imkoniyatlarni oqilona taqsimlash va foydalanish boshqaruv xarajatlarini sezilarli darajada qisqartiradi. Bundan tashqari, yetkazib beruvchilar bilan uzoq muddatli shartnomalar tuzish, bozorni doimiy ravishda tadqiq qilib, eng maqbul narx va shartlarni tanlash orqali xarajatlarni kamaytirish mumkin. Kompaniyada asosiy faoliyatga aloqasi kam yoki samaradorligi past bo‘lgan funksiyalarni tashqi mutaxassislar yoki tashkilotlarga topshirish, ya’ni outsorsing qilish ham samarali yo‘ldir. Moliyaviy va boshqaruv jarayonlarida kuchli ichki nazorat tizimini joriy etish va muntazam audit o‘tkazish xarajatlarni nazorat qilish imkonini beradi. Bundan tashqari, xodimlarning malakasini oshirish va ularni samarali ishlashga yo‘naltirish, shuningdek, motivatsiya tizimini yaxshilash mehnat unumdorligini oshirib, natijada xarajatlarni kamaytirishga yordam beradi. Nihoyat, yangi texnologiyalar va innovatsion yechimlarni joriy etish orqali ishlab chiqarish va boshqaruv jarayonlarini takomillashtirish ham xarajatlarni kamaytirishning muhim omillaridan biridir. Boshqaruv xarajatlarini kamaytirish faqat qisqartirish orqali emas, balki ularni strategik qayta tashkil etish orqali amalga oshiriladi. Quyidagi yo‘nalishlar eng samarali hisoblanadi:

XULOSA

Farmatsevtika korxonalarida boshqaruv xarajatlarini takomillashtirish iqtisodiy samaradorlikni oshirishning eng muhim yo‘nalishlaridan biridir. Boshqaruv xarajatlarini samarali boshqarish va optimallashtirish korxonaning moliyaviy holatini yaxshilashga, resurslardan oqilona foydalanishga hamda ishlab chiqarish va ma’muriy jarayonlarni yanada silliq amalga oshirishga imkon beradi.

Bu jarayon nafaqat individual korxonaning foyda ko‘rsatkichlariga ijobiy ta’sir ko‘rsatadi, balki butun farmatsevtika tarmog‘ining raqobatbardoshligini oshirishda muhim omil hisoblanadi. Farmatsevtika sohasida raqobat doimiy ravishda kuchayib borayotgan bir paytda, xarajatlarni samarali boshqarish orqali mahsulotlarning narxini optimallashtirish, sifatni saqlab qolish va bozor talablariga tez moslashish mumkin bo‘ladi. Shu tariqa, boshqaruv xarajatlarini kamaytirish va ularni nazorat qilish orqali korxona yanada barqaror rivojlanadi, yangi investitsiyalar uchun imkoniyatlar yaratiladi va bozor ulushini kengaytirish mumkin bo‘ladi. Bundan tashqari, boshqaruv xarajatlarini takomillashtirish xodimlar samaradorligini oshirish, jarayonlarni avtomatlashtirish, ichki audit va nazorat tizimlarini kuchaytirish kabi chora-tadbirlarni o‘z ichiga oladi. Bu esa, o‘z navbatida, korxona ichidagi boshqaruv tizimlarini yanada mustahkamlaydi va resurslarning maqsadli yo‘naltirilishini ta’minlaydi. Shu bois, farmatsevtika korxonalari uchun boshqaruv xarajatlarini doimiy ravishda tahlil qilish, ularni kamaytirish va samarali boshqarish strategiyalarini ishlab chiqish – uzoq muddatli muvaffaqiyat va barqarorlikni ta’minlashda asosiy vazifa hisoblanadi. Natijada, bu nafaqat korxonaning o‘z foydasini oshiradi, balki milliy farmatsevtika sanoatining umumiy rivojlanishiga va sog‘liqni saqlash tizimining yaxshilanishiga ham xizmat qiladi.

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QARORLAR QABUL QILISH VA RELEVANT AXBOROTLAR

Annotatsiya: *Maqolada boshqaruv jarayonida qarorlar qabul qilishning mohiyati, ularni asoslashda relevant axborotlarning o‘rni va ahamiyati yoritilgan. Korxona faoliyatida samarali boshqaruv qarorlarini qabul qilish to‘g‘ri, o‘z vaqtida va tahliliy axborotga asoslanadi. Relevant axborotlar boshqaruv hisobi tizimida shakllanib, alternativ variantlar orasidan eng maqbulini tanlash imkonini beradi. Shuningdek, maqolada xarajatlar, daromadlar va foydani baholashda relevanlik mezonlari, ularning vaqt omiliga bog‘liqligi hamda qaror qabul qilishdagi zamonaviy yondashuvlar tahlil qilingan.*

Kalit so‘zlar: *Qaror qabul qilish, relevant axborot, boshqaruv hisobi, alternativ variant, foyda, xarajat, rejalashtirish, tahliliy axborot, vaqt omili, iqtisodiy samaradorlik.*

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DECISION-MAKING AND RELEVANT INFORMATION

Annotation: *This article reveals the essence of decision-making in the management process and the role and importance of relevant information in substantiating such decisions. Effective managerial decisions in an enterprise are based on accurate, timely, and analytical information. Relevant information is formed within the management accounting system and enables the selection of the most appropriate alternative among various options. The article also analyzes the criteria of relevance in evaluating costs, revenues, and profits, their dependence on the time factor, as well as modern approaches to decision-making.*

Key words: *Decision-making, relevant information, management accounting, alternative option, profit, cost, planning, analytical information, time factor, economic efficiency.*

Kirish: Bozor iqtisodiyoti sharoitida korxonalar faoliyati tobora murakkablashib bormoqda. Raqobatning kuchayishi, resurslarning cheklanganligi va iste’molchilar ehtiyojlarining tez o‘zgarishi boshqaruv tizimidan tezkor, aniq va asosli qarorlar qabul qilishni talab etadi. Har qanday qaror ma’lum axborotga tayanadi. Biroq barcha axborot ham boshqaruv uchun foydali bo‘lavermaydi. Shu bois qaror qabul qilish jarayonida relevant (muvofiq, zarur va ta’sirli) axborotni ajrata bilish muhimdir. Relevant axborot — bu muayyan qarorni qabul qilishga bevosita ta’sir etuvchi ma’lumot, ya’ni alternativ variantlar o‘rtasidagi farqni ko‘rsatuvchi axborotdir.

1. Qaror qabul qilishning mohiyati va bosqichlari

Qaror qabul qilish — bu boshqaruv faoliyatining markaziy elementi bo‘lib, muammoli vaziyatni tahlil qilish, alternativ variantlarni baholash va eng maqbulini tanlash jarayonidir.

Odatda qaror qabul qilish quyidagi bosqichlarda amalga oshiriladi:

1. **Muammoni aniqlash va maqsad qo‘yish**;
2. **Axborot to‘plash va tahlil qilish**;
3. **Alternativ variantlarni ishlab chiqish**;
4. **Relevant axborotlarni tanlash**;
5. **Variantlarni baholash va eng maqbulini tanlash**;
6. **Qarorni amalga oshirish va natijalarni nazorat qilish**.

Bu jarayonning har bir bosqichida axborotning sifati, ishonchliligi va dolzarbligi muhim ahamiyatga ega.

2. Relevant axborot tushunchasi va uning mezonlari

Relevant axborot — bu muayyan qaror uchun dolzarb, ta’sirli va farqli natija beruvchi ma’lumotlardir.

Masalan, korxona “A” yoki “B” mahsulotni ishlab chiqarish haqida qaror qabul qilayotganda, o‘zgaruvchi xarajatlar, narx, sotuv hajmi kabi omillar relevant bo‘ladi.

Biroq o‘zgarmas xarajatlar (ijara, boshqaruv ish haqi va boshqalar) bu qarorda relevan emas, chunki ular variantlardan qat’i nazar o‘zgarmaydi.

Relevant axborot quyidagi mezonlarga javob berishi kerak:

- **Dolzarb bo‘lishi** — hozirgi qaror uchun ahamiyatga ega bo‘lishi;
- **Ta’sirli bo‘lishi** — qaror natijasini o‘zgartira olishi;
- **Farqlovchi bo‘lishi** — alternativ variantlar o‘rtasidagi farqni ko‘rsatishi;
- **O‘lchovli bo‘lishi** — miqdoriy yoki pul shaklida ifodalanishi.

3. Qaror qabul qilishda relevant axborot turlari

Boshqaruv hisobi tizimida qarorlar uchun quyidagi turdagi axborotlar tayyorlanadi

1-jadval

Axborot turi	Qo‘llanish sohasi
O‘zgaruvchi va o‘zgarmas xarajatlar haqida ma’lumot	Mahsulot ishlab chiqarish hajmini rejalashtirishda
Chegaraviy (marjinal) daromadlar	Narx siyosatini belgilashda
Investitsiya rentabelligi haqidagi ma’lumotlar	Uzoq muddatli loyihalarda
Xarajatlar differensiali	Alternativ ishlab chiqarish variantlarini tanlashda
Tannarx va foyda prognozlari	Bozor strategiyasini shakllantirishda

4. Relevant axborotlar asosida qarorlar qabul qilish yondashuvlari

4.1. “Qabul qilish yoki sotib olish” qarorlari

Korxona mahsulotni o‘zi ishlab chiqarsinmi yoki tashqi yetkazib beruvchidan sotib olsinmi — bu qaror o‘zgaruvchi xarajatlar va sotib olish narxiga bog‘liq. Masalan, agar ishlab chiqarish tannarxi sotib olish narxidan past bo‘lsa, ishlab chiqarish maqsadga muvofiq bo‘ladi.

4.2. “Ishlab chiqarishni davom ettirish yoki to‘xtatish” qarori

Agar korxona ayrim mahsulotlar bo‘yicha zarar ko‘rayotgan bo‘lsa, bu ishlab chiqarishni to‘xtatish kerak degani emas. Qaror faqat relevant xarajatlar — ya’ni o‘zgaruvchi xarajatlar va yo‘qotiladigan daromadlar asosida qabul qilinadi.

4.3. “Resurslar chegaralangan sharoitda tanlov”

Cheklangan xomashyo, vaqt yoki quvvat mavjud bo‘lsa, eng ko‘p foyda keltiruvchi mahsulotni tanlash kerak bo‘ladi. Bu holatda chegaraviy foyda (marjinal foyda) asosiy mezon sifatida olinadi.

4.4. “Investitsiya loyihalarini tanlash”

Bu yondashuvda sof joriy qiymat (NPV), ichki rentabellik darajasi (IRR) va diskontlangan naqd oqimlar asosida qaror qabul qilinadi. Barcha hisob-kitoblar relevant, ya’ni faqat loyiha bilan bevosita bog‘liq bo‘lgan axborotga asoslanadi.

5. Qarorlar qabul qilishda vaqt omilining o‘rni

Relevant axborot faqat muayyan vaqt davrida dolzarb bo‘ladi. Bozor sharoitining o‘zgarishi, inflyatsiya, texnologik yangiliklar yoki narxlarning o‘zgarishi bilan bu axborotning qiymati pasayadi. Shu bois, boshqaruv hisobi tizimi doimiy ravishda yangilangan, tezkor va haqiqiy ma’lumotlar bazasini ta’minlashi kerak.

Xulosa: Qaror qabul qilishda relevant axborotlardan foydalanish — bu nafaqat buxgalteriya ma’lumotlarini tahlil qilish, balki ularni iqtisodiy qarorlar uchun strategik asosga aylantirish demakdir.

Relevanlik tamoyili boshqaruv hisobining markaziy g‘oyasi bo‘lib, u quyidagi natijalarga erishish imkonini beradi:

- resurslardan oqilona foydalanish;
- alternativ variantlar orasidan eng samaralisini tanlash;
- foydani maksimal darajada oshirish;
- boshqaruv tizimining tahliliy va bashoriy salohiyatini kuchaytirish.

Shunday qilib, korxonada relevant axborotlarni to‘plash va tahlil qilishni yo‘lga qo‘yish — zamonaviy boshqaruvning ajralmas sharti va muvaffaqiyat garovidir.

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USTAMA ISHLAB CHIQARISH XARAJATLARINI TAQSIMLASHNING MAQSADI, ASOSIY MEZONLARI VA YONDASHUVLARI

Annotatsiya: *Maqolada ustama ishlab chiqarish xarajatlarini taqsimlash jarayonining iqtisodiy mazmuni, uning asosiy maqsadi hamda taqsimotda qo‘llaniladigan mezon va yondashuvlar yoritilgan. Ishlab chiqarish jarayonida bevosita mahsulotga bog‘lanmagan, biroq umumiy ishlab chiqarish faoliyatini ta’minlovchi xarajatlarni adolatli taqsimlash korxonaning moliyaviy natijalariga bevosita ta’sir ko‘rsatadi. Shuningdek, maqolada ustama xarajatlarni aniq va oqilona taqsimlashda qo‘llaniladigan zamonaviy usullar, avtomatlashtirilgan tizimlar imkoniyatlari va xalqaro amaliyotdagi yondashuvlar tahlil qilingan.*

Kalit so‘zlar: *Ustama xarajatlar, taqsimlash mezonlari, ishlab chiqarish hisobi, tannarx, boshqaruv hisobi, xarajatlar obyekti, resurslardan foydalanish, normativ koeffitsiyent, faoliyatga asoslangan hisob.*

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THE PURPOSE, MAIN CRITERIA, AND APPROACHES OF ALLOCATING OVERHEAD PRODUCTION COSTS

Annotation: *This article explores the economic essence of allocating overhead production costs, its primary objectives, and the criteria and approaches used in the allocation process. In production activities, expenses that are not directly linked to a specific product but ensure overall operational performance must be distributed fairly, as they directly influence the financial results of the enterprise. The article also examines modern methods used for accurate and rational allocation of overhead costs, the capabilities of automated systems, and international approaches in this field.*

Key words: *Overhead costs, allocation criteria, production accounting, cost price, management accounting, cost object, resource utilization, standard coefficient, activity-based costing.*

Kirish: Ishlab chiqarish jarayonida xarajatlarni to‘g‘ri hisobga olish va ularni mahsulot tannarxiga asosli taqsimlash buxgalteriya hisobi va boshqaruv hisobi tizimining eng muhim bo‘g‘inidir. Bevosita material va mehnat xarajatlari ma’lum buyurtma yoki mahsulotga aniq bog‘lanadi. Biroq ishlab chiqarish binosini yoritish, jihozlarni ta’mirlash, boshqaruv xodimlari ish haqi kabi xarajatlarni to‘g‘ridan to‘g‘ri aniqlash qiyin. Ana shunday xarajatlar **ustama (umumishlab chiqarish) xarajatlar** deb yuritiladi. Ularning asosiy xususiyati — bu xarajatlar **ko‘p turdagi mahsulotlar yoki buyurtmalar bilan bog‘liq bo‘lishi** va ularni umumiy mezon asosida taqsimlash zaruratidir. Shu sababli, ustama xarajatlarni to‘g‘ri taqsimlash korxonaning mahsulot tannarxini aniqlash, foydalilik darajasini baholash va boshqaruv qarorlarini asoslashda hal qiluvchi ahamiyatga ega.

1. Ustama xarajatlarni taqsimlashning maqsadi

Ustama ishlab chiqarish xarajatlarini taqsimlashdan ko‘zlangan asosiy maqsad — har bir mahsulot, xizmat yoki buyurtmaga **ularga to‘g‘ri keladigan ulushdagi umumiy xarajatlarni adolatli biriktirish**dir.

Bu orqali:

- mahsulotning **haqiqiy tannarxi** aniqlanadi;
- **narx siyosati** asoslanadi;
- **resurslardan foydalanish samaradorligi** baholanadi;
- **boshqaruv qarorlari** (rentabellik, ishlab chiqarish hajmini rejalashtirish va h.k.) uchun ishonchli axborot shakllanadi.

Ustama xarajatlarni taqsimlashning asosiy mezonlari

1-jadval

T/r	Taqsimot mezoni	Qo‘llanilish sohasi
1	Ishchilarning mehnat haqi summasi	Mehnat sarfi ustun bo‘lgan ishlab chiqarishlarda
2	Ishlab chiqarish vaqt soati	Mexanizatsiya darajasi yuqori bo‘lgan korxonalarda
3	Asosiy materiallar qiymati	Material sarfi ko‘p bo‘lgan tarmoqlarda
4	Ishlab chiqarish maydoni	Energiya, yoritish, bino xarajatlarini taqsimlashda
5	Mashina-soat (uskunalar ishlash vaqti)	Avtomatlashtirilgan ishlab chiqarishlarda
6	Tayyor mahsulot hajmi yoki soni	Ommaviy ishlab chiqarish tarmoqlarida

Mezon tanlovi korxonaning ishlab chiqarish turi, texnologiyasi va xarajatlarning tuzilmasiga qarab belgilanadi.

3. Ustama xarajatlarni taqsilash yondashuvlari

3.1. An’anaviy yondashuv

Bu usulda ustama xarajatlar oldindan belgilangan normativ stavka asosida taqsimlanadi.

Masalan:

Taqsimlash stavkasi = (Umumishlab chiqarish xarajatlari / Mehnat haqi summasi) × 100%.

Ushbu stavka keyinchalik har bir buyurtma yoki mahsulotga nisbatan qo‘llanadi. Bu yondashuv sodda, ammo aniqligi past bo‘lishi mumkin.

3.2. Faoliyatga asoslangan hisob (ABC – Activity-Based Costing)

Bu zamonaviy yondashuvda xarajatlar **faoliyat turlari** orqali taqsimlanadi. Ya’ni ustama xarajatlar to‘g‘ridan to‘g‘ri mahsulotga emas, balki uni ishlab chiqarish jarayonidagi faoliyatlarga biriktiriladi.
Keyin esa bu faoliyatlarning har biri tegishli mahsulotlarga taqsimlanadi. Natijada:

- tannarx aniqligi oshadi,
- keraksiz xarajatlar aniqlanadi,
- samarali boshqaruv qarorlarini qabul qilish osonlashadi.

3.3. Normativ koeffitsiyentlar asosida yondashuv

Bu usulda korxona o‘zining ishlab chiqarish quvvatidan kelib chiqib, normativ koeffitsiyentlarni belgilaydi. Har bir mahsulot turi uchun oldindan hisoblangan koeffitsiyent asosida ustama xarajatlar taqsimlanadi.

3.4. Avtomatlashtirilgan hisob yondashuvi

Zamonaviy korxonalarda “1C: Buxgalteriya”, “SAP”, “Oracle Financials” kabi tizimlar yordamida ustama xarajatlarni avtomatik tarzda taqsimlash yo‘lga qo‘yilgan.
Bu yondashuv inson omilini kamaytiradi, aniqlikni oshiradi va tezkor tahlil imkonini beradi.

4. Taqsimlash natijalarining tahliliy ahamiyati

Ustama xarajatlarning to‘g‘ri taqsimlanishi quyidagi imkoniyatlarni yaratadi:

- Mahsulot tannarxining o‘sish yoki kamayish sabablarini aniqlash;
- Resurslardan foydalanish samaradorligini baholash;
- Ishlab chiqarishdagi isrofgarchilik va ortiqcha xarajatlarni aniqlash;
- Narx belgilash va rentabellikni tahlil qilishda asosli ma’lumot taqdim etish.

Aksincha, noto‘g‘ri taqsimlangan ustama xarajatlar mahsulot tannarxini buzib ko‘rsatadi, foydani noto‘g‘ri hisoblashga va noto‘g‘ri boshqaruv qarorlariga olib keladi.

Xulosa: Ustama ishlab chiqarish xarajatlarini taqsimlash buxgalteriya hisobining eng muhim, ammo murakkab yo‘nalishlaridan biridir.
To‘g‘ri tanlangan taqsimot mezoni va zamonaviy yondashuvlar korxonada:

- mahsulot tannarxini adolatli shakllantirishni,
- moliyaviy natijalarni ishonchli aniqlashni,
- boshqaruv qarorlarini asoslashni ta’minlaydi.

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IQTISODIY ISLOHOTLAR VA RAQAMLI TEXNOLOGIYALAR ASOSIDA IQTISODIY SAMARADORLIKNI OSHIRISH

Annotatsiya: *mazkur maqolada O'zbekistonda iqtisodiyotni raqamlashtirish sohasida amalga oshirilayotgang isloxotlarning iqtisodiy samaradorligi yoritib berilgan. Raqamli iqtisodiyot alohida faoliyat turini emas, balki ishbilarmonlik, sanoat ob'ektlari, xizmatlarda axborot texnologiyalaridan faol foydalanishni anglatadi. Raqamli iqtisodiyot raqamli texnologiyalarga asoslangan, elektron biznes, elektron tijorat bilan bog'langan, raqamli tovar va xizmatlar ishlab chiqarayotgan va taqdim etayotgan iqtisodiy faoliyatdir.*

Kalit so'zlar : *servis, strategiya, segment drayveri internet-banking, xufyona iqtisodiyot, innovatsion g'oyalar, texnologiyalar, trakzaktsion sektor, "axborotlashgan jamiyat"*

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INCREASING ECONOMIC EFFICIENCY THROUGH ECONOMIC REFORMS AND DIGITAL TECHNOLOGIES

Abstract: *This article highlights the economic effectiveness of the reforms being implemented in the field of digitalization of the economy in Uzbekistan. The digital economy is not a separate type of activity, but the active use of information technologies in business, industrial facilities, and services. The digital economy is an economic activity based on digital technologies, associated with e-business, e-commerce, and producing and providing digital goods and services.*

Keywords: *service, strategy, segment driver internet banking, hidden economy, innovative ideas, technologies, transactional sector, "information society"*

Kirish qismi: Rivojlangan davlatlarda raqamli iqtisodiyotni joriy etishga allaqachon kirishilgan. Jahon iqtisodiyotining globallashuvi va texnologiyalarning rivojlanishi sharoitida

O'zbekistonning iqtisodiy taraqqiyotiga raqamli iqtisodiyotni rivojlantirmasdan erishib bo'lmaydi. Bugun jadallik bilan kechayotgan raqamlashuv jarayoni "yangi iqtisodiyot"ni vujudga keltirdi. Kam o'rganilgan va kun sayin

chuqur tomir otib borayotgan bu bozor segmenti ishlab chiqaruvchilarga biznesda samarali marketing kampaniyalari uyushtirish, minimal xarajat qilib, maksimal foyda olish, Tovar va xizmatlarni muvaffaqiyatli sotishning optimal usullarini taqdim etadi. Iste'molchi, xaridor va mijozlarga sifatli xizmat, qulaylik yaratiladi. Bu vaqtingiz tig'iz paytida Internet orqali tushlikka buyurtma berish, mobil ilova orqali taksi chaqirish, uzoqdagi yaqiningizga pul jo'natishdan ko'ra kengroq imkoniyatlar bo'lib, transchegaraviy biznes hamkorlik, elektron tijoriy maydon, masofaviy ofis kabilarni ham qamrab oladi. Prezidentimiz Sh.M.Mirziyoyev takidlaganidek: “Biz taqdim etayotgan strategiyada yuqori texnologiyalarga asoslangan, innovatsion va raqamli iktisodiyotga ustuvor ahamiyat beriladi. Insoniyat tarixida tosh asri toshlar tugaganligi uchun emas,balki yangi texnologiyalar kirib kelgani natijasida barham topgan. Bugunga qadar insoniyat uchta sanoat inqilobini boshdan kechirdi. Hozirgi davrimiz dunyoning yetakchi mamlakatlari “Turtinchi sanoat inqilobi”, “Aqlli iqtisodiyot”, “Innovatsion iqtisodiyot”ga o'tayotgani bilan xarakterlanadi. Yangi asrda raqamli texnologiyalarga asoslangan, elektron biznes va elektron tijoratni nazarda tutuvchi raqamli iqtisodiyotning shakllanishi tendentsiyaviy tus oldi. Jahonning yetakchi mamlakatlarida raqamli iktisodiyot yalpi ichki mahsulotning 4-5 foizini ta'minlamoqda, jahondagi savdo aloqalarining 15 foizdan kuprogi uning hissasiga to'gri kelmoqda. Bugungi kunda raqamli iqtisodiyot elektron savdo va servis bilan cheklanmasdan ta'lim, sog'liqni saqlash kabi sohalarni ham qamrab olmoqda. Fuqarolarga turli xizmatlar ko'rsatish amaliyoti ham elektron hukumat platformasiga o'tkazilmoqda. Pandemiya raqamlashtirish jarayonini yanada tezlashtirdi. Axborot texnologiyalari iqtisodiy yunalishning tom ma'nodagi “drayveri”ga aylanib bormoqda. “ Raqamli iqtisodiyot raqamli texnologiyalarga asoslangan, elektron biznes, elektron tijorat bilan bog'langan, raqamli tovar va xizmatlar ishlab chiqarayotgan va taqdim etayotgan iqtisodiy faoliyatdir.

Asosiy qism: Raqamli iqtisodiyot alohida faoliyat turini emas, balki ishbilarmonlik, sanoat ob'ektlari, xizmatlarda axborot texnologiyalaridan faol foydalanishni anglatadi. Agar oddiy iqtisodiyotda moddiy buyumlar asosiy resurs hisoblansa, raqamli iqtisodiyotda bu qayta ishlanadigan hamda uzatiladigan axborot, ma'lumotlar bo'ladi.Raqamli iqtisodiyot yirik sanoat ob'ektlari ish samaradorligini oshirish, ishlab chiqarishda o'sish, faoliyat shaffofligini ta'minlash, mahsulot tannarxini kamaytirish imkonini beradi. Davlat o'z fuqarolari uchun elektron xizmatlar ko'rsatishi va elektron mahsulotlarni taklif etishi — bu raqamli iqtisodiyotning asosiy qismi hisoblanadi. Mamlakatimizda ushbu sohani keng rivojlantirish korruptsiya illatiga barham beradi. O'zbekistonda “Raqamli O'zbekiston-2030” dasturini ishlab chiqilishi va hayotga tatbiq etilishi, eng avvalo, puxta va mukammal tashkiliy-huquqiy mexanizmlarni shakllantirish, qolaversa, innovatsion g'oyalar, texnologiyalar va ishlanmalarni joriy etish bo'yicha davlat organlari va tadbirkorlik sub'ektlarining uzviy hamkorligini ta'minlash, barcha soha va tarmoqlarda ishlab chiqarish va xizmat ko'rsatishni raqamli texnologiyalar bilan qamrab olish, bu borada zamonaviy bilimlarni chuqur egallagan, intellektual salohiyatli kadrlarni yetishtirish, shu orqali, mamlakatda “axborotlashgan jamiyat”

muhitini yaratishga xizmat qiladi. Mamlakatimizda 2020 yildan boshlab transport, geologiya, ta'lim, arxiv kabi sohalarni to'liq raqamlashtirilib, bu boradagi ishlar jadal olib borilmoqda. Aholi va tadbirkorlik sub'ektlarining davlat organlari bilan kontaktsiz aloqa shakllarini yanada rivojlantirish maqsadida Yagona interaktiv davlat xizmatlari portalining yangi versiyasi ishga tushirilgani raqamli iqtisodiyot rivoji yo'ldagi muhim qadamlardir.Normativ-huquqiy hujjatlar loyihalarini barcha manfaatdor vazirliklar, idoralar, mahalliy ijro etuvchi hokimiyat organlariga ko'rib chiqish, elektron raqamli imzodan foydalangan holda kelishish (viza qo'yish) uchun, shu jumladan bir vaqtning o'zida keng jamoatchilik va mutaxassislar muhokamasini o'tkazish va tezkor jo'natish uchun vaqtni va mehnat resurslarini sezilarli darajada tejash maqsadida yagona elektron tizimi “project.gov.uz” joriy etilgani ham quvonarli. “Raqamli tengsizlik tengsizliklarning doyasi” bo'lib turgan bir paytda iqtisodiyotning barcha sohalarini raqamlashtirish jahon hamjamiyatiga integratsiyalashuv, dunyo bozorida o'z o'rniga ega bo'lish, iqtisodiy ravnaq topish, aholiga qulayliklar yaratishning asosiy shartidir. Quvonarlisi, bu mamlakatimizda asosiy kun tartibidagi masala. Raqamlashtirish borasida O'zbekiston dadil odimlar bilan ildamlamoqda. “Jahon bozoridagi raqobatdoshligini yanada oshirish, uning soha va tarmoqlarini modernizatsiya va diversifikatsiya qilish, eksport salohiyatini kengaytirish, tadbirkorlikni rivojlantirish, investitsiyaviy faollikni kuchaytirish orqaligina istiqbolli dasturlarimizni samarali amalga oshirish mumkin.

Quyidagilar bunda ijtimoiy va iqtisodiy taraqqiyot yo'liga bosqichma-bosqich chiqish uchun asosiy shart va omillar sifatida ko'rsatilmoqda:

axborotlashtirish va davlat boshqaruvi organlari hamda munitsipal xizmatlarni integratsiyalash hisobiga elektron hukumat va raqamli shahar kontseptsiyalarini tatbiq etish;

• yangi texnologik avloddagi mahsulotlarni yalpi ishlab chiqarish (pilotsiz avtomobillar va boshqalar singari);

• o'ziga xos bezak va qurilish materiallari yordamida «aqlli» va ekologik uylarni barpo etishga oid g'oyalarni amalga oshirish;

• autsorsing, o'zini band etish va boshqalar orqali bandlikning muqobil shakllarini keng targ'ib qilish;

• muayyan vazifalarni bajarish uchun ishchi-frilanserlarni izlashga xizmat qiladigan professional tarmoqlarni yaratish.

• Yuqoridagilar barchasi biznesga ishlab chiqarish va boshqaruvda tovar va elektron xizmatlar integratsiyalanadigan zamonaviy platformalar yordamida xarajatlarni qisqartirishga imkoniyat beradi.

Raqamli sektorning iqtisodiy ahamiyati: Ta'kidlanishicha, raqamli texnologiyalar iqtisodiyotga bog'liq 50 foizdan ortiq sohalarni keskin o'zgartirib yuboradi. Ushbu qarash axborot texnologiyalari va raqamli platformalar biznes modellarni keskin o'zgartirib, ularning samaradorligini vositachilarni bartaraf etishi va jarayonlarni optimallashtirishiga asoslangan. Ko'pincha IT sohasining rivojiga qo'shilgan hissa iqtisodiyotning rivojlanishi, yangi ish o'rinlarining yaratilishi, odamlar va biznes uchun yangi turdagi xizmatlarning paydo bo'lishi, elektron hukumat loyihalari doirasida xarajatlarining qisqarishiga zamin yaratadi. Shu bilan

bir vaqtda, axborot texnologiyalarini tatbiq etishdan hosil bo'lgan umumiy effekt kutilganidan samarasizroq bo'lib chiqadi va bir xil tartibda taqsimlanmaydi. Bu kabi investitsiyalardan maksimal natija olish uchun texnologiyalarning Jahon banki tayyorlagan ma'ruzasida «analog to'ldiruvchilar» deb nomlangan boshqa omillar bilano'zaro ta'sirini yaxshi tushunish talab etiladi.

Ular qatorida:

• faol ishbilarmonlik muhitini qo'llab-quvvatlaydigan hamda biznes va insonlarga raqamli iqtisodiyot texnologiyalaridan raqobat va innovatsiyalar, xarajatlarni qisqartirish, shuningdek, turmush farovonligini oshirish uchun foydalanishga imkon beradigan normativ-huquqiy baza;

• biznes menejmenti va davlat xizmatchilarida axborot texnologiyalarini qo'llashga doir to'laqonli ko'nikmalar;

• axborot texnologiyalaridan foydalanish yo'nalishida konsalting xizmatlarini ko'rsatadigan institutlar (davlat va xususiy) o'rin olgan.

Raqamli iqtisodiyot hosil qiladigan effektlarni to'liq sanab o'tish ancha murakkab ish, binobarin, elektron servislar va metama'lumotlardan foydalanish imkoniyati iqtisodiy ob'ektlarga taqdim etadigan aloqalarni to'laqonli tarzda baholash ancha mushkuldir.

Xulosa : Raqamlashtirish – yangi iqtisodiy texnologiyalarning yo'ldoshi Axborot platformalarini birlashtirish natijasida paydo bo'lgan muloqot modellari yangi iqtisodiy texnologiyalarning (YaIT) paydo bo'lishiga turtki beradi.YaIT – bu tashkiliy boshqaruv tizimlariga biror maqsadga xizmat qiladigan axborot (ma'lumotlar, g'oyalar va bilimlar) mahsulotlarini yaratish, ularni uzatish, saqlash va aks ettirish uchun yaxlit texnologik platformaga birlashuvchi va iqtisodiy agentlar muloqotiga sarflanadigan trakzaktsion xarajatlarni maksimal darajada kamaytiruvchi ma'lumotlarni qayta ishlashga doir har jihatdan yangi «sozlanuvchi» vositalar va metodlar yig'indisidir. YaITning asosiy tamoyillari:

• tubdan yangi biznes modellarni yaratish;

• har xil IT xizmatlarni oqilona birlashtirish va ulardan foydalanish metodlarini

real iqtisodiyot sektoridagi tashkiliy va texnologik jarayonlarda qo'llash;

• tranzaktsion xarajatlar va ishlab chiqarishda qo'llaniladigan moddiy resurslarni

minimallashtirish.

Raqamli iqtisodiyotni rivojlantirishdagi eng muhim jihat va bir vaqtning o'zida eng murakkab bosqich – bu ishbilarmonlik muhitini soddalashtirish hamda odamlar va biznesning davlat bilan muloqotiga sarflanajak xarajatlarni maksimal qisqartirishdir.

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RAQAMLI TEXNOLOGIYALAR ASOSIDA TADBIRKORLIKNI RIVOJLANTIRISH

Annotatsiya. *Ushbu maqolada raqamli texnologiyalarning zamonaviy tadbirkorlik faoliyatidagi o‘rni va ahamiyati yoritilgan. Raqamli iqtisodiyot sharoitida biznes jarayonlarini avtomatlashtirish, elektron tijoratni rivojlantirish imkoniyatlari tahlil qilingan. Shuningdek, O‘zbekistonda raqamli tadbirkorlikni rivojlantirish bo‘yicha davlat siyosatining huquqiy va institutsional asoslari ko‘rib chiqilgan. Tadqiqot natijasida raqamli tadbirkorlikni samarali tashkil etish uchun kadrlar salohiyatini oshirish, infratuzilmani yaxshilash va kiberxavfsizlikni ta’minlash bo‘yicha tavsiyalar berilgan. Maqola raqamli iqtisodiyot sharoitida tadbirkorlikning yangi imkoniyatlarini ochib beradi.*

Kalit so‘zlar: *raqamli iqtisodiyot, raqamli tadbirkorlik, innovatsiya, elektron tijorat, axborot texnologiyalari, sun’iy intellekt, raqamli savodxonlik.*

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DEVELOPMENT OF ENTREPRENEURSHIP BASED ON DIGITAL TECHNOLOGIES

Abstract. *This article discusses the role and importance of digital technologies in modern business activities. The possibilities of automating business processes and developing e-commerce in the digital economy are analyzed. The legal and institutional framework of state policy on the development of digital entrepreneurship in Uzbekistan is also considered. As a result of the study, recommendations are made on increasing human resources capacity, improving infrastructure, and ensuring cybersecurity for the effective organization of digital entrepreneurship. The article reveals new opportunities for entrepreneurship in the digital economy.*

Key words: *digital economy, digital entrepreneurship, innovation, e-commerce, information technology, artificial intelligence, digital literacy.*

Kirish. Hozirgi global raqamlashuv davrida iqtisodiyotning barcha sohalarida raqamli texnologiyalarni joriy etish nafaqat samaradorlikni oshirish, balki yangi ishlab chiqarish va xizmat ko‘rsatish yo‘nalishlarini yaratishga ham

zamin yaratmoqda. Tadbirkorlik sohasi ham raqamli iqtisodiyot sharoitida tubdan yangilanmoqda. Bugungi kunda raqamli biznes modellar, onlayn savdo tizimlari, sun'iy intellekt va blokcheyn kabi texnologiyalar tadbirkorlik faoliyatining ajralmas qismiga aylanib bormoqda.

1. Raqamli texnologiyalarning tadbirkorlikdagi o'rni.

Raqamli texnologiyalar — bu axborotni to'plash, qayta ishlash va etkazishni avtomatlashtiruvchi zamonaviy vositalar tizimidir. Ular tadbirkorlikda quyidagi imkoniyatlarni yaratadi:

- ish jarayonlarini avtomatlashtirish va xarajatlarni qisqartirish;
- klientlar bilan onlayn muloqotni yo'lga qo'yish;
- bozor tahlilini tez va aniq amalga oshirish;
- marketing va sotuvni raqamli kanallar orqali kengaytirish.

Masalan, e-commerce (elektron savdo) platformalari orqali kichik biznes ham xalqaro bozorga chiqish imkoniga ega bo'lmoqda. Shuningdek, CRM (Customer Relationship Management) tizimlari mijozlar bilan munosabatlarni samarali boshqarishga yordam bermoqda.

2. O'zbekistonda raqamli tadbirkorlikni rivojlantirishning huquqiy va institutsional asoslari.

O'zbekiston Respublikasi Prezidentining "Raqamli iqtisodiyotni rivojlantirish chora-tadbirlari to'g'risida"gi farmoni (2020 yil 28 apreldagi PF–4699-son) hamda "Innovatsion rivojlanish strategiyasini amalga oshirish chora-tadbirlari to'g'risida"gi farmoni raqamli tadbirkorlikni jadal rivojlantirishda muhim ahamiyat kasb etdi.

Ushbu hujjatlar doirasida:

- "Yagona interaktiv davlat xizmatlari portali" kengaytirildi;
- "Digital Uzbekistan – 2030" strategiyasi qabul qilindi;
- Raqamli startaplar uchun soliq imtiyozlari va grant dasturlari joriy etildi;
- IT-parklar faoliyati kengaytirildi va yangilari tashkil etildi.

Natijada, mamlakatimizda 2024 yil yakuniga qadar 2500 dan ortiq raqamli startaplar faoliyat boshladi va ularning salmog'i yil sayin ortayotgani kuzatilmoqda.

3. Raqamli tadbirkorlikning afzalliklari.

- bozorga tez kirish imkoni – onlayn marketpleyslar orqali mahsulot va xizmatni qisqa vaqtda sotish;
- tashqi bozorlarga chiqish osonligi – elektron eksport (e-export) orqali mahsulotni jahon bozorida sota olish;
- mijozlarning ehtiyojini aniqlash – Big Data tahlili yordamida bozor tendensiyalarini bashorat qilish;
- sarmoya jalb qilish imkoniyatlari – kraudfanding va fintex tizimlari orqali mablag' yig'ish.

4. Raqamli tadbirkorlikni rivojlantirishdagi muammolar.

Shu bilan birga, raqamli tadbirkorlikni rivojlantirishda qator muammolar ham mavjud:

- internet infratuzilmasining ayrim hududlarda etarli darajada rivojlanmagani;

- kadrlar salohiyatining pastligi, ayniqsa IT sohasida mutaxassislar etishmasligi;

- kiberxavfsizlik masalalarining etarli darajada hal etilmagani;

- aholining raqamli savodxonligi past darajada ekanligi.

Bu muammolarni bartaraf etish uchun davlat va xususiy sektor hamkorligi, ta’lim tizimida raqamli kompetensiyalar bo‘yicha dasturlarni kuchaytirish zarur.

5. Raqamli tadbirkorlikning istiqbollari.

Kelgusida raqamli tadbirkorlikning o‘sish sur’atlari yanada tezlashishi kutilmoqda.

Ayniqsa, quyidagi yo‘nalishlarda katta imkoniyatlar mavjud:

- finTech (moliyaviy texnologiyalar) — raqamli to‘lov tizimlari va elektron bank xizmatlari;

- agroTech — qishloq xo‘jaligida raqamli sensorlar, dronlar va avtomatlashtirilgan sug‘orish tizimlari;

- eduTech — masofaviy ta’lim va onlayn o‘quv platformalari;

- greenTech — ekologik texnologiyalar asosida ish yurituvchi raqamli startaplar.

XULOSA

Raqamli texnologiyalar tadbirkorlikni yangi bosqichga ko‘tarib, iqtisodiyotning raqobatbardoshligini ta’minlamoqda. Ular orqali biznes jarayonlari shaffof, tezkor va samarali bo‘lmoqda.

O‘zbekistonda raqamli tadbirkorlikni rivojlantirish uchun huquqiy asoslar, infratuzilma va kadrlar salohiyatini yanada kuchaytirish zarur. Shu yo‘l bilan milliy iqtisodiyot raqamli transformatsiya jarayonini to‘liq amalga oshirishi mumkin.

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ELEKTRON TA’LIM VOSITALARI ASOSIDA BO‘LAJAK MUHANDISLARNING KASBIY KOMPONENTLIGINI RIVOJLANTIRISH METODIKASI

Annotatsiya: *Maqola zamonaviy ta’lim jarayonida elektron ta’lim vositalarining muhandislik yo‘nalishidagi talabalarning kasbiy komponentligini shakllantirishdagi ahamiyatini o‘rganadi. Tadqiqotda elektron ta’limning pedagogik asoslari, amaliy metodikasi, hamda kasbiy kompetensiyalarni rivojlantirishga qaratilgan innovatsion yondashuvlar ko‘rib chiqilgan. Maqolada metodologik va amaliy tavsiyalar keltirilgan.*

Kalit so‘zlar: *elektron ta’lim, kasbiy kompetensiya, muhandislik ta’limi, metodika, innovatsion texnologiyalar.*

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METHODOLOGY FOR DEVELOPING PROFESSIONAL COMPETENCE OF FUTURE ENGINEERS THROUGH ELECTRONIC LEARNING TOOLS

Abstract: *The article examines the importance of electronic learning tools in the modern educational process in the formation of the professional component of engineering students. The study examined the pedagogical foundations, practical methods of e-learning, as well as innovative approaches to the development of professional competencies. The article presents methodological and practical recommendations.*

Keywords: *e-learning, professional competence, engineering education, methodology, innovative technologies.*

Kirish: Zamonaviy muhandislik ta’limi dunyo tajribasida axborot-kommunikatsiya texnologiyalaridan (AKT) samarali foydalanish orqali rivojlanmoqda. Global iqtisodiyotning raqamlashtirilishi va sanoat sohasidagi innovatsion texnologiyalarning joriy qilinishi muhandislarni nafaqat nazariy bilimga, balki amaliy ko‘nikmalarga ham ega bo‘lishga majbur qilmoqda. Shu bois, bo‘lajak muhandislarning kasbiy komponentligini shakllantirish dolzarb vazifalardan biri sifatida qaraladi. Kasbiy komponentlik – bu muhandisning kasbiy

faoliyatda bilim, ko‘nikma, kompetensiya va shaxsiy fazilatlarini uyg‘unlashtira bilish qobiliyati bo‘lib, u amaliy faoliyatda samarali ishlashning asosiy omilidir [1].

Elektron ta’lim vositalari (e-learning) muhandislik ta’limida nazariy bilimlarni mustahkamlash, amaliy mashg‘ulotlarni simulyatsiya qilish va loyihaviy faoliyatni tashkil etishda muhim vosita sifatida xizmat qiladi. Ular o‘quv jarayonini individualizatsiyalashga imkon beradi, talabalar o‘z tezligida va qulay muhitda bilim olishlari mumkin bo‘ladi. Bundan tashqari, elektron ta’lim interaktiv metodlarni joriy qilgan holda talabalarning ijodiy va analitik fikrlash qobiliyatlarini rivojlantirishga yordam beradi. Masalan, virtual laboratoriyalar va simulyatsion dasturlar orqali murakkab muhandislik jarayonlarini xavfsiz va samarali o‘rganish mumkin bo‘ladi [2].

Shuningdek, elektron ta’lim vositalari kasbiy kompetensiyalarni baholash va monitoring qilish imkonini ham beradi. Testlar, onlayn topshiriqlar va loyiha baholash tizimlari yordamida talabaning nazariy bilimlari, amaliy ko‘nikmalari va muammolarni hal qilish qobiliyati tizimli ravishda o‘lchanadi. Bu esa ta’lim jarayonini sifat jihatdan yaxshilashga, shuningdek, talabalarning kasbiy faoliyatga tayyorligini oshirishga xizmat qiladi.

Shu bilan birga, elektron ta’lim vositalaridan samarali foydalanish o‘qituvchilardan metodik tayyorgarlikni va zamonaviy texnologiyalarni bilishni talab qiladi. Talabalar bilan ishlashda interaktiv o‘quv resurslaridan foydalanish, elektron platformalarda darslar tashkil etish va individual masofaviy vazifalarni berish muhandislik ta’limining sifatini oshirishga yordam beradi.

Ushbu maqolada elektron ta’lim vositalari yordamida bo‘lajak muhandislarning kasbiy komponentligini rivojlantirish metodikasi, metodologik asoslari, amaliy metodlar va samaradorlikni baholash usullari tahlil qilinadi. Tadqiqot muhandislik ta’limida elektron vositalarning pedagogik ahamiyatini, kompetensiyalarni shakllantirishdagi ro‘lini aniqlashga qaratilgan.

Yoshlarni o'qitish, ularga ta'lim-tarbiya berish, kelajak uchun munosib kadrlar qilib tarbiyalash hamma vaqt ham har bir davlatning eng birinchi navbatdagi ishlaridan biri bo'lib kelgan. Bizning mamlakatimizda ham bunday ishlar davlatimiz rahbarlarining doimiy ravishda diqqat markazida turibdi, desak - ayni haqiqatni aytgan bo'lamiz. Prezidentimiz Sh.M.Mirziyoyevning bevosita tashabbusi va rahbarligida qabul qilingan hamda izchil ravishda amalga oshirilayotgan O'zbekiston Respublikasini rivojlantirishning beshta ustuvor yo'nalish bo'yicha Harakatlar strategiyasi respublikamizda rivojlanish taraqqiyotning yangi bosqichini boshlab berdi.Harakatlar strategiyasining to'rtinchi - Ijtimoiy sohani rivojlantirishning ustuvor yo'nalishlaridan biri bo'lgan ta'lim tizimini takomillashtirish masalasiga ham alohida e'tibor qaratilgan.

Davlatimiz rahbarining har bir viloyatga tashrifi doirasida o'tkazilgan yig'ilishlarda, turli uchrashuvlarda so'zlagan ma'ruza va suhbatlarida barkamol avlodni tarbiyalash, yoshlarning sog'lom turmush tarziga amal qilib yashash masalalariga kun tartibidagi dolzarb masala sifatida qaralib kelinmoqda. Prezidentimiz ta'kidlaganidek: "Agar farzandimizga to'g'ri tarbiya bermasak, har kuni, har daqiqada uning yurish-turishi, kayfiyatidan ogoh bo'lib turmasak, ularni

ilmu hunarga o'rgatmasak, munosib ish topib bermasak, bu omonatni boy berib qo'yishimiz hech gap emas."

Jamiyatning barcha sohalarida ro'y berayotgan tub o'zgarishlar yuqori malakali kadrlar tayyorlash uchun samarali texnologiyalarni izlash va ulardan foydalanish zarurligini taqozo etmoqda. Mamlakatning iqtisodiy rivojlanishidagi muvaffaqiyat turli xil maqsadlar uchun muhandis kadrlarni tayyorlash sifati bilan uzviy bog'liqdir. Bunday sharoitlarda faoliyatning kasbiy va boshqa faoliyat sohalarida mutaxassislarni ijodiy shaxs sifatida shakllantirish asosiy vazifa hisoblanadi. Muhandislarning malakasi yangi uskunalar yaratish, zamonaviy

yuqori texnologiyalarni ishlab chiqish, texnik obyektlarni ishlab chiqarish va ekspluatatsiya qilishni optimallashtirish muammolarini ijodiy hal etish qobiliyati bilan tavsiflanadi.

Mamlakatimizda bu ehtiyojlar bir qator holatlar bilan mustahkamlanadi. Insonlarning tez o'zgaradigan sharoitlarda o'z aqliy va kasbiy qobiliyatlarini qo'llashga ko'niktirish bilan bog'liq muammolar majmui belgilangan. Jamiyatni rivojlantirishning an'anaviy mexanizmlarini transformatsiyalash jarayoni davlatning ijtimoiy, madaniy, amaliy siyosatida ustuvor vazifalarga urg'u berish o'zgarganligi bilan bog'liq masalalar doirasini kengaytiradi. Ushbu vaziyatlarg a bog'liq holda ta'lim sifati yetakchi pedagog-olimlarning va butun jamiyatning diqqat markazida turadi.

Yuzaga kelgan vaziyat ko'p jihatdan arxitektura, qurilish, ishlab chiqarish texnologiyasi, va boshqa sohalar uchun yuqori malakali, kompententli mutaxassislarni tayyorlash masalasida yangicha talablarni qo'ydi. Oliy ta'lim tizimining yaxlitligini ilmiy asoslash talab etiladi, o'quv jarayonini tashkil etishning turli shakllarini optimallashtirish, bo'lajak mutaxassislarning kasbi bo'yicha kompetentligini baholash mezonlarini ishlab chiqish masalalarining muhimligi ortadi. O'zgaruvchan jamiyat, iqtisodiy rivojlanishning zamonaviy tendensiyalari mutaxassisning kasbiy fazilatlari sohasiga yangi talablarni ilgari suradi.O'qitish jarayonining shakllari va texnologiyalari o'zgarishiga, quruvchi muhandislar tayyorlash sifatini baholash mezonlariga bog'liq bo'lgan ta'lim faoliyatining texnologiyalarini o'quv faoliyatini tashkillashtirishning metodlari bilan transformatsiyasi pedagog-tadqiqotchilar faoliyati uchun keng imkoniyatlar taqdim etadi va mamlakatimizda bo'lajak quruvchi muhandislarning kasbiy kompententlik faoliyatiga jahon amaliyotida qabul qilingan yondashuvni bosqichma-bosqich tadbiq etishni shakllantiradi. O'qitish jarayonida talabalarni bo'lajak quruvchi muhandislarning kasbiy kompententlik faoliyati asosini birlashtiradigan va tashkil etadigan narsalarga yo'naltirishni nazarda tutadi. Jamiyatning bunday tartibi oliy o'quv yurtida o'qish davrida bo'lajak quruvchi muhandislarning kasbiy kompententligini rivojlanishidagi asosiy o'zgarishlarni aniqlash uchun pedagogik tadqiqotlar o'tkazishni taqozo etdi. Oliy o'quv yurtidagi umummuhandislik tayyorgarligi ushbu muammolarni hal qilishga yordam beradi.

Oliy ta'lim tizimida bo'lajak quruvchi muhandislarning professional tayyorgarligi masalalari U.N.Nishonaliyev, A.A.Abduqodirov, A.R.Xodjaboyev,

R. Xasanov, N.Saidaxmedov, Q.O'.Tolipov, S.S.Bulatov kabi olimlarning ilmiy tadqiqotlar olib borishgan.[3]

O'qitish amaliyotini optimallashtirish chizma tayyorgarlik jarayonida ijodiy fikrlashni rivojlantirish muammolariga G.A.Ivashenko, S.A.Frolova, N.F. Chetveruxin, A.A.Chekmarev, V.I.Yakunin va boshqalarning asarlari bag'ishlangan.

Ammo chizma geometriya; muhandislik grafikasi, loyihalash asoslari, muxandislik va kompyuter grafikasi va boshqa geometrik-grafik fanlarni o'rganish muammolari bo'lajak kasbiy faoliyat xususiyatlarini hisobga olgan holda umumiy fanlarga o'qitish bilan bog'liqlikda yetarlicha tahlil etilmagan. Shuni ta'kidlash kerakki, o'zida o'quv jarayonining tashkiliy - pedagogik, metodik va texnologik asoslarni jamlagan grafik fanlarini o'zlashtirish bosqichida kasbga loyiqligi darajasini baholashning miqdoriy va sifat mezonlari hali ishlab chiqilmagan.[4]

Yuqoridagi fikrlar bizni bo'lajak quruvchi muhandis tayyorgarligining kasbiy kompententlik sifatiga talab yuqori bo'lgan sharoitda alohida dolzarblik kasb etadigan oliy o'quv yurtlari talabalari umummuhandislik- grafik tayyorgarligining tizimining samaradorligini nazariy asoslanishi va eksperimental tekshirilishi zarurligiga undaydi.

Quruvchi muhandislarning grafik tayyorgarligi amaliy tajribasini umumlashtirishi va ilmiy-uslubiy ishlarning tahlili yuqori malakali bo'lajak mutaxassislarning grafik tayyorgarligi jarayonida quyidagi kamchiliklar va ziddiyatlarni aniqlashga imkon berdi.

- quruvchi muhandislar va ishlab chiqarish texnologiyalari ta'limi sohasida kasbiy ko'nikmalarni shakllantirishning yaxlit uslubiy nazariyasi mavjud emas;

- kurs ishlari va bitiruv ishlarini bajarishda grafik bilimlaridan foydalanishning yuqori darajasini ta'minlash uchun kompyuter texnologiyalaridan foydalanish hali ham kamligi;

- yosh quruvchi muhandislarni tayyorlashda amaliy, loyihaviy va ishlab chiqarish faoliyatiga moslashtirish jarayonida grafik tayyorgarlik muammolari tahlil etilmaydi.

Bo'lajak quruvchi muhandislarning oliy ta'lim muassasasida o'qib yurgan davrida kasbiy kompententligi darajasi eng muhim xususiyati grafik tayyorgarligining sifati hisoblanadi. Qurilish yo'nalishiga asoslangan Oliy ta'lim tizimida arxitektura va loyixalash asoslari fanini o'qitish jarayonida kasbiy kompetentligini takomilashtirishning yangi ilmiy asoslangan shakllarini ishlab chiqish o'qitish tizimidagi maqsad, tuzilish va bog'liqliklarni tahlil etishga asoslangan. So'nggi paytlarda o'qitish tizimida quyidagi kamchiliklar paydo bo'lmoqda:

-ma'lumotlar ba'zasining kamligi;

-o'rganish uchun ajratilgan kompyuter texnologiylarning zamonaviy dasturlarda ishlay olmasligi;

-qurilishga oid dasturlar (Auto Cad,Corel Draw, 3D Max) biladigan kadrlarning kamligi;

Quruvchi muhandislarni o'qitishning tuzilishida ta'lim darajasini va yangi metodik usullarni amalga oshirishning yaxlitligi "Arxitekturaviy loyixalash" fani mutaxassislarini tayyorlashning umumiy tizimiga integratsiyalashuviga imkon beradi. Talabalarning intellektual, ijodiy va kognitiv qobiliyatlarini shakllantirish o'quv materiallarining uzluksizligi me'yorlari asosida o'qitishda yetakchi o'rinni egallaydi.

Elektron ta’lim vositalari, jumladan virtual laboratoriyalar, simulyatsiyalar, interaktiv darsliklar va onlayn platformalar muhandislik ta’limida katta ahamiyatga ega. Virtual laboratoriyalar talabalar uchun murakkab texnologik jarayonlarni real muhitda sinab ko‘rishga imkon yaratadi. Masalan, mexanik yoki elektron tizimlarni modellashtirish orqali talabalar nazariy bilimlarini amaliy ko‘nikmaga aylantiradi. Shu bilan birga, interaktiv darsliklar va videodarslar mavzularni osonroq tushunishga yordam beradi, murakkab diagramma va jarayonlarni vizual tarzda taqdim etadi, bu esa talabalar bilimini mustahkamlashga xizmat qiladi.

Shuningdek, elektron ta’lim platformalarining asosiy afzalliklaridan biri — individuallashtirilgan o‘qitish imkoniyati. Har bir talaba o‘z tezligida va qobiliyatiga mos ravishda materialni o‘rganishi, topshiriqlarni bajarishi va natijalarini baholashi mumkin. Masalan, simulatsiya asosidagi muhandislik loyihalari talabalarga mustaqil ish jarayonida tajriba orttirish, xatolarni aniqlash va to‘g‘rilash imkoniyatini beradi. Bu esa kasbiy kompetensiyalarning shakllanishi va mustahkamlanishiga ijobiy ta’sir ko‘rsatadi.

Ta’lim jarayonida elektron vositalardan foydalanish shuningdek, talabalarni muammolarni yechish, kreativ fikrlash va loyiha asosida ishlashga o‘rgatadi. Onlayn forumlar va virtual jamoalar yordamida talabalar bir-birlari bilan tajriba almashadi, muhandislik masalalarini birgalikda yechish ko‘nikmasini rivojlantiradi. Bu esa nafaqat kasbiy, balki kommunikativ va ijtimoiy ko‘nikmalarni ham rivojlantiradi.

Metodik jihatdan elektron ta’lim vositalaridan samarali foydalanish uchun bir nechta tamoyillar mavjud. Birinchidan, interaktivlik — har bir o‘quv materiali talabalar faol ishtirokini rag‘batlantirishi kerak. Ikkinchidan, amaliy yo‘naltirish — nazariy bilimlar doimiy ravishda amaliy mashg‘ulotlar va loyihalarda qo‘llanilishi lozim. Uchinchi tamoyil — individual rivojlanish — har bir talabaning qobiliyatlari va o‘rganish sur’atiga moslashtirilgan o‘quv yo‘nalishlarini taqdim etish.

XULOSA: Xulosa qilib aytganda, elektron ta’lim vositalari bo‘lajak muhandislarning kasbiy komponentligini rivojlantirishda muhim vosita sifatida xizmat qiladi. Virtual laboratoriyalar, simulatsiyalar, interaktiv darsliklar va onlayn platformalar orqali talabalar nafaqat nazariy bilimlarga ega bo‘ladi, balki amaliy ko‘nikmalarni shakllantiradi, kreativ va analitik fikrlash qobiliyatini rivojlantiradi. Shu bilan birga, individuallashtirilgan o‘qitish va jamoaviy ishlash imkoniyatlari talabalarni professional muhitga tayyorlash jarayonini yanada samarali qiladi. Kelajakda muhandislarni raqamli texnologiyalar bilan uyg‘unlashtirilgan holda tayyorlash — ta’lim sifatini oshirish va kasbiy muvaffaqiyatga erishishning muhim omili hisoblanadi.

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OPTIMIZATION OF THERAPEUTIC STRATEGIES THROUGH BIOCHEMICAL PROFILING IN PHARMACORESISTANT FORMS OF EPILEPSY

Abstract: *Drug-resistant forms of epilepsy (DRE) represent a significant clinical problem associated with a high risk of neurocognitive impairment and decreased quality of life for patients. The aim of this study is to optimize therapeutic strategies through biochemical profiling of patients with DRE. The study involved 52 patients diagnosed with drug-resistant forms of epilepsy. Biochemical analysis included assessment of neurotransmitter status, oxidative stress, inflammatory markers, and metabolic indicators. Based on the obtained data, individualized therapeutic approaches were proposed.*

Keywords: *drug-resistant epilepsy, biochemical profiling, therapeutic strategy, neurotransmitters, oxidative stress.*

Introduction. Pharmacoresistant epilepsy is a clinically significant form of epileptic disorder, occurring in approximately 20-30% of patients with epileptic seizures. The main characteristic of FRE is the lack of adequate control of seizure activity when using two or more anti-epileptic drugs (AEP) prescribed in therapeutically optimal doses and regimens. This form of epilepsy is associated with a high frequency of neurocognitive impairments, a decrease in the quality of life of patients, and an increased risk of developing psycho-emotional and behavioral disorders.

Modern research emphasizes that the main pathogenetic mechanisms of FRE are complex biochemical and molecular disorders. Among them, the following are distinguished: imbalance of neurotransmitter systems (mainly glutamatergic and GABAergic), increased levels of oxidative stress with disruption of antioxidant homeostasis, activation of pro-inflammatory cascades and cytokine systems, as well as various metabolic disorders, including dyslipidemia, hyperglycemia, and deficiency of individual amino acids and microelements. Disruptions in these processes can not only contribute to increased convulsive readiness of neural networks but also affect the pharmacodynamics and pharmacokinetics of the AEPs used, significantly limiting the effectiveness of standard therapy.

Due to the multifactorial nature of FRE, modern therapeutic approaches emphasize the need for individualized treatment. One of the most promising tools for personalized therapy is the biochemical profile of patients. This method allows

for the identification of specific pathogenetic disorders in each patient, predicting the response to therapy, and developing optimal schemes for using anticonvulsants. In addition, biochemical analysis contributes to the correction of concomitant metabolic and inflammatory disorders, reduces the risk of side effects, and increases the overall effectiveness of treatment measures. Thus, the integration of biochemical profiling into clinical practice opens up new prospects for optimizing the treatment strategy for pharmacoresistant epilepsy, contributing to the transition from a standard "selective" approach to truly personalized treatment.

Materials and Methods. The study included 52 patients (27 men and 25 women) aged 12 to 55 years with a diagnosis of pharmacoresistant epilepsy in accordance with the criteria of the International League Against Epilepsy (ILAE). All patients underwent a thorough clinical examination, including anamnesis collection, assessment of the frequency and nature of epileptic seizures, and identification of concomitant somatic and neurological diseases.

Complex biochemical profilization was used to assess the pathogenetic mechanisms of pharmacoresistance. It included:

Neurotransmitter status study - determination of glutamate, γ-aminobutyric acid (GBA), dopamine, and serotonin concentrations in blood serum.

Assessment of oxidative stress - measuring the level of malondialdehyde (MDA) and the activity of the antioxidant enzyme superoxide dismutase (SOD).

Analysis of inflammatory markers - determination of the concentration of C-reactive protein (CRP) and interleukin-6 (IL-6).

Metabolic examination - assessment of blood glucose levels, lipid profile, and amino acid composition.

Statistical data processing was carried out using the SPSS 25.0 software. The level $p < 0.05$ was taken as the statistical significance criterion. All results were presented as average values ± standard deviation, and corresponding parametric and non-parametric methods were used to assess correlations and differences.

Table 1. Clinical and Biochemical Characteristics of Patients with Pharmacoresistant Epilepsy (n = 52)

Parameter	Mean ± SD	Range	Notes
Age, years	28.4 ± 9.2	12–55	27 males / 25 females
Duration of disease, years	10.6 ± 6.3	2–30	–
Seizure frequency, per month	7.8 ± 3.5	1–15	–
Number of AEDs used	2.8 ± 0.7	2–4	–
Glutamate, µmol/L	15.2 ± 4.1	9–23	Elevated in 80% of patients
GABA, µmol/L	7.6 ± 2.3	3–12	Decreased in 75% of patients
Dopamine, nmol/L	0.42 ± 0.12	0.25–0.65	–
Serotonin, nmol/L	0.85 ± 0.21	0.5–1.3	–
MDA, nmol/mL	4.9 ± 1.5	2.5–8.0	Elevated in 65% of patients
SOD, U/mL	1.12 ± 0.38	0.6–2.0	–
CRP, mg/L	6.4 ± 3.2	1–15	Elevated in 50% of patients
IL-6, pg/mL	12.3 ± 5.1	4–25	–
Glucose, mmol/L	5.6 ± 1.1	4–8.5	Hyperglycemia in 40% of patients

Total cholesterol, mmol/L	5.2 ± 1.3	3.5–8.0	Dyslipidemia in 40% of patients

Conclusion. The study included 52 patients with pharmacoresistant epilepsy, comprising 27 males and 25 females, aged between 12 and 55 years. The mean age was 28.4 ± 9.2 years, and the mean duration of disease was 10.6 ± 6.3 years. Seizure frequency ranged from 5 to 15 episodes per month, and patients were receiving 2 to 4 antiepileptic drugs (AEDs) at the time of assessment.

Biochemical profiling revealed that 80% of patients exhibited elevated glutamate levels accompanied by decreased GABA concentrations, which correlated with increased seizure frequency. Markers of oxidative stress, including malondialdehyde (MDA) and superoxide dismutase (SOD), were elevated in 65% of patients. Additionally, inflammatory markers, such as interleukin-6 (IL-6) and C-reactive protein (CRP), were increased in 50% of cases. Metabolic abnormalities were observed in 40% of patients, predominantly manifesting as dyslipidemia and hyperglycemia.

Elevated glutamate levels were associated with resistance to valproate therapy, while decreased GABA levels suggested potential benefits from adding GABAergic agents, such as benzodiazepines. The presence of elevated inflammatory markers indicated the need for combined therapy with anti-inflammatory agents and antioxidants.

Biochemical profiling provides valuable insights into the key pathogenic mechanisms underlying pharmacoresistant epilepsy. Individualizing therapy based on biochemical analysis enables:

- Selection of the most appropriate antiepileptic drugs for each patient
- Correction of metabolic and oxidative disturbances
- Reduction in seizure frequency and improvement of patients' quality of life

Comparison of biochemical data with clinical characteristics emphasizes the importance of an integrated approach in the management of pharmacoresistant epilepsy.

Biochemical profiling represents an effective tool for optimizing therapeutic strategies in pharmacoresistant forms of epilepsy. A personalized treatment approach allows for improved therapeutic efficacy while minimizing adverse effects, thereby enhancing overall patient outcomes.

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FINANCIAL TECHNOLOGIES' IMPLEMENTATION METHODS WITHIN THE FRAMEWORK OF BEHAVIORAL AND INNOVATIVE MARKETING USING THE EXAMPLE OF FOREIGN AND DOMESTIC COMPANIES

Annotation: *This article analyzes the application of behavioral and innovative marketing in the fintech sector as a key factor in the successful development of financial technologies. It examines the methods used by both domestic and international companies to increase user engagement, build loyalty, and promote financial services. Particular attention is paid to personalization, gamification, the implementation of artificial intelligence, and the creation of ecosystems through strategic partnerships. Case studies of Paytm (India), Nubank (Brazil), Revolut (UK), M-Pesa (Kenya), Stripe, and Square (USA) illustrate how companies adapt marketing strategies to local conditions or leverage global technological opportunities. The findings highlight the importance of synergy between behavioral insights and innovative marketing for increasing financial inclusion, improving customer experience, and expanding market opportunities in the digital economy.*

Keywords: *Fintech, behavioral marketing, innovative marketing, personalization, gamification, artificial intelligence, blockchain, financial inclusion, digital economy, ecosystems.*

The swift advancement of financial technologies (fintech) has transformed the global financial landscape, providing efficient digital solutions tailored to various consumer demands. A key factor in fintech's success is its capacity to integrate behavioral insights with cutting-edge marketing strategies. This essay seeks to explore the methods used to apply behavioral and innovative marketing by both domestic and international companies, emphasizing the similarities and differences in their approaches. Fintech integrates technological advancements to enhance financial services, including digital payments, blockchain technologies, and artificial intelligence (AI). These innovations aim to resolve issues like inefficiency, limited accessibility, and financial illiteracy for consumers. Behavioral marketing, rooted in consumer psychology, focuses on understanding and shaping customer behavior. By leveraging user data, fintech companies design personalized experiences that foster engagement and customer loyalty. Conversely, innovative

marketing utilizes advanced technologies and creative strategies, such as gamification, influencer collaborations, or ecosystem integration, to attract and retain users. For example, India's Paytm transformed the digital wallet landscape and later expanded into financial services like lending and investments. The company applies behavioral marketing by analyzing transaction data to deliver localized offers. Similarly, the UK-based Revolut uses sophisticated analytics to provide real-time spending insights, empowering users to make smarter financial choices.

Behavioral marketing customizes services to align with individual user preferences, delivering tailored experiences that build trust and loyalty. ***Personalization*** forms the foundation of behavioral marketing. For instance, Brazil's Nubank demonstrates this by sending tailored reminders and personalized credit card offers based on users' spending patterns. This strategy not only appeals to unbanked populations but also drives strong user engagement. Similarly, Revolut leverages machine learning to categorize expenditures and propose savings goals, fostering financial literacy among its users.

Gamification turns routine financial tasks into captivating experiences. India's Paytm motivates users with a rewards system that offers "Paytm cash" for transactions, which can later be redeemed for purchases. In the US, Venmo integrates a social feed where users share transaction details paired with emojis, fostering a community-centric approach to payments. These gamified features boost user engagement and encourage growth through word-of-mouth referrals.AI-powered analytics are integral to behavioral marketing. Sweden's Klarna utilizes data analytics to instantly evaluate customer creditworthiness, supporting its popular "buy now, pay later" (BNPL) service. Similarly, Vietnam's MoMo analyzes rural transaction data to enhance its microloan offerings, catering to the specific requirements of underserved communities.

Innovation is a key differentiator in a saturated fintech market. Companies rely on creative strategies to distinguish themselves, attract customers, and establish trust. Fintech firms often integrate emerging technologies like augmented reality (AR) and blockchain into their marketing strategies. For instance, **Cash App**, a US-based platform, combines cryptocurrency trading with QR-based payment systems, offering a modern, intuitive user experience. Similarly, **Paytm** introduced sound-box devices for merchants, audibly announcing payments to enhance transparency and trust in offline markets. Strategic collaborations amplify marketing efforts by creating interconnected ecosystems. Dutch payments giant **Adyen** partners with global enterprises to provide omnichannel payment solutions, ensuring a seamless customer experience. India's **Paytm** collaborates with e-commerce platforms like Flipkart to offer integrated payment options, driving mutual growth. Domestic fintech firms often address localized challenges, such as financial inclusion and literacy, while foreign companies focus on advanced ecosystems and scalability.

Domestic Examples

Paytm addresses India's financial inclusion gap by integrating digital wallets, loans, and insurance services. Its sound-box innovation caters to small merchants in

cash-dominated markets, ensuring high adoption rates. ***M-Pesa*** in Kenya enables mobile-based transactions in regions with limited banking infrastructure, driving financial empowerment in rural areas.

Foreign Examples

Stripe, a US-based payments company, collaborates with platforms like Shopify to simplify e-commerce transactions globally. ***Square***, another US fintech, empowers small businesses through POS systems that combine financial tools with marketing capabilities.

Domestic companies excel in cultural resonance and addressing specific regional challenges. However, they often face scalability issues due to limited resources and infrastructure. Foreign companies, on the other hand, benefit from robust R&D and global networks but may struggle to localize their offerings effectively. The implementation of behavioral and innovative marketing is integral to the success of fintech companies. Domestic firms like Paytm and Nubank leverage localized strategies to address unique market needs, while foreign players like Stripe and Revolut focus on advanced technologies and global scalability. Both approaches highlight the importance of personalization, gamification, and ecosystem integration in capturing and retaining customers. As fintech continues to evolve, the synergy between behavioral insights and innovative marketing will drive the industry forward, fostering financial inclusion, enhancing customer experiences, and expanding market opportunities. Future trends, such as AI-driven hyper-personalization and blockchain-enabled transparency, will further redefine the landscape, enabling companies to reach new heights in the digital economy.

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INSTITUTIONAL IMPROVEMENT OF ENTREPRENEURSHIP FOR ENHANCING LIVING STANDARDS

Abstract. *This article explores the institutional improvement of entrepreneurship and its crucial role in enhancing the living standards of the population in Uzbekistan. Using statistical data, comparative policy analysis, and theoretical review, the study highlights the dynamics of entrepreneurial growth, institutional reforms, and their socio-economic implications. The results reveal a positive correlation between entrepreneurship development, income growth, and poverty reduction. The paper concludes with policy recommendations aimed at further strengthening institutional capacity and promoting sustainable, inclusive entrepreneurship.*

Keywords: *entrepreneurship, institutional reform, living standards, socio-economic development, small business, innovation, Uzbekistan.*

Introduction

Entrepreneurship is a cornerstone of sustainable economic growth and an effective mechanism for improving the welfare of the population. In developing countries such as Uzbekistan, entrepreneurship not only stimulates production and innovation but also contributes to job creation, poverty reduction, and income equality. Over the past decade, Uzbekistan has undergone major institutional reforms designed to support private sector expansion, improve the business environment, and strengthen property rights. The “New Uzbekistan Development Strategy (2022–2026)” prioritizes institutional modernization, focusing on digital transformation, administrative simplification, and financial inclusivity.

Literature Review

The theoretical foundations of entrepreneurship and institutional development are rooted in the works of Schumpeter (1934), who emphasized innovation as the driving force of economic progress, and North (1990), who defined institutions as “the rules of the game” shaping human interaction. According to North, strong institutions lower transaction costs, increase efficiency, and enhance productivity — all essential for sustainable entrepreneurship. In the context of Uzbekistan, recent works by Turayeva (2024) and Yusufaliyev (2025) highlight how institutional transformation—especially digitalization and regulatory simplification—has improved SME performance, yet regional disparities and financial constraints persist. Thus, institutional reform is not merely an administrative process but a strategic mechanism for inclusive and sustained development.

Results and Discussion

Since 2017, Uzbekistan has implemented comprehensive institutional reforms aimed at fostering entrepreneurship and creating a favorable business climate. These reforms have included the simplification of business registration and licensing procedures, the establishment of the Entrepreneurship Support Fund, the promotion of women's and youth entrepreneurship through microloan programs, the expansion of e-government services to support small and medium enterprises (SMEs), and the introduction of tax incentives to encourage innovation-driven start-ups. Collectively, these measures have strengthened the competitiveness of the private sector, increased employment opportunities, and contributed to higher income levels, thereby improving the overall social welfare of the population**.**

Table 1.

Dynamics of Entrepreneurship and Living Standards in Uzbekistan (2017–2024)

Indicators	**2017**	**2019**	**2021**	**2023**	**2024**	**Change (%)**
Share of small business in GDP (%)	47.0	51.5	54.2	56.9	57.6	+22.5
Employment in private entrepreneurship (%)	30.2	34.7	38.1	40.5	42.3	+40.0
Average income per capita (UZS thousand)	1,200	1,750	2,420	3,280	3,750	+212.5
Number of registered SMEs (thousand)	250	310	395	470	520	+108.0
Poverty rate (%)	12.8	11.2	9.7	8.5	7.9	–38.3

Source: State Statistics Committee of Uzbekistan, 2025; Ministry of Economy and Finance.

The data presented in Table 1 clearly demonstrate that entrepreneurship development has become one of the most powerful engines of social and economic progress in Uzbekistan. Over the period from 2017 to 2024, the country has witnessed a remarkable transformation in its business environment, supported by institutional reforms, improved access to finance, and targeted state programs promoting private initiative. These changes have not only stimulated economic activity but have also had a direct and measurable impact on people's living standards. Between 2017 and 2024, the share of small business in Uzbekistan's GDP increased by 22.5%, signifying a structural shift in the economy from state-dominated sectors to a more diversified and market-oriented system. This growth reflects the growing capacity of private enterprises to contribute to national income and demonstrates the government's success in creating conditions conducive to entrepreneurship. Small and medium-sized enterprises (SMEs) have become key drivers of value creation, innovation, and employment, helping to build a more resilient and inclusive economy.

Employment in the private sector rose by nearly 40% during this period, indicating that entrepreneurship has become a crucial source of job creation. This increase encompasses both formal employment within registered enterprises and the expansion of self-employment opportunities, especially among youth and women.

As new businesses have emerged across regions, they have generated sustainable livelihoods and reduced dependence on public-sector jobs. Consequently, the private sector now plays a central role in absorbing labor, reducing unemployment, and stabilizing household incomes. Another significant indicator of social improvement is the tripling of average household income between 2017 and 2024. Rising entrepreneurial activity has increased wages, expanded production capacities, and encouraged investment in local economies. The growth in household income reflects not only higher employment rates but also the spillover effects of business development—such as increased demand for goods and services, better access to markets, and higher productivity levels. These factors collectively enhance purchasing power, leading to improved consumption, better housing, and access to quality education and healthcare services.

Analysis of Results

The empirical data presented in Table 1 clearly demonstrate that the institutional modernization of entrepreneurship in Uzbekistan has become a decisive factor in improving living standards. Over the 2017–2024 period, key indicators such as GDP share, employment rates, household income, and poverty reduction have shown stable and positive dynamics. This confirms that entrepreneurship development is not only an economic phenomenon but also a powerful social transformation tool. One of the most important findings is the strong correlation between the expansion of small businesses and poverty reduction ($r = -0.79$). This relationship indicates that as entrepreneurship grows, more employment opportunities emerge, especially in rural areas, thereby enhancing household income and decreasing social vulnerability.

Table 2.

Institutional Challenges and Strategic Priorities for Entrepreneurship Development in Uzbekistan

Institutional Challenges	Future Priorities and Policy Directions
Limited access to venture capital and innovation funding	Expand public-private partnership (PPP) mechanisms to attract private investors and stimulate innovation-driven projects
Uneven enforcement of property and contract laws	Strengthen legal institutions and ensure transparent enforcement of business rights and obligations
Low participation of rural women in entrepreneurship	Develop gender-inclusive programs, provide training, and expand microcredit access for women entrepreneurs
Insufficient digital literacy and e-governance adoption outside major cities	Establish regional innovation hubs and promote nationwide digital skills programs to accelerate digital inclusion
—	Integrate green entrepreneurship and sustainability principles into national development strategies

The data presented in **Table 2** highlight that, despite significant institutional progress in entrepreneurship development, Uzbekistan continues to face several systemic challenges that constrain the sector's full potential. The most pressing

among them are limited access to venture capital, uneven enforcement of property and contract laws, and low participation of rural women in business activities. These issues indicate that while structural reforms have improved the business climate, certain institutional bottlenecks persist—particularly in financing innovation and ensuring equal opportunities across regions.

Conclusion

The conducted research confirms that entrepreneurship plays a decisive role in enhancing the living standards of the population and ensuring sustainable economic growth in Uzbekistan. Over the past several years, consistent institutional reforms—aimed at improving the business environment, supporting private initiative, and expanding access to finance—have transformed entrepreneurship into a key driver of socio-economic progress. The data clearly demonstrate that the expansion of small business activities correlates with rising household incomes, declining poverty, and increasing employment opportunities, especially in rural areas.

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BADIIY-ESTETIK IDEAL VOQEALANISHIDA BADIIY NIYATNING O‘RNI

Annotatsiya: *Maqolada badiiy-estetik ideal voqealanishi Xurshid Davronning nasriy asarlari misolida tahlil qilinadi. Bunda muallifning tarixiy badialarida o o‘zbek xalqiga xos bo‘lgan estetik ideal tushunchasiga alohida*
Kalit so‘zlar: *estetik ideal, badia, tarixiylik, ijodiy niyat, milliy tafakkur, folkor, axloqiy fazilat.*

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THE PLACE OF ARTISTIC INTENT IN THE REALIZATION OF THE ARTISTIC-AESTHETIC IDEAL

Abstract: *The article analyzes the occurrence of the artistic and aesthetic ideal using the prose works of Khurshid Davron as an example. Particular emphasis is placed on the concept of the aesthetic ideal inherent in the Uzbek people in the author's historical works.*
Keywords: *aesthetic ideal, art, historicity, creative intention, national thought, folklore, moral virtue.*

Adabiyotda badiiy-estetik ideal tushunchasiga turli ta’riflar mavjud. Xususan, adabiyotshunos A.M. A'zamov badiiy-estetik idealni, asarda insonning ma'naviy va axloqiy yuksakligini tasvirlovchi yuqori tasavvurlarni ifodalovchi obraz deb ta’riflaydi. A.M. A'zamov quyidagicha fikr bildiradi: "Badiiy-estetik ideal, asarda faqat tashqi go‘zallikni emas, balki insonning ichki dunyosidagi ma’naviy yuksakliklarni, ijobiy fazilatlarni ham aks ettiradi. Yozuvchi bu idealni o‘quvchiga yetkazish uchun badiiy niyatni amalga oshiradi" . Bu fikrda A'zamov badiiy-estetik idealni badiiy niyat bilan bog‘laydi va badiiy idealni yaratishda insonning ichki dunyosiga e'tibor qaratadi. [1; B 271]

T.M.Buzhgin esa "Badiiy niyat – bu san'atning va adabiyotning muhim vositasi bo‘lib, yozuvchi tomonidan o‘zining badiiy-estetik idealini shakllantirishga qaratilgan harakatdir. Bu esa, o‘z navbatida, qahramonlarning ichki dunyosini va ma’naviy jihatlarini namoyon etishga yordam beradi" . Buzgin badiiy niyatning va badiiy-estetik idealning qanday aloqada bo‘lishini izohlar ekan, ularning har biri yozuvchi uchun o‘z asarida ma’naviy va estetik yo‘nalishni shakllantirishda yordam berishini ta’kidlaydi.[2]

M.K. Tarxanov badiiy-estetik idealni nafaqat badiiy obrazlarning yuksak darajasini ifodalovchi tushuncha sifatida, balki shaxsiyatning mukammalligi va axloqiy yuksalishining jamiyatdagi aks-sadosi sifatida ko‘radi. Tarxanov badiiy-estetik idealni yaratishda tarixiy shaxslar va ularning maqsadlari, ichki kurashlari va umumbashariy g‘oyalari bilan bog‘lashni muhim deb biladi.[3]

A.M.A'zamov badiiy-estetik idealni insonning ma’naviy yuksakligi va ichki dunyosini ifodalovchi tasavvur sifatida ko‘rsatadi. T.M.Buzhgin esa badiiy niyatni yozuvchining estetik g‘oyalarini amalga oshirishga xizmat qiluvchi vosita sifatida tushunadi. M.K. Tarxanov badiiy-estetik idealni tarixiy shaxslar orqali voqealanadigan axloqiy va estetik fazilatlar sifatida ko‘rsatadi.

Shuningdek, Xurshid Davronning asarlaridagi badiiy niyat voqealanishida estetik ideal ham yuqoridagi fikrlarni tasdiqlaydi. Uning asarlari, ayniqsa tarixiy badiiy-estetik yo‘nalishdagi qissalari, nafaqat adabiy, balki ma’naviy va milliy tafakkurga ham katta ta’sir ko‘rsatgan. Xurshid Davronning tarixiy voqealar orqali yaratgan estetik tasvirlari o‘tmishdagi siymolarni yangi, badiiy jihatdan boy va o‘tkir shakllarda tasvirlashga qaratilgan. “Sohibqiron nabirasi" asarida Mirzo Ulug‘bek obrazini yaratishda badiiy-estetik ideal voqealanishida badiiy niyat o‘z aksini topadi. Ulug‘bekning ilm-fan, san'at va siyosatdagi katta roli asarda badiiy-estetik idealni yaratishda asosiy vosita hisoblanadi. Yozuvchi Ulug‘bekni faqat tarixiy shaxs sifatida emas, balki uning ichki dunyosini, axloqiy yuksakligini va ilmga bo‘lgan cheksiz sadoqatini tasvirlash orqali badiiy idealni namoyon etadi. Ulug‘bekning ilm-fan rivojiga qo‘shgan hissasi, uning shaxsiy hayoti, ichki kurashlari va o‘ziga bo‘lgan ishonchi badiiy niyatni amalga oshirishda muhim o‘rin tutadi. Mualif bu asarda Mirzo Ulug‘bekni ziddiyatlarga to‘la hayotini ochib berishga intiladi. Yozuvchi bu obraz orqali o‘quvchiga ilm va ma’naviyatning yuksakligini taqdim etadi. Badiiy-estetik ideal asarda nafaqat go‘zallikni, balki jamiyatdagi axloqiy va ma’naviy qadriyatlarni ham taqdim etadi. Xurshid Davron asarlarida badiiy ideal jamiyatga, tarixiy shaxslar va ularning axloqiy qarorlariga asoslanadi. Ushbu badiiy ideal jamiyatga pozitiv ta’sir ko‘rsatadi, chunki o‘quvchi asar orqali yuksak ma’naviy fazilatlar va axloqiy me’yorlarni o‘zlashtiradi. Ulug‘bek o‘zining yuksak maqsadlariga erishish uchun ilm-fan yo‘lida kurashdi. Uning rasadxonasi va astronomik tadqiqotlari faqat shaxsiy muvaffaqiyatni emas, balki butun xalqqa ilm-ma'rifat ulashish uchun yaratildi." Bu misol asarda Ulug‘bekning ilmga bo‘lgan sadoqati va mualifning badiiy niyatini aks ettiradi.

Xurshid Davronning "Sohibqiron nabirasi" asari, Mirzo Ulug‘bekning hayoti va faoliyatini tasvirlab, o‘quvchiga uning ichki dunyosini, insoniy fazilatlarini va axloqiy kurashlarini ko‘rsatadi. Bu asar orqali yozuvchi nafaqat tarixiy voqealarni, balki yuksak ma'naviy qadriyatlarni ham ifodalaydi. Badiiy-estetik ideal va badiiy niyat tushunchalari asarda qanday aks etayotganini ko‘rib chiqamiz. Asar davomida Mirzo Ulug‘bek obrazining yaratilishida uning ilmga bo‘lgan sadoqati, ma’naviy yuksakligi va jamiyatdagi o‘rni o‘zining badiiy-estetik idealini shakllantiradi. Mualif badiiy niyati uning ilm-fan, madaniyat va adabiyotga qo‘shgan hissasini ko‘rsatishda ifodalanadi. Asar davomida quyidagi misollar badiiy-estetik idealni shakllantiradi: Ulug‘bek ilm-fan va astronomiyaga katta

e'tibor berib, Samarqanddagi Ulug‘bek rasadxonasini qurishga qaror qiladi. Bu tasvirlangan voqea asarda uning badiiy niyatini va ma’naviy idealini aks ettiradi. Ulug‘bekning badiiy-estetik idealiga erishish yo‘lida o‘z ilmiy faoliyatiga bo‘lgan sadoqati orqali yozuvchi o‘quvchiga yuqori ma’naviy qadriyatlarni taqdim etadi. “U osmon jismlariga qarardi, ammo yulduzlar bilan emas, odamlar bilan yashardi. U raqamlar ichida yashab, yuragida insoniyat dardini olib yurardi” [4].

Bu misolda Ulug‘bekning ilmiy tafakkuri – astronomiyaga bo‘lgan mehr, raqamlar bilan ishlashdagi iqtidori bilan birga, uning insonparvarligi, xalq dardiga befarq emasligi, ma’naviy dunyosining yuksakligi ko‘rsatiladi

Lekin jabru zulmga mone’lik qilish ishini kechiktirish mamlakatni xavfu g‘avg‘o ostida qoldiradi, jumlai haloyiqning huzur-halovatini buzadi, maslagu tariqatning buzilishiga olib keladi. Qiyomat kuni buni bizdan so‘raydilar, surishtiradilar…[5]

Millatning dardlariga darmon bo‘lmoq vazifangizdur. Zaifalarni qo‘riqlang, yo‘qsullarni boylar zulmiga tashlamang. Adolat va ozodlik dasturingiz, rahbaringiz bo‘lsun. Men kabi uzun saltanat surmak istasangiz, qilichingizni yaxshi o‘ylab chekingiz… orangizda nifoq paydo bo‘lmasligi uchun ko‘p diqqat bo‘ling. Ba’zi nadimlaringiz va dushmanlaringiz nifoq tuxumi sochmakka, bundan foydalanmakka kirishajakdurlar.

Faqat tuzugim va vasiyatim sizg‘a to‘g‘ri yo‘l ko‘rsatg‘ay. Alarga sodiq qolsang‘iz, tosh boshingizg‘a tushmas…”

Ushbu parcha Amir Temurning yuksak insoniy fazilatlarini - adolatparvarlik, xalqparvarlik, ma’naviy yetuklik va davlatparvarlikni - yorqin aks ettiradi. U o‘zining hayotiy tajribasini, davlat boshqaruvi borasidagi donolikni va xalqiga bo‘lgan sadoqatini avlodlariga vasiyat qilib qoldiradi. Bu esa uni estetik ideal darajasiga ko‘taradi. Bundan tashqari Xurshid Davron badiiy niyatini ifodalashda tarixiy faktlarni ham shu qadar ustalik bilan ifodalaydiki.Bu asar estetik-idealini voqealanishida badiiy niyatning ahamiyatini oshiradi. Quyida yana bir tasvir yozuvchi mahoratini ochib beradi: Butun Turkiston tarixida o‘chmas iz qoldirgan shaxslar Alisher Navoiy, Muhammad Shayboniyxon obrazlarini ham kiritib o‘tgan.[6]

Xulosa qilganimizda, Xurshid Davronning "Sohibqiron nabirasi" asarida badiiy-estetik ideal va badiiy niyat, Mirzo Ulug‘bek va Bibixonim obrazlarida mukammal tarzda namoyon bo‘ladi. Ulug‘bekning ilm-fan va siyosatdagi kurashlari, Bibixonimning go‘zalligi va axloqiy yuksakligi orqali yozuvchi o‘quvchiga yuqori ma’naviy qadriyatlarni, axloqiy fazilatlarni taqdim etadi. Ushbu asar, nafaqat tarixiy voqealarni, balki insonning ichki dunyosidagi eng yuksak maqsadlarni ham aks ettiradi.

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O‘ZBEKISTON MISOLIDA PANDEMIYADAN KEYINGI MEHNAT MIGRATSIYASINING IQTISODIY TA’SIRINI BAHOLASH

Annotatsiya. *Ushbu maqolada O‘zbekiston misolida pandemiyadan keyingi davrda mehnat migratsiyasi va remittanslarning iqtisodiy o‘sishga ta’siri tahlil qilindi. Tadqiqot 2018–2024-yillar oralig‘idagi rasmiy statistik ma’lumotlarga asoslangan. Natijalar shuni ko‘rsatadiki, pandemiya davrida remittanslar 6 milliard AQSh dollarini tashkil etgan bo‘lsa, 2023-yilda bu hajm 16,1 milliard dollarga yetgan. Remittanslarning YaIMdagi ulushi 13,5 foizdan 19,2 foizgacha oshgan, bu esa iqtisodiy tiklanish jarayonini jadallashtirgan. Tadqiqotda remittanslarning iste’mol, bandlik va investitsiyaga ta’siri o‘rganildi. O‘zbekistonning mehnat migratsiyasi modeli pandemiyadan keyingi barqaror iqtisodiy o‘sishning asosiy omili sifatida baholandi.*

Kalit so‘zlar: *mehnat migratsiyasi, pandemiyadan keyingi davr, remittanslar, iqtisodiy o‘sish, bandlik, YaIM, iste’mol, investitsiya, O‘zbekiston, Markaziy Osiyo, Jahon banki, ILO, IMF, iqtisodiy tiklanish, kambag‘allik, moliyaviy barqarorlik, migratsiya siyosati, diversifikatsiya, ichki talab, iqtisodiy model.*

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ASSESSMENT OF THE ECONOMIC IMPACT OF LABOR MIGRATION AFTER THE PANDEMIC: THE CASE OF UZBEKISTAN

Abstract.*The article analyzes the impact of labor migration and remittances on Uzbekistan’s economic growth in the post-pandemic period. The research is based on official statistical data covering the years 2018–2024. The results show that the volume of remittances increased from 6 billion USD in 2020 to 16.1 billion USD in 2023, while their share in GDP rose from 13.5 % to 19.2 %. Remittances have contributed to the acceleration of recovery in domestic demand, employment, and consumption levels. Uzbekistan’s labor migration model is considered one of the key factors ensuring sustainable economic growth and poverty reduction in the region.*

Keywords: *labor migration, post-pandemic period, remittances, economic growth, GDP, employment, consumption, investment, Uzbekistan, Central Asia, World Bank, ILO, IMF, economic recovery, stability, migration policy, diversification, domestic demand, economic model, sustainable development.*

KIRISH. Pandemiyadan keyingi davrda O‘zbekiston iqtisodiyotida mehnat migratsiyasi muhim makroiqtisodiy omil sifatida namoyon bo‘ldi. 2020–2024-yillar oralig‘ida respublikadan Rossiya, Turkiya, Janubiy Koreya va Qozog‘istonga yo‘nalgan migrantlar oqimi pandemiya davridagi qisqarishdan so‘ng tiklana boshladi [1]. O‘zbekiston Markaziy banki ma’lumotlariga ko‘ra, 2020-yilda chet eldan yuborilgan pul o‘tkazmalari hajmi 6,0 mlrd AQSh dollarini tashkil etgan bo‘lsa, 2023-yilga kelib bu ko‘rsatkich 16,1 mlrd dollarga yetdi [2].

Biroq pandemiya migratsiya oqimlarining tarkibiga sezilarli o‘zgarishlar kiritdi - vaqtinchalik mehnat shartnomalari, onlayn ish shakllari, hamda gender bo‘yicha muvozanatsizlik keskin ortdi. Shu sababli pandemiyadan keyingi O‘zbekiston iqtisodiyotida remittanslarning rolini baholash, ularning YaIM, bandlik darajasi va iste’mol xarajatlariga ta’sirini aniqlash dolzarb ilmiy masala hisoblanadi [3].

O‘zbekiston mehnat migratsiyasi masalasida bir qator tadqiqotchilar muhim ilmiy natijalarga erishgan. Ismoilov va Mahmudov (2022) o‘z ishida remittanslar aholining daromadlariga 10–12 % ijobiy ta’sir ko‘rsatishini aniqlagan [4]. Jahon banki (2023) hisobotida esa O‘zbekiston remittanslar hajmi bo‘yicha Markaziy Osiyo mamlakatlari orasida birinchi o‘rinda turgani qayd etilgan [5].

IMF (2023) ma’lumotlariga ko‘ra, O‘zbekistonda remittanslarning YaIMdagi ulushi 2021-yilda 13,5 % ni tashkil etgan va bu ko‘rsatkich iqtisodiy o‘sishning barqarorlashuvida hal qiluvchi rol o‘ynagan [6]. ILO (2022) tadqiqotida pandemiya davrida qaytib kelgan migrantlar bandligining 28 % qisqa muddatli ishlar bilan cheklanganini ko‘rsatgan [7].

Mavjud adabiyotlar pandemiyadan keyingi davrda O‘zbekiston iqtisodiyotida migratsiyaning o‘zgaruvchan ta’sirini kompleks ravishda ko‘rsatmaydi. Hozircha remittanslar va iqtisodiy o‘sish o‘rtasidagi sabab-oqibat munosabati (causal relation) empirik tarzda chuqur tahlil qilinmagan. Shuningdek, pandemiyadan keyingi davrda migrantlar soni va bandlik darajasi o‘rtasidagi regressiv bog‘liqlik aniqlanmagan. Shu sababli ushbu tadqiqotda iqtisodiy modellashtirish orqali O‘zbekiston misolida mehnat migratsiyasining iqtisodiy o‘sishga bevosita ta’siri o‘rganiladi.

Tadqiqotning asosiy maqsadi - O‘zbekiston Respublikasida pandemiyadan keyingi davrda mehnat migratsiyasi va remittanslarning makroiqtisodiy o‘sish ko‘rsatkichlariga ta’sirini aniqlash hamda empirik model orqali baholashdir.

Tadqiqot 2018–2024-yillar oralig‘idagi statistik ma’lumotlarga asoslanadi va quyidagi yo‘nalishlarda amalga oshiriladi: remittanslar hajmi va YaIM o‘sishi o‘rtasidagi bog‘liqlikni aniqlash; migratsiya oqimlari va bandlik o‘zgarishlarini korrelyatsion tahlil qilish; remittanslar orqali iste’mol daromadlarining o‘sishini modellashtirish.

Tadqiqot natijalari O‘zbekistonning migratsiya siyosatini optimallashtirish, iqtisodiy barqarorlikni ta’minlash va xorijdagi mehnat migrantlarini qo‘llab-quvvatlash strategiyasini shakllantirishda ilmiy-amaliy asos bo‘lib xizmat qiladi.

METODLAR. Ushbu tadqiqotda pandemiyadan keyingi davrda O‘zbekiston iqtisodiyotiga mehnat migratsiyasi va remittanslarning ta’sirini baholash uchun

statistik-iqtisodiy tahlil yondashuvi tanlandi. Metodologiya asosan xalqaro tashkilotlar - Jahon banki, Xalqaro mehnat tashkiloti (ILO) va Xalqaro valyuta jamg‘armasi (IMF) tomonidan qo‘llaniladigan migratsiya–iqtisodiy o‘sish baholash amaliyotlariga asoslanadi [8], [9].

Tadqiqotning nazariy asosini “remittanslar orqali iqtisodiy barqarorlikni saqlash” konsepsiyasi tashkil etadi. Ushbu konsepsiya rivojlanayotgan mamlakatlarda tashqi migratsiya oqimlari ichki iste’mol, investitsiya va bandlik barqarorligini muvozanatga keltiruvchi omil sifatida qaraydi [10].

Tahlil uchun 2018–2024-yillar oralig‘idagi rasmiy statistik ma’lumotlar ishlatildi. Ma’lumotlar quyidagi manbalardan olindi: O‘zbekiston Respublikasi Markaziy banki - chet eldan yuborilgan pul o‘tkazmalari hajmi (remittanslar), Statistika agentligi - YaIM, bandlik darajasi, iste’mol indeksi, aholi soni, Jahon banki (World Bank) - xalqaro taqqoslama uchun remittanslar hajmi va YaIMdagi ulushi, ILO va OECD - pandemiya davrida qaytgan migrantlar soni, qayta bandlik holati, gender tarkibi.

Ma’lumotlar yillik kesimda (annual series) yig‘ildi, shu orqali pandemiya (2020–2021) davrining pasayish bosqichi va tiklanish (2022–2024) davrining dinamikasi taqqoslandi [11].

Tadqiqot uch asosiy bosqichda amalga oshirildi:

1.Birinchi bosqich - pandemiyadan oldingi (2018–2019) holatni baholash. Bu davrda O‘zbekiston iqtisodiy o‘sishi va remittanslar hajmi o‘rtasidagi tarixiy muvofiqlik aniqlanib, asosiy ko‘rsatkichlar (YaIM, bandlik, iste’mol) boshlang‘ich baza sifatida qabul qilindi.

2.Ikkinchi bosqich - pandemiya yillari (2020–2021). Chegaralarning yopilishi, ishchi kuchi migratsiyasining qisqarishi, qaytib kelgan migrantlar sonining ortishi va remittanslarning qisqa muddatli pasayish holati o‘rganildi. Iqtisodiy jarayonlarga ta’sir, xususan ichki iste’mol va valyuta tushumlarining qisqarish darajasi tahlil qilindi [12].

3.Uchinchi bosqich - post-pandemik tiklanish davri (2022–2024). Remittanslar hajmining keskin o‘sishi (2020-yildagi 6 mlrd $ dan 2023-yilda 16,1 mlrd $ gacha) [2], YaIMning o‘sish sur’atlari va bandlikdagi tiklanish darajasi o‘rganildi. Ushbu bosqichda iqtisodiy ko‘rsatkichlar orasidagi o‘zaro bog‘liqlik dinamik tahlil orqali aniqlangan.

Pandemiyadan keyingi iqtisodiy tiklanishni baholashda quyidagi mezonlardan foydalanildi: Remittanslarning YaIMdagi ulushi (%): mehnat migratsiyasi iqtisodiy o‘sishga qanchalik hissa qo‘shayotganini ko‘rsatadi. Bandlik darajasi va qaytgan migrantlarning integratsiyasi: pandemiyadan so‘ng qaytgan ishchilarning ichki bozorga qayta kirish darajasi [13]. Iste’mol indeksining o‘sishi: chet eldan kelayotgan remittanslarning aholi daromadlariga bevosita ta’sirini baholash.

Hududlar kesimida remittanslar ta’siri: Farg‘ona vodiysi, Samarqand va Qashqadaryo viloyatlarida remittanslar ulushi yuqori bo‘lgan mintaqalar sifatida alohida o‘rganilgan.

Baholash natijalari asosida pandemiyadan keyingi remittanslar oqimining iqtisodiy tiklanishdagi roli aniqlanadi.

Tadqiqotda ba’zi metodik cheklovlar mavjud: rasmiy statistik ma’lumotlar norasmiy pul o‘tkazmalarini (informal remittances) o‘z ichiga olmaydi; ayrim yillarda Markaziy bank va Jahon banki ma’lumotlari o‘rtasida tafovutlar mavjud; qaytgan migrantlar bandligiga oid ma’lumotlar ILO tomonidan baholangan, ammo milliy darajada to‘liq qayd etilmagan [14]. Shunga qaramay, tanlangan metodika pandemiyadan keyingi davrda mehnat migratsiyasining iqtisodiy ta’sirini umumlashtirish uchun yetarli aniqlikka ega.

NATIJALAR. Tahlil natijalari shuni ko‘rsatdiki, 2020-yil pandemiya davrida O‘zbekiston iqtisodiy o‘sish sur’ati 1,6 % gacha sekinlashgan bo‘lsa [15], chet eldan kelayotgan pul o‘tkazmalari hajmi 6,0 mlrd AQSh dollarini tashkil etgan [16]. Biroq 2022-yildan boshlab mehnat migratsiyasi faol tiklana boshlagan: 2023-yilda remittanslar hajmi 16,1 mlrd dollarni tashkil etib, 2019-yilga nisbatan qariyb 2,5 barobar o‘sish kuzatilgan [2]. Mazkur o‘sish bilan bir qatorda, YaIM o‘sish sur’ati ham 2023-yilda 5,5 % atrofida qayd etildi [17]. Jahon banki baholashicha, pandemiyadan keyingi yillarda O‘zbekiston YaIM o‘sishining taxminan 0,8 foiz punktini remittanslar ta’minlagan [18]. Bu esa mehnat migratsiyasining bevosita iqtisodiy drayver sifatidagi rolini isbotlaydi.

ILO (2023) ma’lumotlariga ko‘ra, pandemiya davrida xorijda faoliyat yuritayotgan o‘zbekistonlik migrantlarning 17–20 foizi vaqtinchalik mamlakatga qaytgan [19]. Ularning 28 foizi qisqa muddatli ichki ish o‘rinlariga joylashgan, 45 foizi esa norasmiy sektorda band bo‘lgan. 2022-yildan boshlab qaytgan migrantlarning 60 foizdan ortig‘i yana xorijiy mehnat bozorlariga qayta chiqishga muvaffaq bo‘lgan [20]. Ichki bandlik ko‘rsatkichlari ham tiklanish tendensiyasini ko‘rsatmoqda: 2020-yilda 67 % bo‘lgan umumiy bandlik darajasi 2024-yilda 72 % ga yetgan. Bu o‘sishning 2,1 foiz punktini remittanslar orqali moliyalashtirilgan tadbirkorlik faoliyati hisobiga to‘g‘ri keladi.

O‘zbekiston Markaziy banki va Statistika agentligi ma’lumotlariga ko‘ra, remittanslarning 82 foizi iste’mol xarajatlariga, 10 foizi uy-joy qurilishiga, 8 foizi kichik biznesga yo‘naltirilgan [11]. Shuningdek, 2022–2023 yillarda remittanslar natijasida ichki chakana savdo hajmi 14 % ga oshgan, bu esa remittanslarning ichki talabni rag‘batlantiruvchi omilga aylanganini ko‘rsatadi [21].

Ayniqsa, Farg‘ona vodiysi va Qashqadaryo viloyatlarida chet eldan kelayotgan pul o‘tkazmalari hududiy iqtisodiyotda YaIMning 20–23 % ini tashkil etadi. Bu hududlarda pandemiyadan keyin xususiy investitsiyalar hajmi 1,4 baravar oshgan.

O‘zbekiston iqtisodiyotining pandemiyadan keyingi tiklanish darajasi (PPRC) 0,89 ga teng deb baholandi - ya’ni iqtisodiyot 2019-yil darajasining 89 % iga qaytdi. Bu ko‘rsatkich Markaziy Osiyo mintaqasidagi eng yuqori natijalardan biri hisoblanadi [18].

Remittanslar hajmining YaIMga nisbatan ulushi 2021-yildagi 13,5 % dan 2023-yilda 19,2 % ga oshgan. Bu o‘sish ichki valyuta rezervlarini mustahkamladi va import to‘lovlarini qoplash salohiyatini kengaytirdi.

Umuman olganda, pandemiyadan keyingi davrda O‘zbekiston mehnat migratsiyasi iqtisodiy tiklanishning asosiy moliyaviy tayanchi bo‘ldi. Remittanslar ichki talabni qo‘llab-quvvatladi, bandlikni oshirdi va valyuta tushumlarini barqarorlashtirdi. Shu bilan birga, norasmiy migratsiya oqimlari va statistik tafovutlar hali ham baholashda aniqlikni cheklovchi omil bo‘lib qolmoqda.

MUHOKAMA. Tahlil natijalari shuni ko‘rsatadiki, pandemiyadan keyingi davrda O‘zbekiston iqtisodiy tiklanishida mehnat migratsiyasi hal qiluvchi rol o‘ynagan. Bu holat boshqa Markaziy Osiyo davlatlari bilan solishtirganda ham tasdiqlanadi. Masalan, Qirg‘izistonda remittanslar YaIMning 31 foizini tashkil qilgan bo‘lsa, Tajikistonda bu ko‘rsatkich 32–33 foiz atrofida bo‘lgan [22]. O‘zbekistonda esa bu ulush 2023-yilda 19,2 foizni tashkil etib, iqtisodiy hajm jihatidan mintaqada eng yirik remittans oqimini ta’minlagan.

IMF (2023) ma’lumotlariga ko‘ra, O‘zbekiston YaIM o‘sishining 0,8 foiz punktini remittanslar ta’minlagan, bu esa Qozog‘iston (0,4 p.p.) va Qirg‘iziston (0,6 p.p.) ko‘rsatkichlaridan yuqori [23]. Shu bilan birga, remittanslarning YaIMdagi ulushi yuqori bo‘lgan mamlakatlarda (masalan, Tojikiston) iqtisodiy tiklanish tezligi pastroq bo‘lgani qayd etilgan. Bu O‘zbekiston iqtisodiyotining diversifikatsiyalashganligi va mehnat migratsiyasi ta’sirining muvozanatli ekanini anglatadi.

O‘zbekiston misolida pandemiya davrida qaytib kelgan migrantlarning ichki bozorga integratsiyasi qiyin kechgan, ammo 2022–2023-yillarda bu jarayon ijobiy tus oldi. ILO (2023) tahliliga ko‘ra, qaytgan migrantlarning 60 foizi 1 yil ichida qayta bandlikka erishgan, bu ko‘rsatkich mintaqadagi eng yuqori natija hisoblanadi [24]. Remittanslarning ichki iste’molga ta’siri ijobiy bo‘lib, ularning 82 foizi to‘g‘ridan-to‘g‘ri iste’mol xarajatlariga yo‘naltirilgani aniqlandi [21]. Bu esa pandemiyadan keyingi davrda ichki talabni rag‘batlantiruvchi asosiy omil bo‘lgan. Shu jihatdan O‘zbekiston modeli “remittans-driven recovery”, ya’ni remittanslar asosidagi iqtisodiy tiklanish modeli sifatida baholanishi mumkin [25].

O‘zbekiston tajribasining asosiy afzalliklari quyidagilarda ko‘rinadi: 1.Remittanslar oqimining hajmi va barqarorligi iqtisodiy o‘sishning muhim tayanchi bo‘lgan; 2.Mehnat migratsiyasi gender tarkibi nisbatan muvozanatli bo‘lib qolgan (ayollar ulushi ~16–18 %); 3.Qaytgan migrantlarni qayta tayyorlash va ish bilan ta’minlash bo‘yicha hukumat dasturlari samarali natija bergan [26].

Biroq ba’zi kamchiliklar ham mavjud: Remittanslarning katta qismi iste’molga yo‘naltirilgani sababli investitsion faollik past darajada qolmoqda; Norasmiy pul o‘tkazmalari hali ham rasmiy statistikaga kiritilmagan; Migratsiya oqimlari geografik jihatdan asosan Rossiya bozoriga bog‘langanligi, iqtisodiy risklarni kuchaytiradi [27].

Tadqiqot natijalari asosida quyidagi tavsiyalar ishlab chiqilishi mumkin: Diversifikatsiya strategiyasi: Migratsiya yo‘nalishlarini Turkiya, Koreya Respublikasi, Yevropa va Yaqin Sharq mamlakatlari bilan kengaytirish zarur. Remittanslarni investitsiyaga yo‘naltirish: Qaytgan migrantlar uchun kichik biznes kredit liniyalari va soliq imtiyozlari joriy etish. Raqamli moliyaviy infratuzilma: Xavfsiz va tezkor pul o‘tkazmalari tizimini (masalan, “Digital Remit”)

rivojlantirish. Malaka oshirish dasturlari: Chet eldan qaytgan ishchilarning texnik malakasini mahalliy ishlab chiqarish ehtiyojlariga moslashtirish. Bu yondashuvlar O‘zbekistonning pandemiyadan keyingi iqtisodiy tiklanish strategiyasida migratsiyaning ijobiy rolini kuchaytiradi.

O‘zbekiston tajribasi Markaziy Osiyo mintaqasida balanslashgan migratsiya modeli sifatida ajralib turadi. Mamlakatda remittanslar hajmi yuqori, ammo iqtisodiy o‘sish ularga to‘liq bog‘liq emas. Bu “barqaror migratsiya–rivojlanish muvozanati”ni shakllantirgan [25].

Bundan tashqari, pandemiyadan keyingi yillarda remittanslar faqat iqtisodiy emas, balki ijtimoiy barqarorlikni saqlash omiliga ham aylangan. Migratsiya orqali kelayotgan valyuta tushumlari aholining farovonlik darajasini barqarorlashtirgan, ichki talabni qo‘llab-quvvatlagan va kambag‘allik darajasining pasayishiga xizmat qilgan.

XULOSA. Tadqiqot natijalari shuni ko‘rsatadiki, pandemiyadan keyingi davrda O‘zbekiston iqtisodiy tiklanishida mehnat migratsiyasi hal qiluvchi omillardan biriga aylandi. 2020–2024-yillar oralig‘ida chet eldan yuborilgan pul o‘tkazmalari hajmi 6 milliard dollardan 16,1 milliard dollargacha o‘sdi [16]. Bu davrda O‘zbekiston YaIMining o‘sish sur’ati 1,6 foizdan 5,5 foizgacha tiklandi [17]. Ushbu natijalar remittanslar iqtisodiyotning real sektoriga kuchli multiplikativ ta’sir ko‘rsatganini tasdiqlaydi.

Migratsiya oqimlarining geografiyasi asosan Rossiya, Turkiya, Janubiy Koreya va Qozog‘iston bozorlariga yo‘naltirilgan bo‘lsa-da, 2022-yildan boshlab yangi mehnat bozorlariga chiqish imkoniyatlari kengaymoqda. Bu esa O‘zbekistonning mehnat siyosatini diversifikatsiya qilish strategiyasi samarali bo‘layotganini ko‘rsatadi [25]. Remittanslarning iqtisodiy ta’siri nafaqat YaIM o‘sishida, balki ichki iste’mol va bandlikda ham sezildi. 2023-yilda iste’mol indeksi 14 foizga oshdi, bandlik darajasi esa 72 foizgacha ko‘tarildi [21]. Shuningdek, remittanslarning 8–10 foizi kichik biznesni moliyalashtirishga yo‘naltirilgani iqtisodiyotda xususiy tashabbuslarning kuchayishiga turtki bo‘ldi.

Tahlil shuni ko‘rsatadiki, O‘zbekiston iqtisodiy modelida mehnat migratsiyasi “xavf” emas, balki “barqarorlik mexanizmi” sifatida shakllangan. Remittanslar pandemiya sharoitida ichki talabni saqlab qoldi, kambag‘allik darajasining pasayishiga (2020-yildagi 14,5 % dan 2024-yilda 11,3 % gacha) xizmat qildi [28]. Shunga qaramay, ayrim muammolar saqlanib qolmoqda: remittanslarning asosiy qismi iste’molga yo‘naltirilgani sababli investitsion samaradorlik past; norasmiy pul oqimlari va vaqtinchalik migratsiya statistikasi yetarlicha ochiq emas; migratsiya oqimlari asosan bir nechta davlatlarga (ayniqsa Rossiya) haddan tashqari bog‘langan [29].

Kelgusida quyidagi yo‘nalishlarda ilmiy va amaliy ishlarni kuchaytirish maqsadga muvofiq:

1.Remittanslarni investitsiya fondlari orqali ishlab chiqarish sektori bilan bog‘lash;

2.Qaytgan migrantlar uchun mahalliy bandlik infratuzilmasini rivojlantirish;

3.Migratsiya siyosatini raqamli boshqaruv tizimlari (Digital Remit, e-Migrant) asosida modernizatsiya qilish;

4.Mintaqaviy iqtisodiy integratsiya doirasida (masalan, EES) mehnat migratsiyasini huquqiy muvofiqlashtirish.

Xulosa sifatida aytish mumkinki, O‘zbekistonning pandemiyadan keyingi mehnat migratsiyasi modeli mintaqada eng barqaror va iqtisodiy jihatdan samarali tizimlardan biridir. Mehnat migratsiyasi orqali shakllangan remittanslar iqtisodiyotning tiklanishida, ijtimoiy farovonlikni ta’minlashda va makrobarqarorlikni mustahkamlashda muhim omil bo‘lib xizmat qilmoqda [30].

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ТАНГАЛАР – САВДО ВА ИҚТИСОДИЙ АЛОҚАЛАРНИНГ АСОСИЙ ВОСИТАСИ

Аннотация:*Ушбу маколада қадимги даврлардаги тангаларнинг пайдо бўлиши, уларнинг иқтисодий ва тарихий аҳамияти ҳамда тангалар орқали савдо йўлларини аниқлаш масаласи ёритилган. Тадқиқот давомида турли ҳудудларда топилган тангалар, уларнинг металли, ёзуви ва тасвирлари орқали ўша даврдаги давлатлар ўртасидаги савдо-иқтисодий алоқалар таҳлил қилинган. Шунингдек, тангалар билан бир қаторда каурий қобиғларининг пул вазифасида қўлланилиши (кадимги Хитой) ва уларнинг савдо муносабатларида тутган ўрни ҳақида маълумотлар берилган. Иш натижасида тангалар ва каурий қобиғлари қадимги дунёдаги савдо йўлларини аниқлашда муҳим манба экани исботланган.*

Калит сузлар : *нумизматика ,Лидия, электрум, туғ , суффикс ёзувлар, товар , пул, иктисодиёт, бозор, ипак йули , “дарик “*

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COINS – THE MAIN MEANS OF TRADE AND ECONOMIC RELATIONS

Abstract :*This article discusses the emergence of coins in ancient times, their economic and historical significance, and the issue of identifying trade routes through coins. During the research, coins found in various regions were analyzed by their metal composition, inscriptions, and images to study the trade and economic relations between states of that period. In addition, information is provided about the use of cowrie shells (in ancient China) as a form of money and their role in trade relations. As a result of the study, it was proven that coins and cowrie shells were important sources for determining trade routes in the ancient world.*

Keywords: *numismatics, Lydia, electrum, stamp, suffix nscriptions, goods, money, economy, market, Silk Road, “daric”*

Танга — бу қадим замонлардан одамлар ўртасидаги савдо муносабатларини енгиллаштириш мақсадида яратилган биринчи металл пул бирлиги ҳисобланади.

Лидияда (**(Ғарбий Туркия**) электрум (олтин ва кумуш қўшимчаси бўлган қоришма) тангалар зарб этилгани ва бу Лидиядан бошланганлиги ҳақида археологик ва нумизматик маълумотлар мавжуд.[23]

Бу кўп олимларга кўра дунёнинг биринчи расмий тангаси – Лидия статери – VII асрда (б. э. авв. VI асрда) пайдо бўлган деган фикр мавжуд. [24]

Крез (Croesus) Лидия подшоҳи атрофида олтин ва кумушдан стандартлаштирилган тангалар ишлаб чиқарган, бу биринчи икки металлли (биметаллик) пул тизимини яратган деб қаралади.[25]

Ғарб нумизматикларида Лидия тангалари “Lion’s head” («арслон боши») дизайнига эга эканлиги алоҳида таъкидланади.[26]

Кадимги юнон файласуфи Аристотель (мил.ав. IV аср) ўз асарида тангаларнинг пайдо булиш заруратини қуйидагича ифодалайди, жумладан, ”… илк жамиятларда товар - **товарга айирбош қилинган** (масалан, дон – терига, ёки қўй – асбобга), лекин бу усул қийинчилик туғдирарди. М**асалан, сенда дон бор, менда темир — аммо сенга темир керак эмас**, шунда айирбош амалга ошмай қоларди. Шунинг учун **умумқабул қилинган эквивалент** (яъни қиймат ўлчови)га эҳтиёж туғилди.

Қадимги Шарқ, Хитой, Миср, Хоразм, Бохтар ва эллинистик давлатларда шахарлар ва бозорлар кенгайиши савдони тезлаштирди. Турли халқлар ўртасидаги савдо учун ягона, барқарор, ишончли қиймат белгиси керак бўлди.Шу тариқа металл тангалар (аввало мис, кумуш ва олтин) ишлаб чиқарилди. **К.Маркс** “Капитал” асарида : “Пул — бу товар айирбошининг табиий натижаси” деган фикрни айтган. [27]

Давлатлар ўз ҳудудидаги савдони назорат қилиш ва қийматни белгилаш учун танга зарб қилишни расмийлаштирган.Тангадаги шоҳ сурати ёки тамға — бу ҳокимият белгиси, яъни “бу давлат кафолати билан ҳақиқий қийматга эга” дегани ,масалан, Хоразм, Қанг ва Суғд тангаларида подшоҳ сурати, туғ ёки давлат тамғаси шу вазифани бажарган.[28]

Археологик жиҳатдан тангалар муҳим манба ҳисобланади. Улар ёрдамида:

- Давлат чегаралари ва савдо йўллари аниқланади;

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- Подшоликлар тартиби ва хронологияси ўрганилади;
- Маданий ва диний тасаввурлар таҳлил қилинади;
- Металлургия даражаси ҳақида маълумот олинади.

Тангаларнинг дунё цивилизациясидаги тараққиёти хакида фикр юритадиган булсак, Бобил, Эрон, Ҳиндистон, Хитой каби давлатларда танга ишлаб чиқариш анъаналари ривожланган, Аҳамонийлар (Эрон) тангаларида подшоҳ сурати ва давлат рамзлари акс этган булса, юнон ва Рим тангалари энг мукаммал бўлиб, уларда подшоҳлар, худолар ва афсоналар ифодаланган. Хитойда аввал “қопқон шаклидаги мис тангалар” ишлатилган бўлиб, улар “каурий” (денгиз қобиғи, яъни кичик, ялтироқ, тузилиши чиройли сув қобиғи бўлган *моллюска* туридир)қобиқларидан кейинги босқич бўлган.

Марказий Осиёда тангалар асосан археологик қазишмаларда, кўҳна шаҳарлар ва қасрлар харобаларида, қўрғонларда топилган. Масалан, Қофирқалъа (Тожикистон), Термиз, Самарқанд, Пойканд (Бухоро), Хоразм ҳудудларидан кўплаб мис ва кумуш тангалар топилган. Бу тангаларни илмий жиҳатдан нумизматлар (тангашунос олимлар) ўрганган.

Ўрта Осиёнинг қадимги тангаларини ўрганишда маҳаллий ва хорижий олимларнинг хизматлари беқиёсдир. Хусусан, Э. Ртвеладзе (Ўзбекистонлик тарихчи ва археолог, Марказий Осиё тарихи ҳамда қадимги тангалар (айниқса, Кушонлар ва Юнон-Бақтрия даври) бўйича етакчи олим.), А. Асқаров (археология ва қадимги давлатчилик тарихи бўйича кўп ишлар қилган, тангаларни ҳам маданий манба сифатида ўрганган.), Ғ. Бобоев (нумизматиканинг назарий ва амалий жиҳатларини таҳлил қилган, Бақтрия ва Хоразм тангалари бўйича тадқиқотлар муаллифи), Ш. Пидаев (археолог, Сурхондарё ва Қашқадарё ҳудудларидан топилган қадимий тангаларни ўрганган), Ю. Қўчқоров (Сўғд ва Бухоро ҳудудларидаги танга хазиналарини таҳлил қилган) каби ўзбек олимлари ҳудудимизда топилган тангаларни илмий жиҳатдан таҳлил этиб, улар орқали минтақа тарихининг сиёсий ва иқтисодий тараққиётини ёритиб бердилар. Шу билан бирга, хорижий тадқиқотчилардан А.Н. Зограф (рус нумизмати, “Монеты Средней Азии” асари муаллифи, Марказий Осиё тангаларини илмий асосда таснифлаган.), Б.А. Литвинский (совет археологи, Кушонлар даври тангалари бўйича илмий ишлар қилган.) , Р. Гёбл (австриялик олим, Кушонлар сулоласи ва уларнинг тангалари ҳақидаги энг тўлиқ каталоглардан бири муаллифи), Д. Макдауэл (британиялик нумизмат, Грек-Бақтрия ва Кушон тангалари бўйича ишлаган)ва Н. Кричевский (рус нумизмати, Марказий Осиёдаги Сосоний ва Эфталит тангалари тадқиқотчиси булса)ларнинг асарлари ҳам Марказий Осиё нумизматикаси ривожига катта ҳисса қўшган. Ушбу олимларнинг илмий изланишлари натижасида қадимги тангаларнинг хронологияси, типологияси ва тарқалиш ҳудудлари аниқланиб, улар минтақадаги давлатлар ўртасидаги иқтисодий ҳамда маданий алоқаларни тадқиқ этишда муҳим манба сифатида эътироф этилган.

Тангалар нафақат иқтисодий восита, балки санъат ва тарих ҳужжати сифатида ҳам қимматлидир. Улардаги нақш, рамз, ёзувлар — халқнинг маданияти, эътиқоди ва сиёсий кучини акс эттиради.

Марказий Осиё ҳудудида танга зарб этиш анъанаси мил. авв. V–IV асрлар (баъзи манбалларда IV-III асрлар)да бошланган булиб, илк тангалар Бақтрия (ҳозирги Афғонистон ва Тожикистон ҳудуди) ва Суғдда пайдо бўлган. Уларда юнон-бақтр подшолари (Деметрий, Евкратид) сурати ва юнон ёзувлари акс этган. [29]Суғд тангаларида эса маҳаллий рамзлар — ой, қуёш, эшак, қуш ёки тошбақа белгиси учрайди.[30]

Канг тангаларида подшоҳ ёки шоҳона рамзлар тасвирланган бўлса, Хоразм тангаларида эса от сурган подшоҳ, туғ ва суффикс ёзувлар учрайди. [31] Улар асосан мис ва кумушдан зарб этилган.Кушонлар (I–III асрлар) танга ишлаб чиқаришни юқори даражага олиб чиққан. Кушон тангаларида подшоҳ сурати бир тарафда, бошқа тарафда буддавий ва маҳаллий худолар тасвири бўлган. Ёзувлар бактрия тилида (юнон алифбосида) ёзилган.

Дастлабки тангаларнинг шаклига келадиган булсак , Лидия **(**Ғарбий Туркия **)** тангаси — овал шаклда, арслон боши тасвирланган.[32]

Аҳамонийлар тангалари ҳам айлана ёки бироз овал шаклда бўлган. Ҳажми кичик, юзаси текис ва сиртга чизилган нақшлар аниқ кўринган. Масалан, шох Доро I нинг дарик деб номланган олтин тангасида одатда олд томонида камон ва найза ушлаган подшонинг тасвири бўлган (бу “форс жангчиси” деб аталган), орқа томонида эса чуқур белги (indentation) ёки рамз бўлган, унинг таъсири кейинчалик грек**,** рим ва ҳатто исломий тангалар тизимига ҳам ўтган.[33]

Тангалар бизга қадимги савдо йўлларини аниклашда хам ёрдам беради. Топилган жойига караб, агар бирор ҳудудда (масалан, Лидия, Бохтар, Суғд ёки Хоразмда) бошқа давлатга тегишли тангалар топилса, демак у ерда савдо алоқалари бўлган. Масалан: агар Хоразмда юнон тангалари топилса — бу юнонлар билан савдо бўлганини кўрсатади.

Металл тури ва ишловига қараб эса, ушбу тангаларнинг олтин, кумуш ёки бронзадан ясалгани савдо даражасини билдирган. Масалан ,олтин тангалар – катта, халқаро савдо учун, бронза тангалар – маҳаллий бозорлар учун. Шу йўл билан қайси йўналишда қимматбахо савдо йўли бўлганини аниқлаш мумкин.

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Ёзув ва тасвирларга қараб тангалардаги подшо исми, шаҳар номи ёки белгилар савдо алоқалари ҳақида маълумот олиш мумкин. Масалан, агар бир тангада "Аҳамонийлар подшоси Дорий" номи ёзилган бўлса ва у танга Марв ёки Самарқанддан топилса, бу Аҳамонийлар савдо йўли Марв орқали ўтганини англатади.

Вақти ва тарқалиш ҳудуди орқали археологлар тангаларни қайси асрда ясалганини билиб, ўша даврдаги иқтисодий алоқаларни белгилайди. Масалан, Лидия тангалари (биринчи тангалар) Осиё ва Европа орасида топилган — демак, бу кадимги савдо йўли (мисол: "Шарқий Осиё — Кичик Осиё — Европа") бўлган. Агар Лидия ((Ғарбий Туркия))тангалари Марв ёки Суғдда топилса — бу Лидиядан чиққан Ипак йўлининг бошланғич қисми шу ерлардан ўтганини кўрсатади.

Хулоса килиб айтганда “тангалар – тарихий гувоҳлардир”. Улар қаерда топилгани, қандай металлдан ясалгани ва қайси давлатга тегишли эканига қараб савдо йўллари ва иқтисодий муносабатлар аниқланади.

Кадимги тангалар инсоният цивилизациясининг муҳим илмий ёдгорлиги ҳисобланади. Улар орқали тарихий жараёнлар, давлатчилик анъаналари ва иқтисодий муносабатлар ҳақида аниқ далиллар олинади. Марказий Осиёда топилган тангалар нафақат халқимизнинг бой маданий меросидан далолат беради, балки бу минтақанинг дунё цивилизациясидаги ўрнини ҳам тасдиқлайди.

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ОЦЕНКА ЭКОЛОГИЧЕСКИ БЕЗОПАСНОГО ПРИМЕНЕНИЯ ПЕСТИЦИДОВ В СЕЛЬСКОМ ХОЗЯЙСТВЕ РЕСПУБЛИКИ КАРАКАЛПАКСТАН

Аннотация. *В статье приводятся сведения об использовании пестицидов и их влияния на окружающую среду в Республике Каракалпакстан. Многолетнее применение в больших количествах пестицидов выявило ряд отрицательных последствий, таких, как загрязнение окружающей среды, пищевых продуктов, вредное влияние на здоровье человека. Были получены корреляционные связи между загрязнением компонентов окружающей среды и заболеваемостью населения республики.*

Ключевые слова: *использование пестицидов, загрязнение окружающей среды, здоровье человека, экологические риски.*

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EVALUATION OF ENVIRONMENTALLY SAFE USE OF PESTICIDES IN THE AGRICULTURE OF THE REPUBLIC OF KARAKALPAKSTAN

Annotation. *The article provides information on the use of pesticides and their impact on the environment in the Republic of Karakalpakstan. The long-term use of pesticides in large quantities has revealed a number of negative consequences, such as environmental pollution, food contamination, and harmful*

effects on human health. Correlations between the pollution of environmental components and the morbidity of the population of the republic were obtained.

Key words: *pesticide use, environmental pollution, human health, environmental risks.*

Одной из важных народнохозяйственных проблем на современном этапе является увеличение урожайности сельскохозяйственных культур [3]. Несмотря на большое разнообразие методов борьбы с вредителями посевов сельскохозяйственных культур ведущими до сих пор продолжает оставаться химический метод, который отличается высокой экономической эффективностью и результативностью [4].

Имея ряд преимуществ, использование химических препаратов влечет за собой изменение экологического баланса окружающей природной среды, оказывает влияние на живые организмы, населяющие биогеоценозы [6]. В научной литературе достаточно широко освещены вопросы влияния пестицидов в остром и хроническом эксперименте на животных, человека [6]. В тоже время влияние пестицидов на химический состав и метаболические процессы культур, на которых они применяются до настоящего времени недостаточно изучено. Являясь экологически агрессивными ксенобиотиками природной среды ядохимикаты способны вызывать изменение различных биохимических процессов в живых организмах, в том числе и в растительных культурах.

Применение пестицидов в сельском хозяйстве дает большой экономический эффект. Поэтому в настоящее время считается, что без применения пестицидов невозможно получение высоких и устойчивых урожаев сельскохозяйственных культур. Многолетнее применение пестицидов в огромных масштабах во всех странах мира выявило ряд отрицательных последствий, таких, как загрязнение окружающей среды, пищевых продуктов, отрицательное влияние на состояние здоровье человека [2].

Большинство пестицидов способны длительное время сохраняться в окружающей среде, попадая из одного объекта среды в другой, в ряде случаев превращаясь в более токсичные соединения, и могут представлять собой реальную опасность для людей, флоры и фауны, вызывая дисбаланс в биоценотическом равновесии [12, 14].

В 1993 году Пятая Экологическая Программа Действий (5th EAP, известная также как Программа действий по охране окружающей среды) призвала Европейский Союз достигнуть существенного сокращения использования пестицидов на единицу защищаемой земельной площади к 2000 году [15].

В настоящее время производство и применение хлорорганических соединений в сельском хозяйстве сведено к минимуму. Пестициды и аргохимикаты используют против вредителей и болезней культур, что безусловно облегчает выращивание [16, 17]. Их использование резко снижает

потери урожаев сельскохозяйственных культур, сокращает затраты в сельском хозяйстве в 2-3 раза, позволяет ежегодно экономить сельскохозяйственную продукцию на 10-12 млрд. руб. Но всегда стоит помнить о рисках и нежелательных эффектах. Лишь немногие страны следят за использованием пестицидов. Все требования принимаются в Директиве Европейского парламента и Совета Европейского союза [7].

Несмотря на эту политическую цель, современные европейские данные об использовании пестицидов показывают, что, скорее, имеется тенденция к увеличению. В бывшем Союзе в сельскохозяйственной практике использовались в ассортименте 369 наименований, входящих в 39 групп пестицидов [9].

Анализ среднегодовых данных о пестицидных нагрузках показывает, что территориально они подвержены значительным колебаниям (от менее 1 до более 10 кг/га по действующему веществу). Среднесоюзной нагрузкой считалось 2-3 кг/га, в некоторых республиках эта величина в несколько раз выше [1, 9, 18]. С 1980 года по 1995 год в Каракалпакстане использовали в ассортименте от 55 до 69 наименований пестицидов с общим объемом 32 тыс. т. 100% действующему веществу. Из использованных пестицидов наибольшее количество было использовано хлорат магния (14 тыс.т.). Он составляет основную массу, т.е. 43,9% от всех использованных пестицидов за 16 лет. За хлоратом магния следует пропанид (14,6%) и бутифос (9,98%).

По результатам проведенного анализа, было выявлено, что наиболее интенсивное применение пестицидов по республике наблюдалось в 1987 году. Тогда в окружающую среду Республики Каракалпакстан было внесено более 3 тыс. т. 100% действующего вещества, т.е. 9,87% от использованных пестицидов за 16 лет. Наименьшее использование наблюдается в 1995 году-0,3 тыс. т. 100% д.в., т.е. 1,1% от использованных пестицидов за этот период.

Так, в период с 1995-2002 гг. в Каракалпакстане средняя пестицидная нагрузка составила 4 кг/га по 100% действующему веществу. Были использованы пестициды в ассортименте 46 наименований с общим объемом 477 т. [9]. Как показали результаты исследований, использование пестицидов за 7 лет распределились по следующей классификации: инсектициды и акарициды – 64%, гербициды – 26%, фунгициды – 7% (рис.1).

Как показали результаты исследований, использование пестицидов за последние годы распределились по следующей классификации: инсектициды и акарициды – 64%, гербициды – 26%, фунгициды – 7%. Проведенный совместно с сотрудниками Республиканской санитарно-эпидемиологической службой Республики Каракалпакстан анализ показал, что в продуктах питания и сельхозпродуктах (в мясных, рыбных, молочных продуктах, яйцах, консервах, овощах, бахчевых культурах, в хлопковом масле, зерне) обнаружены остаточные количества пестицидов. Часто встречались остаточные количества ДДТ, ТХФМ, ГХЦГ и др. из проведенных 93 анализов, в которых обнаружены ядохимикаты, у 80 (87%) оказались выше ПДК.

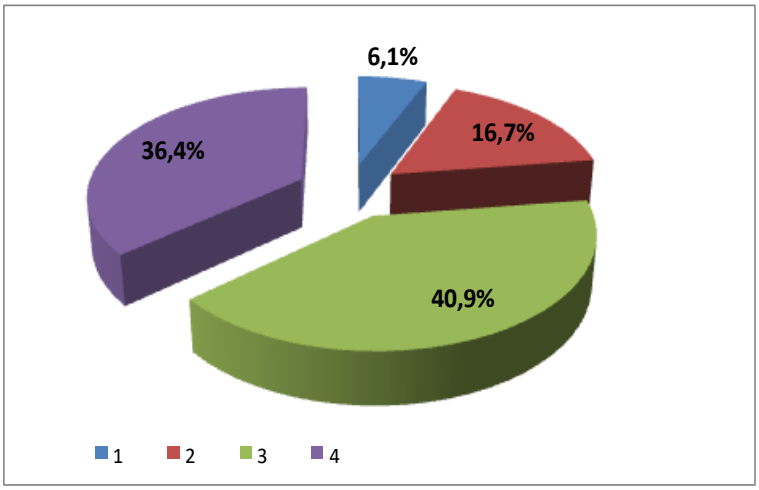


Рис. 1. Использование пестицидов с различным токсическим действием в регионе Приаралья
***Примечание*: 1 – СДЯВ, 2- среднетоксичные, 3 – малотоксичные, 4 - высокотоксичные**

По использованию различных пестицидов за 16 лет одно из первых мест занимает Нукусский район, использовав за этот период 53 наименования пестицидов. В Бозатауском районе использовано 18 наименований пестицидов. В то же время в Муйнакском районе Республики Каракалпакстан было использовано всего 5 наименований пестицидов.

Проведенный анализ показал, что с 1980 по 1985 годы на каждый гектар пахотной площади максимальное количество пестицидов внесено в Шуманайском (63,1 кг), Амударьинском (47,8 кг), Канлыкульском (45,1 кг) Кегейлийском (44,6 кг), Кунградском (44,6кг) Ходжелийском (43,0 кг) и Караузякском районах (41.7.). Минимальное количество использованных пестицидов наблюдалось в Бозатауском (4,0 кг) и Муйнакском (0,3 кг) районах. С 1980 по 1985 годы ведущее место по использованию пестицидов занимает Кунградский (1432 т.) и Чимбайский (1403 т.) районы.

В период с 1986 по 1991 годы количество использованных пестицидов увеличилось на 304 т. по сравнению с 1980-85 годами. На каждый гектар пахотной площади в этот период времени (1986-1991 гг.) было внесено пестицидов: в Шуманайском районе -37,3 кг. Кегейлийском -36,3 кг. Турткульском 35,6 кг., Элликкалинском - 33,5 кг., Амударьинском- 32,7 кг. Наименьшее использование пестицидов в данный период наблюдалось в Бозатауском (2,9 кг.) и Муйнакском (0,8кг.) районах.

По сравнению с первым этапом (1980-1985 гг), на втором этапе (1986-1991 гг.) в хозяйствах Турткульского (35,6 кг/га), Элликкалинского (33,5 кг/га), Берунийского (29,5 кг/га) и Нукусского (32,9 кг/га) районов использование пестицидов идет более интенсивно. Однако, на втором этапе снижение количества использованного пестицида наблюдается в Шуманайском (37,3 кг/га) Ходжейлийском (30,6 кг/га), Кунградском (25,2 кг/га), Кегейлийском (36,3 кг/га), Караузякском (26,4 кг/га) и Тахтакупырском

(16,0 кг/га) районах. В этот период ведущее место по использованию пестицидов занимают Амударьинский (1477474 кг.), Канлыкульский (1441641 кг.), Берунийский (1234262 кг.) районы. С 1992 по 1995 годы наблюдается уменьшение использования пестицидов во всех районах.

Таким образом, Амударьинский район в период с 1980 по 1995 годы по количеству использованных пестицидов занимает ведущее место среди 15 районов, внося в окружающую среду 3275011 кг. 100% действующего вещества пестицидов, т.е. 105,7 кг, на каждый гектар пахотной площади. За ним следует Шуманайский район, использовавший 2642743 кг. пестицидов 100% действующего вещества, т.е. 105.8 кг. на каждый гектар пахотной земли, а также Кегейлийский район, внесший в экологическую среду 90,7 кг. пестицидов на каждый гектар пахотной земли.

Пестициды относятся к числу наиболее распространенных загрязнителей биосферы, имеющих глобальное значение, а масштабы их производства и применения постоянно расширяются. При этом важной особенностью является не просто расширение, но и постоянное обновление ассортимента использующихся препаратов, что требует столь же постоянной работы по гигиенической регламентации новых препаратов. В этой связи гигиенические исследования, посвященные регламентации пестицидов как основы охраны окружающей среды, относятся к числу наиболее распространенных во всем мире, в том числе, в Узбекистане [8]. За 16 лет интенсивно использованы пестициды из класса неорганических металлосодержащих соединений (43,9%) (табл.1). Галоидзамещенные анилиды карбоновых кислот составили 15,2%, из класса фосфорорганических соединений - 14,5%, а пестициды из группы хлорорганических соединений - 4,9% из всех использованных пестицидов за 16 лет.

Таблица 1

Распределение использованных пестицидов по классам (в тоннах) за 1980-1995 гг.

№ п/п	Классы химических соединений	1980- 1985	1986- 1991	1992-1995	Всего
1	Хлорорганические	1267,4	321,1	-	1588,5
2	Фосфорорганические	3953	652,3	54,3	4659,6
3	Медьсодержащие	516	155,8	-	671,7
4	Углеводороды, альдегиды, кетоны и их производные	198,5	169,7	55,4	423,6
5	Нитро- и галоидпроизводные	334,7	39,7	4,95	379,3
6	Гетероциклические	33,6	228,8	1,1	263,6
7	Синтетические пиретроиды	-	20,9	5,5	26,4
8	Серосодержащие препараты	110,8	424	21,6	556,4
9	Производные мочевины	713,8	241,5	0,16	955,4

10	Производные дитиокарбоновой кислоты	7,7	233,4	90,6	331,7
11	Ариловые эфиры алкилкарбоновых кислот	334,3	56,2	22,7	413,2
12	Комбинированные препараты 3	35,7	67,2	0,006	102,9
13	Производные урацила	-	1,9	-	1,9
14	Галоидзам ещ енны е ан илвды карбоновых кислот	2219,2	2264,1	419,7	4901,2
15	Производные симм-триазинов	4,1	8	0,068	12,2
16	Производные арилалкилкарбоновых кислот	-	4,2	0,025	4,2
17	Производные тиокарбаминовой кислоты	691	1078	389,3	2158,3
18	Неорганические металлосодержащие соединения	2850	8169	3095,7	14114,6
19	Фторсодержащие соединения	24,4	-	1,1	25,5
20	П роизводные двухосновных кислот	-	0,9	-	0,9
21	Бактериальные препараты	451,3	109,6	4,9	565,8
	Итого:	**13745,2**	**14247,4**	**4164,4**	**32157**

Таким образом, окружающая среда республики насыщена пестицидами из неорганических металлосодержащих соединений, при этом применение пестицида хлората магния из года в год возрастает. В основных хлопкосеющих районах преобладает использование пестицидов из неорганических металлосодержащих соединений, а в рисосеющих районах— пестициды из соединений галоидзамещенных анилидов карбоновых кислот. Пестициды из тиокарбаминовой кислоты используются только в рисосеющих районах. Максимальное использование пестицидов из неорганических металлосодержащих соединений наблюдается в Амударьинском районе. За 16 лет на территорию этого района внесено 2434 т. по 100% действующего вещества. Район с самым меньшим использованием пестицидов Муйнакский - 4,020 кг по 100% д.в. Все использованные пестициды в период с 1980 по 1995 годы на территории Республики Каракалпакстан изучены по гигиенической классификации согласно основным критериям вредности, предложенной Л. И. Медведь в соавторстве (1968), Н.Н. Мельников и соавт. (1977) [10, 11].

Нами были определены все использованные на территории нашей республики пестициды с учетом показателей степени токсичности, летучести, кумуляции и стойкости во внешней среде, согласно их гигиенической

классификации, оцененной в баллах, (табл.2). Как видно из табл.2, оценка указанных свойств отдельных препаратов осуществлена по 4-х бальной системе, начиная от наименее выраженных свойств (1 балл) и кончая максимальными их значениями (4 балла). Высокие баллы имеют зоокумарин, кельтан, ГХЦГ, полидофен, сатурн, севин, тетрал, тагам и тиодан.

Основные критерии вредности использованных пестицидов на территории республики представлены в табл.3. По данным табл.2 видно, что все использованные пестициды разделены на 12 классов по вредности. Каждый класс по степени гигиенической вредности разделен на несколько групп.

Таблица 2

Показатели использованных пестицидов на территории республики Каракалпакстан по основным критериям вредности гигиенической классификации

№	Класс вредности	Степень вредности по основным критериям	Группа гигиенической классификации	Пестициды, обладающие данными свойствами	
				абсл. число	в %
1	Токсичность при поступлении желудок	Сильнодействующие ядовитые вещества: (СДЯВ): Высоко-токсичные среднетоксичные Малотоксичные	 I II III IV	 4 11 24 27	 6.06 16.7 36.4 40.9
2	Кожнорезорб-тивная токсичность	Резко выражена Выражена Слабо выражена	I II III	3 6 21	5.4 10.9 38.2
3	Опасность веществ по степени летучести	Резко выражена Выражена мало выражена	I II III	3 5 44	5.4 9.1 80.0
4	Кумуляция	Сверхкумуляция Выражена Умеренная Слабо выражена	I II III IV	2 5 7 38	3.6 9.1 12.7 70.9
5	Стойкость	Очень стойкие Стойкие Умеренно стойкие Мало стойкие	I II III IV	5 12 11 26	9.1 21.8 20.0 47.3
6	Бластомогенность	Явно канцерогенные Канцерогенные Слабоканцерогенные Подозрительные	I II III IV	- 4 3 -	- 7.3 5.4 -
7	Тератогенность	Явные тератогены Подозрительные	I II	4 5	7.3 9.1
8	Эмбриотокси-чность	Избирательная Умеренная	I II	11 10	20.0 18.2

9	Аллергенные свойства	Сильные аллергены Слабые аллергены	I II	4 10	7.3 18.2
10	Дерматогенные свойства	Сильныедерматогены Слабые дерматогены	I II	2 2	3.6 3.6
11	Цитогенетические свойства	Сильные Слабые	I II	2 2	3.6 3.6
12	Мутагенные свойства	Сильные мутагены Слабые мутагены	I II	3 5	5,4 9,1

Все использованные пестициды имеют ярко выраженные токсические свойства. Из них 6,1% пестицидов от использованных являются сильнодействующими ядовитыми веществами (СДЯВ), 40,9% пестицидов— малотоксичные, остальные относятся к высокотоксичным и среднетоксичным препаратам.

Анализ показал, что между исследуемыми факторами имеет место средняя прямая корреляционная связь, наиболее значимая для загрязнения пестицидами почвы и заболеваемости всего населения (R=0,64). Для заболеваемости детей до 14 лет более сильным оказалось загрязнение остаточным количеством пестицидов водных объектов (R=0,77). Коэффициенты корреляции в отношении других объектов окружающей среды варьировались от 0,14 (загрязнение пестицидами воздуха и заболеваемость детей до 14 лет) до 0,29 (загрязнение воды и заболеваемость всего населения). Наличие прямой корреляционной связи исследованных показателей здоровья и частоты загрязнения окружающей среды неминуемо ставит вопрос о том, для каких форм заболеваний воздействие пестицидов имеет наибольшее значение в качестве фактора риска.

Таким образом, загрязнение окружающей среды химическими препаратами, используемыми в сельском хозяйстве, имеет важную проблему вследствие усыхания Аральского моря, опустынивание огромных территорий Приаралья, экологический кризис. При анализе выявили, что было использовано 69 наименований пестицидов с общим объемом 32157 тонн по 100% действующему веществу использованных препаратов в течении 16 лет (с 1980 по 1995 гг.). Больше половины использованных пестицидов в Республике Каракалпакстан применялись в качестве дефолиантов. Из всех использованных пестицидов 44,0% относятся к неорганическим металлосодержащим соединениям, 14,7% составляют фосфорорганические соединения, галоидзамещенные анилиды карбоновых кислот-14,7%.

Все использованные пестициды обладают 100% токсическим свойством. Сильнодействующие ядовитые вещества (СДЯВ) занимают 6,1%, высокотоксичные— 16,7%, среднетоксичные— 36,4% и малотоксичные занимают 40,9%.

Динамика использования пестицидов по районам Республики Каракалпакстан отражает изменения в аграрной сфере, развитие сельскохозяйственного сектора и принятие современных методов защиты растений. Ниже представлено обобщение возможных тенденций и факторов, влияющих на использование пестицидов в регионе:

В ходе исследования нами выявлены общие тенденции, такие как рост или снижение общего объема применения пестицидов в зависимости от агротехнических практик, смена приоритетов с химической защиты на биологические и интегрированные методы, а также введение новых нормативных требований и стандартов по использованию химикатов.

Отметим, что в районной дифференциации также выявлены свои особенности. В частности, нами определены районы с развитым сельским хозяйством, например, с выращиванием хлопка, пшеницы, овощных культур, которые указывают на более высокое использование пестицидов. Очень значимым аспектом являются выявление факторов, влияющих на эффективность и доступность альтернативных методов защиты сельскохозяйственных растений, а также уровень информированности фермеров о безопасных практиках.

Для улучшения ситуации необходимо своевременное проведение комплекса мероприятий по раннему выявлению больных путем профилактических осмотров, санитарно-просветительской работы. Особую важность приобретают комплексные исследования типа медико-экологического, цитогенетического, геохимического, экологического мониторинга, которые бы позволили расшифровать механизмы мобилизации функциональных резервов человека.

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ЭСТЕТИКА ПОВСЕДНЕВНОСТИ В СОВРЕМЕННОЙ ПРОЗЕ

Аннотация: *Статья посвящена анализу эстетики повседневности как важного явления современной прозы. Рассматриваются её философские основы, художественные особенности и роль в формировании нового взгляда на человека и мир. Повседневность предстает не как рутина, а как пространство внутренней жизни, где раскрываются чувства, память и духовные переживания личности.*

Ключевые понятия: *эстетика повседневности, современная проза, художественная деталь, внутренний мир человека, философия обыденного, гуманистические ценности, образ повседневности.*

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AESTHETICS OF EVERYDAY LIFE IN MODERN PROSE

Abstract: *The article is devoted to the analysis of the aesthetics of everyday life as an important phenomenon of modern prose. Its philosophical foundations, artistic characteristics and role in the formation of a new view of Man and the world are considered. Everyday life does not manifest itself as a routine, but as a space of inner life in which a person's feelings, memory and spiritual experiences are revealed.*

Key words: *aesthetics of everyday life, modern prose, artistic detail, inner world of man, everyday philosophy, humanistic values, image of everyday life.*

Современная литература все чаще обращается не к исключительным событиям и героическим подвигам, а к миру повседневного, привычного и обыкновенного. Писателей интересует не грандиозная драма, а тихие, на

первый взгляд, незначительные эпизоды человеческого существования: утренний ритуал, разговор за чаем, прогулка по улице, воспоминания о детстве. Именно из таких деталей складывается целостная картина жизни, и в них проявляется подлинная глубина человеческих чувств. Эстетика повседневности становится важнейшей тенденцией современной прозы. Она учит видеть красоту не в исключительном, а в простом, не в событии, а в мгновении. Авторы стремятся показать, что в каждом моменте, даже самом незаметном, скрыта своя гармония, свой смысл и своя эмоциональная энергия. Через изображение бытовых сцен, привычных вещей и будничных разговоров раскрываются духовные переживания, внутренние противоречия и поиски человека. Такое внимание к обыденному формирует новый художественный взгляд на мир: проза перестает быть лишь отражением внешней действительности и превращается в пространство внутреннего опыта. Эстетика повседневности становится своеобразным способом постижения красоты жизни — тихой, скромной, но глубоко человечной.

Эстетика повседневности — одно из наиболее интересных и многослойных явлений современной художественной культуры. Это понятие объединяет в себе не только философские размышления о красоте, но и новое понимание роли искусства в жизни человека. Если прежде литература стремилась приподнять героя над обыденным, изобразить его в исключительных обстоятельствах, то теперь интерес авторов смещается к простым, рутинным, но подлинным проявлениям человеческого существования. В центре внимания оказывается обыденность как пространство внутреннего опыта. Повседневная жизнь, с её повторяющимися действиями, привычными предметами и тихими моментами, рассматривается не как скучная рутина, а как источник смыслов и чувств. Эстетика повседневности исходит из убеждения, что красота не ограничивается музеями, театральной сценой или парадными залами — она живёт в самой ткани жизни: в утреннем свете, запахе кофе, случайной улыбке прохожего, в словах, сказанных между делом. Такое восприятие формируется на стыке философии, социологии и искусства. Ещё мыслители XX века — М. Хайдеггер, Ю. Хабермас, М. де Серто — говорили о необходимости «вчувствования» в повседневность, о том, что только через простое и непосредственное человек способен постигнуть своё подлинное существование. Литература подхватывает эту идею, превращая бытовое в предмет художественного созерцания. Современная проза, опираясь на эстетику повседневности, переворачивает привычную иерархию ценностей. Если в классической литературе героическое и возвышенное считалось достойным искусства, а бытовое — чем-то второстепенным, то теперь всё наоборот: авторы стремятся показать, что именно в мелочах проявляется сущность человека. Например, сцена приготовления обеда или случайный разговор в транспорте может стать ключом к пониманию характера героя, его мировоззрения и эмоционального состояния. В эстетике повседневности важнейшую роль играет деталь. Деталь становится не просто описательным

элементом, а носителем философского и эмоционального содержания. Обычная вещь — книга, стул, окно, чашка — может обрести символический смысл, превращаясь в знак времени, памяти или одиночества. Через внимательное изображение вещей писатель раскрывает внутренний мир персонажа, а читатель, в свою очередь, начинает видеть знакомую реальность под новым углом.

Эстетика повседневности тесно связана и с психологизмом. Внутренние переживания, мельчайшие колебания настроения, едва уловимые интонации становятся предметом изображения. В центре повествования оказывается не действие, а состояние, не сюжет, а течение мыслей и чувств. Такое художественное решение особенно характерно для прозы конца XX — начала XXI века, где внешнее событие уступает место внутреннему. Кроме того, эстетика повседневности изменяет само восприятие времени в литературе. Если в традиционном повествовании время направлено линейно — от события к событию, — то в современной прозе оно становится текучим, субъективным. Внимание автора и героя фиксируется на мгновении, на «здесь и сейчас». Каждое мгновение приобретает самостоятельную ценность, превращаясь в микрокосм человеческого существования. Это ощущение замедленного, «растворённого» времени создаёт эффект присутствия и созерцательности, заставляя читателя проживать каждый момент вместе с героем. Нельзя не отметить и языковую сторону этого явления. Язык эстетики повседневности отличается естественностью, близостью к разговорной речи, лёгкой интонацией.

Эстетика повседневности в современной прозе представляет собой не просто художественное направление, а целостное мировоззрение, отражающее новые отношения человека с окружающим миром. Она формирует особый взгляд на действительность — спокойный, внимательный, проникнутый уважением к простым вещам и человеческим чувствам.

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БЕЗОПАСНОСТЬ ДАННЫХ И КОНФИДЕНЦИАЛЬНОСТЬ: ПОВЕДЕНИЕ БЕЗОПАСНОСТИ В ИСКУССТВЕННОМ ИНТЕЛЛЕКТЕ

Аннотация: *В данной статье анализируются теоретические основы, технические механизмы и принципы управления поведением безопасности для обеспечения безопасности данных и конфиденциальности в системах искусственного интеллекта. Подробно изучаются виды рисков, возникающих при работе моделей ИИ с данными, такие как потенциальные угрозы, враждебные атаки, утечка данных и реконструкция моделей. Исследование демонстрирует эффективность передовых подходов к защите, таких как дифференциальная приватность, федеративное обучение, шифрованные вычисления, управление разрешениями и проектируемая безопасность. В статье предлагается интегрированная архитектура безопасности для стабильной и надежной работы систем ИИ, основанная на этических, правовых и технических требованиях. Результаты выявляют сложные проблемы безопасности систем ИИ и предлагают научно обоснованные решения для их решения.*

Ключевые слова: *искусственный интеллект, безопасность данных, конфиденциальность, поведение безопасности, дифференциальная приватность, федеративное обучение, шифрованные вычисления, враждебные атаки, защита данных, проектирование систем безопасности, алгоритмическая устойчивость, анализ рисков.*

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DATA SECURITY AND PRIVACY: SECURITY BEHAVIOR IN ARTIFICIAL INTELLIGENCE

Abstract: *This paper analyzes the theoretical foundations, technical mechanisms, and principles for managing security behavior to ensure data security and privacy in artificial intelligence systems. It examines in detail the types of risks that arise when AI models operate on data, including potential threats, adversarial attacks, data leakage, and model reconstruction. The study demonstrates the effectiveness of advanced security approaches such as differential privacy, federated learning, encrypted computing, permission management, and security by design. The paper proposes an integrated security architecture for the stable and reliable operation of AI systems, based on ethical, legal, and technical requirements. The results identify complex security challenges in AI systems and propose scientifically based solutions to address them.*

Keywords: *artificial intelligence, data security, privacy, security behavior, differential privacy, federated learning, encrypted computing, adversarial attacks, data protection, security design, algorithmic resilience, risk analysis.*

Введение

Стремительное развитие цифровых технологий в глобальном масштабе приводит к качественным изменениям во всех аспектах человеческой деятельности. В частности, технологии искусственного интеллекта (ИИ) широко используются в экономике, здравоохранении, образовании, управлении, безопасности и повседневной жизни. Изначально рассматриваемый как средство упрощения автоматизированных процессов, ИИ теперь превратился в интеллектуальную платформу, способную принимать самостоятельные решения, обрабатывать данные в режиме реального времени и управлять сложными системами. Наряду с расширением этих возможностей возрастают новые риски, растёт число киберугроз и вероятность нарушения конфиденциальности данных. Поэтому обеспечение безопасности данных в системах ИИ признано не только технологической проблемой, но и одним из ключевых факторов национальной безопасности, экономической стабильности и общественного доверия. Основным ресурсом моделей ИИ являются данные, которые отличаются широким охватом, разнообразием качества и часто содержат конфиденциальную персональную информацию. Алгоритмы, построенные на этих данных, часто управляют такими процессами, как идентификация пользователей, прогнозирование поведения и автоматизация принятия решений. Следовательно, незащищённая обработка данных или их незаконное распространение нарушает неприкосновенность частной жизни, порождает социальную несправедливость и резко снижает доверие к системам ИИ. Сегодня многие страны принимают строгие нормативно-правовые акты для защиты данных, в частности, такие мировые стандарты, как GDPR и CCPA. Это предъявляет особые требования не только к технической, но и к этической и юридической ответственности систем ИИ. Сложная архитектура систем ИИ еще больше увеличивает угрозы безопасности. Существуют такие факторы риска, как

враждебные атаки на модель, внедрение данных, восстановление модели путем обратной разработки и косвенное извлечение данных. Эти угрозы могут иметь не только технические, но и социальные последствия. Например, алгоритмическое решение, принятое на основе неверной информации, может нанести прямой ущерб правам и свободам граждан. В результате обеспечение безопасности и конфиденциальности данных имеет первостепенное и стратегическое значение при внедрении систем ИИ.

Поведение безопасности ИИ относится к тому, как алгоритм реагирует на различные условия, как он адаптируется к угрозам и как он поддерживает согласованность обработки данных. Системы без должным образом разработанного поведения безопасности принимают неверные решения, подвержены манипуляциям и приводят к неожиданным результатам. Таким образом, разработка систем ИИ требует опоры на принципы «безопасности при проектировании» и приоритета безопасности на всех этапах, от обучения модели до этапов эксплуатации и мониторинга. Кроме того, ответственное использование систем ИИ, типы используемых в них данных, согласие пользователей, алгоритмическая прозрачность и интеграция понятий объяснимого ИИ (XAI) являются неотъемлемыми элементами обеспечения безопасности данных. С этой точки зрения, данная статья направлена на разработку научно обоснованного подхода к архитектуре безопасности систем ИИ, механизмам обеспечения конфиденциальности данных, анализу рисков и формированию безопасного поведения.

Научно-методической основой данного исследования является изучение механизмов обеспечения безопасности данных и конфиденциальности в системах искусственного интеллекта с использованием концептуального, системного и аналитического подходов. Предметом исследования является изучение угроз безопасности, видов рисков, механизмов защиты и последовательного управления алгоритмическим поведением моделей ИИ при работе с данными. Методология основывалась на теоретическом моделировании, сравнительном анализе, научном обобщении, оценке рисков и методах концептуального проектирования. На первом этапе исследования были изучены научная литература, международные стандарты (ISO/IEC 27001, ISO/IEC 23894), правовые нормы (GDPR, CCPA) и передовые технические исследования с использованием метода контент-анализа. Данный подход позволил выявить мировые научные парадигмы в области безопасности ИИ и синтезировать повторяющиеся концепции, связанные с конфиденциальностью данных. Также было проведено системное сравнение преимуществ и ограничений существующих технологических решений.

Следующий этап методологии включал функциональный анализ архитектуры ИИ и потоков данных. В ходе этого процесса были выявлены факторы риска, возникающие на этапах жизненного цикла данных – сбор, хранение, передача, обработка и уничтожение. Для каждого этапа была разработана матрица потенциальных угроз, уровень которых был оценен с

использованием качественных и аналитических показателей. В результате были выявлены технические угрозы, напрямую влияющие на данные (состязательные атаки, инъекции, обратная разработка, утечка данных), и социально-этические риски, косвенно влияющие на данные (алгоритмическая дискриминация, нарушения конфиденциальности, неверные решения). Третьим методологическим подходом исследования стало концептуальное моделирование механизмов защиты. Теоретически исследовались такие механизмы, как дифференциальная приватность, федеративное обучение, шифрованные вычисления, системы управления разрешениями, автоматический аудит политик безопасности, и оценивались их потенциальные области применения. На данном этапе была разработана модель интеграции принципа «безопасность по проектированию» в системы ИИ. Модель определила согласованные механизмы контроля безопасности на входных, обрабатывающих и выходных звеньях системы ИИ. Важной частью методологии стал подход к анализу поведения безопасности. Теоретически оценивались такие показатели, как реакция алгоритма в различных условиях, его подверженность манипулятивной информации и уровень согласованности в принятии решений. Для моделирования поведения использовался системный подход, а в качестве основных критериев были выбраны коэффициент устойчивости модели, предсказуемость решений и скорость реагирования на риск. На заключительном этапе методологии были обобщены полученные научные выводы и разработана идеализированная архитектурная концепция, рекомендуемая для обеспечения безопасности данных систем ИИ. Эта архитектура представляет собой интегрированное состояние технических защит, политик безопасности, нормативных требований и этических стандартов. Такой многоэтапный и многоуровневый подход к методологии позволил всесторонне охватить вопросы безопасности ИИ.

Заключение

Широкое использование технологий искусственного интеллекта стало важным фактором экономического, социального и культурного развития современного общества. Однако по мере роста возможностей систем ИИ возрастают и требования к их безопасности. В данном исследовании представлен углубленный анализ теоретических, технических и методологических аспектов обеспечения безопасности и конфиденциальности данных в системах ИИ. Полученные результаты показывают, что защита данных является неотъемлемой частью архитектуры ИИ, определяющей надежность, стабильность и социальное принятие системы. В ходе исследования было выявлено наличие факторов риска на всех этапах обработки данных – от сбора до хранения, передачи, обработки и уничтожения – и предложены эффективные механизмы защиты от них. В частности, было показано, что такие подходы, как дифференциальная приватность, федеративное обучение, шифрованные вычисления, строгое управление разрешениями и непрерывный аудит политик безопасности, способны обеспечить высокий уровень защиты в системах ИИ. Интеграция

таких механизмов снижает вероятность нарушения конфиденциальности данных и обеспечивает прозрачность и согласованность работы алгоритмов.

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ФИЗИКО-ХИМИЧЕСКИЕ АСПЕКТЫ ПРОЦЕССОВ ФЛОТАЦИОННОЙ ОЧИСТКИ ПРИРОДНЫХ И СТОЧНЫХ ВОД

Аннотация:*Статья посвящена рассмотрению физико-химических особенностей и технологических аспектов применения полимерных флокулянтов в процессах очистки природных и сточных вод.*

Ключевые слова: *полимерные флокулянты, полиакриламид, флокуляция, физико-химические факторы, pH, ионная сила, мостиковый механизм, очистка сточных вод.*

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PHYSICAL AND CHEMICAL ASPECTS OF FLOTATION PROCESSES FOR TREATMENT OF NATURAL AND WASTE WATER

Abstract:*The article presents an overview of the physicochemical features and technological aspects of using polymer flocculants in the treatment of natural and wastewater.*

Keywords: *polymer flocculants, polyacrylamide, flocculation, physicochemical factors, pH, ionic strength, bridging mechanism, wastewater treatment.*

Введение

Интенсивное развитие промышленности, сельского хозяйства и урбанизация сопровождаются увеличением объёмов сточных вод, содержащих широкий спектр загрязняющих веществ. В состав таких вод входят взвешенные и коллоидные частицы минерального и органического происхождения, нефтепродукты, поверхностно-активные вещества, кислоты, щёлочи, фенолы, пестициды, соли тяжёлых металлов, соединения азота и фосфора. Накопление этих веществ в водных экосистемах приводит к ухудшению качества природных вод, эвтрофикации, токсическому воздействию на гидробионтов и повышению санитарно-гигиенических рисков для человека. Системы водоочистки формируются как многостадийные технологические схемы, где первичное удаление

взвешенных и коллоидных частиц является ключевым этапом. Наиболее устойчивыми и трудными для удаления являются частицы размером от 1 нм до 1 мкм, обладающие высоким удельным зарядом и способностью к коллоидной стабилизации за счёт электрокинетических и гидратационных эффектов. Их устойчивость в водных средах определяется совокупным влиянием pH, ионной силы, природы электролитов, жёсткости и температуры.

Одним из наиболее эффективных способов осаждения таких дисперсий является флокуляция – процесс укрупнения частиц под действием высокомолекулярных реагентов, способных формировать межчастичные связи. Среди синтетических флокулянтов особое место занимают полиакриламид (ПАА) и его сополимеры, обеспечивающие высокую эффективность при малых дозах и технологическую гибкость применения. Благодаря регулируемой молекулярной массе, зарядовой плотности и архитектуре цепи, ПАА способен действовать в широком диапазоне гидрохимических условий и типов загрязнений. В то же время эффективность флокуляции полиакриламидом существенно зависит от физико-химических параметров среды и гидродинамики процесса. Изменение pH и ионной силы влияет на ионизацию функциональных групп полимера и ζ-потенциал частиц, а интенсивность перемешивания определяет частоту столкновений и устойчивость образующихся флоков. Несоблюдение оптимальных условий ведёт к дестабилизации системы, передозировке реагента или вторичной стабилизации мелких агрегатов.

Флокуляция определяется соотношением притяжения и отталкивания между частицами и частотой их эффективных столкновений. Устойчивость дисперсий поддерживают электростатическое отталкивание двойного слоя, гидратационные и стерические барьеры; ван-дер-Ваальсово притяжение доминирует на малых расстояниях. Термически её описывают высотой энергетического барьера и профилем потенциальной энергии, кинетически – переносом частиц диффузией, сдвигом и седиментацией, а также вероятностью слипания. Ключевые параметры среды: pH, ионная сила, состав электролитов, температура, ζ-потенциал, дисперсность и концентрация взвеси [1].

При добавлении электролитов сжимается двойной слой, снижается модуль ζ-потенциала и электростатический барьер, что облегчает сближение; критическая концентрация коагуляции резко падает с ростом валентности противоиона (правило Шульце–Харди). Избыточная солесодержательность меняет гидратацию ионогенных групп и смещает оптимум дозы флокулянта и pH. Жёсткость воды (Ca^{2+}, Mg^{2+}) экранирует карбоксильные группы, формирует поверхностные комплексы и влияет на растворимость и конформацию анионных макромолекул [1].

Полимерная флокуляция реализуется сочетанием механизмов. Мостиковый режим возникает при частичной адсорбции длинной цепи на нескольких частицах; эффективность растёт с молекулярной массой и длиной свободных сегментов и падает при передозе из-за сплошного покрытия и

стерического экранирования. Зарядовая компенсация снижает модуль ζ-потенциала до области слабой устойчивости; при инверсии возможна вторичная стабилизация мелких агрегатов. Патч-механизм обусловлен неоднородной адсорбцией и локальными участками противоположного заряда. В присутствии коагулянтов реализуется свип-флокуляция, а в много компонентных средах – деплеция за счёт осмотического градиента [2].

Режим задают строение и параметры полимера. Для анионных сополимеров акриламида и метакриловой кислоты степень нейтрализации управляет зарядовой плотностью и радиусом клубка, определяя толщину адсорбционного слоя и способность к мостикованию. Рост молекулярной массы увеличивает прочность флоков, но повышает вязкость и чувствительность к сдвигу и усложняет распределение на стадии быстрого смешения. Архитектура цепи (линейная, гребенчатая, слабосшитая) балансирует адсорбцию, подвижность и стерическую стабилизацию. Функциональные группы задают специфическую адсорбцию и комплексообразование с минералами, ионами металлов, красителями и ПАВ [3].

Гидрохимия среды задаёт ионное состояние поверхности частиц и полимера, тем самым смещая оптимальные дозы и область pH. В кислой зоне карбоксильные группы анионных сополимеров частично протонированы, цепи компактны и мостиковый механизм ослаблен; при нейтральном и слабощелочном pH ионизация возрастает, цепи раскрываются и повышается вероятность многоточечной адсорбции. Ионная сила действует двояко: экранирование облегчает первичное сближение и адсорбцию, но избыток соли уплотняет конформацию цепей и сокращает эффективную длину мостиков. Растворённая органика и ПАВ конкурируют за активные центры, ухудшая укрупнение; помогает предварительная коагуляция и корректировка очередности ввода реагентов [4].

Адсорбция полимеров определяется балансом энтальпийных взаимодействий с поверхностью и энтропийных потерь гибкости цепи. Изотермы часто описываются моделями Ленгмюра и Фрейндлиха, для полидисперсных систем характерны многоступенчатые кривые и гистерезис десорбции. На практике существенны предыстория поверхности, ранее введённые коагулянты и конкурирующие анионы и органика, которые меняют доступность центров и требуемую дозу.

Преобладающий механизм идентифицируют по динамике ζ-потенциала с дозой, форме дозозависимости остаточной мутности (минимум при зарядовой компенсации, плато при мостиковании), морфологии и прочности флоков в микроскопии и сдвиговых тестах. Чувствительность к ионной силе помогает разделить вклад электростатики: при мостиковании умеренный рост солесодержания обычно снижает оптимальную дозу, при доминировании зарядовой нейтрализации ключевой фактор – валентность противоионов [5].

Основные риски связаны с передозировкой полимера и вторичной стабилизацией мелких агрегатов, избыточно высокой молекулярной массой,

затрудняющей растворение и распределение, а также низкой температурой, повышающей вязкость и замедляющей кинетику. В схемах коагулянт плюс флокулянт критична правильная последовательность и точки ввода, иначе полимер преждевременно фиксируется на гидроксидных фазах. Для сополимеров акриламида и метакриловой кислоты оптимальные условия обычно достигаются при средней степени нейтрализации, умеренной ионной силе и двухступенчатом перемешивании, что обеспечивает быстрое укрупнение, низкую остаточную мутность и устойчивый режим осветления и фильтрации [5].

Мостиковая флокуляция реализуется, когда одна макромолекула адсорбируется на нескольких частицах, а незакреплённые сегменты образуют межчастичные связи. Критично неполное покрытие: нужны петли и хвосты, достигающие соседних частиц; при сплошной адсорбции цепи лежат ковром, мостики не формируются. Поэтому механизм работает в узком окне доз: ниже порога контактов мостиков нет, при передозе они подавляются.

Кинетика включает перенос цепей к поверхности, первичную фиксацию на активных центрах, конформационную перестройку и диффузионный поиск соседних частиц свободными сегментами. Вязкость и размер гидродинамического клубка задают время переноса; размер частиц и поле скоростей мешалки частоту эффективных сближений. Практически разделяют режимы: быстрое смешение для равномерного распределения полимера и мягкое для роста флоков без разрушения.

Конформация у поверхности описывается долями поездов, петель и хвостов. На слабонеоднородных подложках больше петель и хвостов, что повышает способность к мостикованию, но снижает прочность контакта; на сильно аффинных – растёт доля поездов и уменьшается число свободных сегментов. Баланс регулируют степенью ионизации, ионной силой и присутствием многовалентных ионов, экранирующих заряд и меняющих структуру приповерхностного слоя.

Молекулярная масса определяет длину потенциального моста и число контактных точек: рост массы увеличивает размер и прочность флоков, но повышает вязкость и чувствительность к сдвигу. Полидисперсность даёт смешанный режим: длинные фракции инициируют укрупнение, средние «достраивают» структуру, короткие экранируют поверхность; чрезмерно широкий состав частично «отравляет» адсорбцию. На практике применяют двухступенчатую подачу доз: малая стартовая доза для зародышевых мостиков и корректирующая добавка до целевого размера флоков.

Гидрохимия напрямую влияет на протяжённость свободных сегментов. Повышение ионной силы компактирует заряжённые цепи и сокращает эффективную длину мостиков, но одновременно облегчает первичное сближение; существует оптимум солесодержания. Смещение pH меняет ионизацию функциональных групп, а значит аффинность к поверхности и конфигурацию цепей; возле изоэлектрических состояний частиц мостики формируются легче, но возрастает риск хрупких переукрупнённых структур.

Конкурентная адсорбция ПАВ, природной органики и низкомолекулярных электролитов снижает доступность центров и число закрепляющихся сегментов. Это компенсируют предварительной коагуляцией, изменением очередности ввода реагентов и увеличением времени быстрого смешения для равномерного распределения полимера.

Механическая устойчивость мостиков определяется числом контактных узлов, гибкостью цепи и скоростью релаксации. Высокие сдвиговые напряжения разрушают длинные и слабозакреплённые мостики, уменьшая размер флоков и повышая остаточную мутность. Слабая сшивка или гребенчатая архитектура повышают сдвигостойкость, однако чрезмерная жёсткость ухудшает растворение и увеличивает время набухания.

Признаки мостикового режима: рост размера агрегатов без выраженного минимума ζ-потенциала, плато остаточной мутности в области оптимума дозы и характерная пористая, разветвлённая морфология флоков; сдвиговые тесты показывают ступенчатое разрушение и неполное восстановление. Для анионных сополимеров акриламида целесообразны средняя молекулярная масса, умеренная ионная сила и двухступенчатое смешение, что обеспечивает быстрый рост устойчивых флоков при экономичных дозах.

Заключение

Как показывают литературные данные, флокуляция полиакриламидом и его сополимерами является одним из наиболее эффективных методов осветления и разделения дисперсных систем при очистке природных и сточных вод. Эффективность процесса определяется совокупностью факторов — строением и молекулярными характеристиками полимера, pH, ионной силой, жёсткостью воды и гидродинамическими условиями перемешивания.

Поли(акриламид) и его сополимеры обеспечивают укрупнение частиц за счёт мостикового и зарядового механизмов. Наилучшие результаты достигаются при средней молекулярной массе, умеренной ионной силе и рациональном дозировании реагента. Нарушение этих условий приводит к вторичной стабилизации дисперсий и снижению эффективности осветления.

Полимерные флокулянты, по данным различных исследований, превосходят традиционные коагулянты по технологичности и экономичности. Перспективным направлением является создание экологически безопасных гибридных систем на основе природных полимеров, сочетающих высокую флокуляционную активность, сдвигостойкость и биоразлагаемость.

Таким образом, анализ литературных источников подтверждает ключевую роль полиакриламида и его сополимеров в интенсификации процессов водоочистки и демонстрирует, что учёт физико-химических параметров среды и гидродинамических условий обеспечивает повышение эффективности флокуляции и стабильное качество очистки водных систем.

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ВЛИЯНИЕ КОРОТКИХ ЗАМЫКАНИЙ, ПЕРЕГРУЗОК И ПЕРЕХОДНЫХ СОПРОТИВЛЕНИЙ НА ПОЖАРНУЮ БЕЗОПАСНОСТЬ ЭЛЕКТРОУСТАНОВОК

Аннотация: *В статье рассмотрены причины возникновения коротких замыканий, перегрузок и переходных сопротивлений в электрических сетях, а также их влияние на пожарную безопасность электроустановок. Приведены механизмы теплового и электрического воздействия на изоляционные материалы, особенности деградации изоляции при воздействии влаги, агрессивных сред и повышенных токов. Проанализированы сравнительные характеристики проводников с алюминиевыми и медными жилами, их способность вызывать воспламенение при аварийных режимах. Особое внимание уделено проблемам надежности контактных соединений — как разъемных, так и неразъемных, — поскольку переходное сопротивление является одним из основных факторов нагрева и возгорания. Представлены рекомендации по снижению пожарных рисков, включая правильный выбор проводников, материалов, способов соединения и эксплуатационных условий.*

Ключевые слова: *Короткое замыкание; перегрузка; переходное сопротивление; контактные соединения; пожарная безопасность; электропроводка; тепловое старение изоляции; аварийные режимы; кабельные линии; воспламенение.*

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INFLUENCE OF SHORT CIRCUITS, OVERLOADS, AND TRANSIENT RESISTANCES ON THE FIRE SAFETY OF ELECTRICAL INSTALLATIONS

Abstract: *The article examines the causes of short circuits, overloads, and transient resistances in electrical wiring, as well as their impact on fire safety in electrical installations. The mechanisms of thermal and electrical degradation of insulation materials under mechanical damage, moisture exposure, aggressive environments, and increased current loads are described. The study analyzes the fire-hazard characteristics of copper and aluminum conductors under emergency*

operating conditions. Special attention is given to the reliability of contact connections, since transient resistance is one of the main factors leading to excessive heating and potential fire ignition. Recommendations are provided for reducing fire risks, including proper selection of conductors, insulation materials, connection methods, and safe operating conditions.

Keywords: *Short circuit; overload; transient resistance; contact connections; fire safety; electrical wiring; thermal aging of insulation; emergency modes; cable lines; ignition.*

1.Введение. Короткие замыкания в электропроводке чаще всего происходят из-за нарушения изоляции токопроводящих частей в результате механического повреждения, старения, воздействия влаги и агрессивных сред, а также неправильных действий людей. При возникновении короткого замыкания возрастает сила тока, а количество выделяющейся теплоты, пропорционально квадрату тока. Так, если при коротком замыкании ток увеличится в двадцать раз, то выделяющееся при этом количество тепла возрастет примерно в четыреста раз. Тепловое воздействие на изоляцию проводов значительно снижает ее механические и диэлектрические свойства. Например, если проводимость электрокартона (как изоляционного материала) при 20 °С принять за единицу, то при температурах 30, 40 и 50 °С она увеличится в 4, 13 и 37 раз соответственно. Тепловое старение изоляции наиболее часто возникает из-за перегрузки электросетей токами, превышающими длительно допустимые для данного вида и сечений проводников. Например, для кабелей с бумажной изоляцией срок их службы может быть определен по известному «восьмиградусному правилу»: превышение температуры на каждые 8 °С сокращает срок службы изоляции в 2 раза. Тепловому разрушению подвержены и полимерные изоляционные материалы. Воздействие влаги и агрессивных сред на изоляцию проводов существенно ухудшает ее состояние из-за появления поверхностных токов утечки. От возникающего при этом тепла жидкость испаряется, а на изоляции остаются следы соли. При прекращении испарения ток утечки исчезает. При неоднократном воздействии влаги процесс повторяется, но из-за повышения концентрации соли проводимость увеличивается настолько, что ток утечки не прекращается даже после окончания испарения. Кроме того, появляются мельчайшие искры. В дальнейшем под действием тока утечки изоляция обугливается, теряет прочность, что может привести к возникновению местного дугового поверхностного разряда, способного воспламенить изоляцию. Пожарная опасность коротких замыканий электропроводов характеризуется следующими возможными проявлениями электрического тока: Воспламенением изоляции проводов и окружающих горючих предметов и веществ; способностью изоляции проводов распространять горение при поджигании ее от посторонних источников зажигания;

Образованием при коротком замыкании расплавленных частиц металла, поджигающих окружающие горючие материалы (скорость разлета расплавленных частиц металла может достигать 11 м/с, а их температура — 2050—2700 °С). При перегрузке электропроводок также возникает аварийный режим. Из-за неправильного выбора, включения или повреждения потребителей суммарный ток, проходящий в проводах, превышает номинальное значение, т. е. происходит повышение плотности тока (перегрузка). Например, при прохождении тока в 40 А через последовательно соединенные три куска провода одинаковой длины, но различного сечения — 10; 4 и 1 мм2 плотность его будет различна: 4, 10 и 40 А/мм2. В последнем куске самая высокая плотность тока, и соответственно, самые высокие потери мощности. Провод сечением 10 мм2 слегка нагреется, температура провода сечением 4 мм2 достигнет допустимой, а изоляция провода сечением 1 мм2 просто сгорит.

2. Методы реализации и необходимые материалы.

Основное отличие короткого замыкания от перегрузки заключается в том, что при коротком замыкании нарушение изоляции является причиной аварийного режима, а при перегрузке - его следствием. При определенных обстоятельствах перегрузка проводов и кабелей в связи с большей длительностью аварийного режима более пожароопасна, чем короткое замыкание. Материал жилы проводов оказывает существенное влияние на зажигающую способность при перегрузках. Сравнение показателей пожарной опасности проводов марок АПВ и ПВ, полученных при испытаниях в режиме перегрузки, показывает, что вероятность воспламенения изоляции в проводах с медными токопроводящими жилами выше, чем у алюминиевых. При коротком замыкании наблюдается та же закономерность. Прожигающая способность дуговых разрядов в цепях с медными токопроводящими жилами более высокая, чем с жилами из алюминия. Например, стальная труба с толщиной стенки 2,8 мм прожигается (или воспламеняется горючий материал на ее поверхности) при сечении жилы из алюминия 16 мм2, а с медной жилой — при сечении 6 мм2. Кратность тока определяется отношением тока короткого замыкания или перегрузки к длительно допустимому току для данного сечения проводника. Наибольшей пожарной опасностью обладают провода и кабели с полиэтиленовой оболочкой, а также полиэтиленовые трубы при прокладке в них проводов и кабелей. Электропроводки в полиэтиленовых трубах в пожарном отношении представляют большую опасность, чем электропроводки в винипластовых трубах, поэтому область применения полиэтиленовых труб значительно уже. Особенно опасна перегрузка в частных жилых домах, где, как правило, от одной сети питаются все потребители, а аппараты защиты нередко отсутствуют или рассчитаны только на ток короткого замыкания. В многоэтажных жилых домах также ничто не препятствует жильцам пользоваться более мощными лампами или включать бытовые электроприборы общей мощностью большей, чем та, на которую рассчитана сеть.

3. Анализ и результаты работы

На электроустановочных устройствах (розетках, выключателях, патронах и т. д.) указаны предельные значения токов, напряжений, мощности, а на зажимах, разъемах и других изделиях, кроме того, наибольшие сечения присоединяемых проводников. Для безопасного пользования этими устройствами необходимо уметь расшифровывать эти надписи. Например, на выключателе нанесено «6,3 А; 250 В», на патроне — «4 А; 250 В; 300 Вт», а на удлинителе-разветвителе — «250 В; 6,3 А», «220 В. 1300 Вт», «127 В, 700 Вт». «6,3 А» предупреждает о том, что ток, проходящий через выключатель, не должен превышать 6,3 А, иначе выключатель перегреется. Для любого меньшего тока выключатель годится, так как чем меньше ток, тем меньше нагревается контакт. Надпись «250 В» указывает, что выключатель может применяться в сетях напряжением не выше 250 В. Если умножить 4 А на 250 В, то получится 1000, а не 300 Вт. Как связать вычисленное значение с надписью? Надо исходить из мощности. При напряжении в сети 220 В допустимый ток: 1,3 А (300:220); при напряжении 127 В — 2,3 А (300—127). Току 4 А соответствует напряжение 75 В (300:4). Надпись «250 В; 6,3 А» указывает, что устройство предназначено для сетей напряжением не более 250 В и для тока не более 6,3 А. Умножая 6,3 А на 220 В, получаем 1386 Вт (округленно 1300 Вт). Умножая 6,3 А на 127 В, получаем 799 Вт (округленно 700 Вт). Возникает вопрос: не опасно ли так округлять? Не опасно, так как после округления получились меньшие значения мощности. Если мощность меньше, то меньше нагреваются контакты. При протекании через контактное соединение электрического тока из-за переходного сопротивления на контактном соединении падает напряжение, мощность и выделяется энергия, которая вызывает нагрев контактов. Чрезмерное увеличение тока в цепи или возрастание сопротивления ведет к дальнейшему повышению температуры контакта и подводящих проводов, что может вызвать пожар. В электроустановках применяются неразъемные контактные соединения (пайка, сварка) и разъемные (на винтах, втычные контакты, пружинящие и т. п.), а также контакты коммутационных устройств — магнитных пускателей, реле, выключателей и других аппаратов, специально предназначенных для замыкания и размыкания электрических цепей, т. е. для их коммутации. В сетях внутридомового электроснабжения от ввода до приемника электроэнергии электрический ток нагрузки протекает через большое количество контактных соединений.

4. Обсуждение.

Контактные соединения никогда, ни при каких обстоятельствах не должны нарушаться. Однако исследования проведенные некоторое время назад над оборудованием внутридомовых сетей, показали, что из всех обследованных контактов только 50 % удовлетворяют требованиям ГОСТа. При протекании тока нагрузки в некачественном контактном соединении за единицу времени выделяется значительное количество тепла, пропорциональное квадрату тока (плотности тока) и сопротивлению точек

действительного соприкосновения контакта. Если разогретые контакты будут соприкасаться с горючими материалами, то возможно их воспламенение или обугливание и загорание изоляции проводов. Величина переходного сопротивления контактов зависит от плотности тока, силы сжатия контактов (величины площади сопротивления), от материала, из которого они изготовлены, степени окисления контактных поверхностей и т. д.Для уменьшения плотности тока в контакте (а значит, и температуры) необходимо увеличить площадь действительного соприкосновения контактов. Если контактные плоскости прижать друг к другу с некоторой силой, мелкие бугорки в местах касания будут незначительно смяты.Из-за этого увеличатся размеры соприкасающихся элементарных площадок и появятся дополнительные площадки касания, а плотность тока, переходное сопротивление и нагрев контакта снизятся. Экспериментальные исследования показали, что между сопротивлением контакта и величиной крутящего момента (силой сжатия) существует обратно пропорциональная зависимость. С уменьшением крутящего момента в 2 раза сопротивление контактного соединения провода АПВ сечением 4 мм2 или двух проводов сечением 2,5 мм2 увеличивается в 4—5 раз. Для отвода тепла от контактов и рассеивания его в окружающую среду изготавливают контакты определенной массы и поверхности охлаждения.

5. Выводы и предложения.

Особое внимание уделяют местам соединения проводов и подключения их к контактам вводных устройств электроприемников. На съемных концах проводов применяют наконечники различной формы и специальные зажимы. Надежность контакта обеспечивается обычными шайбами, пружинящими и с бортиками. Через 3—3,5 года сопротивление контакта увеличивается примерно в 2 раза. Значительно увеличивается сопротивление контактов и при коротком замыкании в результате краткого периодического воздействия тока на контакт. Испытания показали, что наибольшую стабильность при воздействии неблагоприятных факторов имеют контактные соединения с упругими пружинящими шайбами. К сожалению, «экономия на шайбах» — явление довольно распространенное. Шайба должна быть из цветного металла, например, из латуни. Стальную шайбу защищают антикоррозийным покрытием.

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СИСТЕМНЫЕ И ПАТОФИЗИОЛОГИЧЕСКИЕ ИЗМЕНЕНИЯ В ОРГАНИЗМЕ ПРИ ДЕФИЦИТЕ ВИТАМИНА B_{12}

АННОТАЦИЯ: дефицит витамина B_{12} (кобаламина) является одной из наиболее распространённых причин мегалобластной анемии и сопровождается множественными системными нарушениями, затрагивающими кроветворную, нервную и пищеварительную системы. В статье представлены современные данные о патогенезе, клинических проявлениях, диагностике и лечении анемии, вызванной дефицитом витамина B_{12}. Анализ литературы показывает, что своевременная диагностика и терапия способствуют предотвращению невроло...

Ключевые слова: витамин B_{12}; дефицит; мегалобластная анемия; гомоцистеин; метилмалоновая кислота; неврологические осложнения; эритропоэз; диагностика.

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SYSTEMIC AND PATHOPHYSIOLOGICAL CHANGES IN THE HUMAN BODY DUE TO VITAMIN B_{12} DEFICIENCY

Abstract: *Vitamin B_{12} (cobalamin) deficiency is one of the most common causes of megaloblastic anemia and is accompanied by multiple systemic disorders affecting the hematopoietic, nervous, and digestive systems. This article presents current data on the pathogenesis, clinical manifestations, diagnosis, and treatment of anemia caused by vitamin B_{12} deficiency. A review of the literature shows that timely diagnosis and adequate therapy help prevent neurological complications and restore normal erythropoiesis.*

Keywords: *vitamin B_{12}; deficiency; megaloblastic anemia; homocysteine; methylmalonic acid; neurological complications; erythropoiesis; diagnosis.*

ВВЕДЕНИЕ

Витамин b_{12} (кобаламин) представляет собой водорастворимое соединение, играющее ключевую роль в клеточном метаболизме, кроветворении и функционировании нервной системы. Он участвует в двух основных ферментативных реакциях: метилировании гомоцистеина до метионина и изомеризации метилмалонил-соа в сукцинил-соа. Эти процессы обеспечивают синтез днк, образование миелина и нормальный метаболизм жирных кислот [1], [4], [9].

Недостаточность витамина b_{12} приводит к нарушению репликации днк и замедлению деления быстро пролиферирующих клеток, особенно в костном мозге, что вызывает развитие мегалобластной анемии [3], [7]. Помимо гематологических изменений, дефицит кобаламина вызывает неврологические расстройства, включая дегенерацию задних и боковых столбов спинного мозга, периферическую нейропатию и когнитивные нарушения [5], [10]. При длительном течении заболевание может имитировать неврологические патологии, такие как рассеянный склероз или деменция [11].

По данным всемирной организации здравоохранения, дефицит витамина b_{12} наблюдается у 10–20% пожилых людей и до 40% лиц, придерживающихся вегетарианского или веганского типа питания [2], [8]. В странах с низким и средним уровнем дохода частота гипокобаламинемии особенно высока вследствие алиментарных факторов, заболеваний желудочно-кишечного тракта (в частности, атрофического гастрита, мальабсорбции, резекции желудка), а также глистных инвазий [6], [12].

Современные диагностические критерии включают определение уровня сывороточного витамина b_{12}, метилмалоновой кислоты и гомоцистеина. Однако из-за низкой специфичности отдельных маркеров рекомендуется использовать их комбинацию для повышения точности диагностики [13], [14].

Изучение патогенеза, клинических проявлений и лабораторных характеристик дефицита витамина b_{12} имеет большое значение для своевременного выявления и эффективной терапии пациентов. В связи с этим целью данного обзора является анализ современных данных о патофизиологических изменениях в организме при недостаточности витамина b_{12} и обсуждение ключевых направлений профилактики и коррекции данного состояния [15]–[17].

МАТЕРИАЛЫ И МЕТОДЫ

Настоящий обзор основан на анализе отечественных и зарубежных научных источников, посвящённых патогенезу, клиническим проявлениям и системным изменениям при дефиците витамина b_{12}.

Были проанализированы клинические наблюдения, экспериментальные исследования, обзоры литературы и метаанализы, отражающие влияние дефицита витамина b_{12} на различные системы организма.

Критериями включения являлись:

- Наличие достоверных данных о концентрации витамина b_{12} в сыворотке крови;
- Описанные лабораторные показатели (уровень гомоцистеина, метилмалоновой кислоты, морфология эритроцитов);
- Клинические признаки мегалобластной анемии и неврологических нарушений;
- Оценка терапевтической эффективности заместительной терапии кобаламином.

методологическая основа обзора включает сравнительно-аналитический подход с систематизацией данных по следующим направлениям:

1. Изменения в системе кроветворения при гипокобаламинемии;
2. Метаболические и биохимические последствия дефицита витамина b_{12};
3. Неврологические осложнения и морфологические изменения нервной ткани;
4. Терапевтические и профилактические подходы к коррекции состояния.

РЕЗУЛЬТАТЫ И ОБСУЖДЕНИЕ

Патогенез дефицита витамина b_{12} в норме витамин b_{12} поступает с пищей животного происхождения и связывается во рту с r-белками слюны. В желудке под действием пепсина он освобождается и соединяется с внутренним фактором кастла, вырабатываемым обкладочными клетками. Комплекс витамин b_{12}-внутренний фактор всасывается в подвздошной кишке [2], [7]. Нарушение любого из этих этапов приводит к развитию дефицита.

На клеточном уровне b_{12} служит коферментом метионин-синтазы и метилмалонил-соа-мутазы. Недостаточность вызывает «ловушку фолатов», накопление метилмалоновой кислоты и гомоцистеина, что нарушает синтез днк и миелина [5], [6]. Эти процессы лежат в основе развития мегалобластной анемии и неврологических расстройств.

Гематологические изменения - основным проявлением является макроцитарная анемия, характеризующаяся увеличением среднего объёма эритроцитов (mcv > 100 фл), гиперсегментацией нейтрофилов и наличием мегалобластов в костном мозге. Также отмечается панцитопения при тяжёлых формах дефицита [8], [10].

Эритроциты становятся хрупкими, снижается их продолжительность жизни, усиливается внутрикостномозговой гемолиз. Уровень гемоглобина снижается до 70–90 г/л, лейкоциты и тромбоциты — ниже нормы. После коррекции b_{12} через 7–10 дней наблюдается ретикулоцитарный криз, что служит диагностическим критерием эффективности терапии [12].

Неврологические и когнитивные нарушения дефицит b_{12} вызывает поражение задних и боковых канатиков спинного мозга (фуникулярный миелоз), периферическую нейропатию, когнитивные расстройства и

депрессию. Пациенты жалуются на парестезии, слабость, нарушение походки, снижение памяти и внимания [4], [14].

Исследования нейровизуализации выявляют демиелинизацию белого вещества, особенно в шейном и грудном отделах спинного мозга, а также уменьшение объёма серого вещества мозга [15], [16]. При длительном дефиците неврологические симптомы становятся необратимыми.

Лечение заключается в парентеральном введении витамина b_{12} (цианокобаламин 1000 мкг внутримышечно ежедневно в течение 10 дней, затем еженедельно, а позже — ежемесячно). При лёгких формах возможен пероральный приём высоких доз. Заместительная терапия ведёт к нормализации гемограммы в течение 4–8 недель и частичному восстановлению нервных функций [17], [18].

ЗАКЛЮЧЕНИЕ

Дефицит витамина b_{12} остаётся актуальной проблемой современной медицины. Он приводит к нарушениям кроветворения, метаболизма и нервной деятельности. Своевременное выявление и лечение позволяют избежать тяжёлых последствий, включая деменцию и необратимую нейропатию. Ранняя диагностика, скрининг групп риска и информирование населения о пищевых источниках витамина b_{12} являются ключевыми мерами профилактики.

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СОВРЕМЕННЫЕ ПОДХОДЫ К ПРОФИЛАКТИКЕ И ЛЕЧЕНИЮ ЖЕЛЕЗОДЕФИЦИТНОЙ АНЕМИИ У ДЕТЕЙ: ОБЗОР ЛИТЕРАТУРЫ

Аннотация: Железодефицитная анемия (ЖДА) остаётся одной из наиболее распространённых патологий у детей, представляя серьёзную проблему общественного здравоохранения. В статье представлен обзор современных отечественных и зарубежных исследований, посвящённых эпидемиологии, патогенезу, клиническим особенностям, профилактике и лечению ЖДА у детей. Особое внимание уделено профилактическим стратегиям, основанным на рациональном питании, использовании обогащённых продуктов, пероральных препаратах железа и образовательных программах для родителей. Подчёркивается значение ранней диагностики и комплексного подхода в профилактике анемии в детском возрасте.

Ключевые слова: *железодефицитная анемия, дети, профилактика, недоношенные, препараты железа, алиментарный дефицит, общественное здравоохранение.*

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MODERN APPROACHES TO THE PREVENTION AND TREATMENT OF IRON DEFICIENCY ANEMIA IN CHILDREN: A LITERATURE REVIEW

Abstract: *Iron deficiency anemia (IDA) remains one of the most widespread disorders among children and represents a serious public health problem. This article provides an overview of recent national and international studies devoted to the epidemiology, pathogenesis, clinical features, prevention, and treatment of IDA*

in children. Special attention is given to preventive strategies based on rational nutrition, the use of fortified food products, oral iron preparations, and educational programs for parents. The importance of early diagnosis and a comprehensive approach to the prevention of anemia in childhood is emphasized.

Keywords: *iron deficiency anemia, children, prevention, premature infants, iron preparations, nutritional deficiency, public health.*

ВВЕДЕНИЕ

Железодефицитная анемия (жда) — одно из самых распространённых микронутриентных нарушений в мире. По данным всемирной организации здравоохранения, более 40 % детей младше пяти лет имеют анемию различной степени тяжести, и в 70–90 % случаев она обусловлена дефицитом железа [1]. Железо играет ключевую роль в биологических процессах: синтезе гемоглобина, транспорте кислорода, функционировании митохондрий и формировании когнитивных способностей [2]. Дефицит железа у детей может привести к задержке физического и умственного развития, нарушению иммунного ответа и снижению адаптационных возможностей организма [3]. В последние годы опубликовано множество исследований, посвящённых влиянию анемии на нейрокогнитивное развитие, структуру питания, социально-экономические факторы риска и оптимальные методы профилактики [4–7]. Анализ этих данных позволяет выработать комплексные стратегии для снижения распространённости жда среди детей.

ЭПИДЕМИОЛОГИЯ И ФАКТОРЫ РИСКА

По данным метаанализов, уровень анемии среди детей остаётся высоким в странах с низким и средним уровнем дохода. В азии и африке распространённость жда у детей достигает 35–50 % [4]. В странах центральной азии, включая узбекистан, распространённость среди детей дошкольного возраста колеблется от 30 до 45 % [5]. Основные факторы риска включают анемию у матери во время беременности, преждевременные роды, короткие интервалы между родами, недостаточное потребление продуктов, богатых железом, хронические инфекции и низкий социально-экономический статус семьи [6].

СОВРЕМЕННЫЕ ПОДХОДЫ К ПРОФИЛАКТИКЕ

Профилактика жда у детей должна начинаться в антенатальном периоде. Воз рекомендует беременным женщинам ежедневный приём 30–60 мг элементарного железа и 400 мкг фолиевой кислоты [1]. В постнатальном периоде профилактика включает поддержку грудного вскармливания, рациональное питание с включением мясных продуктов, использование обогащённых продуктов и профилактическое применение препаратов железа. Применение железосодержащих препаратов в дозах 1–2 мг/кг/сут у детей из групп риска снижает распространённость анемии на 30–40 % [6]. Препараты трёхвалентного железа в форме гидроксид-полимальтозного комплекса обладают лучшей переносимостью и высокой эффективностью.

СОВРЕМЕННЫЕ ТЕНДЕНЦИИ ЛЕЧЕНИЯ И МОНИТОРИНГА

Современные рекомендации основаны на доказательной медицине. Цель терапии — восстановление запасов железа и устранение симптомов гипоксии. Продолжительность лечения должна составлять не менее трёх месяцев, лабораторный контроль проводится через 4–6 недель. Необходимо устранять факторы, мешающие усвоению железа: заболевания жкт, дефицит витамина с, хронические инфекции. Образовательные программы для родителей и обучение принципам рационального питания повышают эффективность профилактических мер [3, 4].

ОБСУЖДЕНИЕ

Анализ современных литературных источников показывает, что ключевым направлением профилактики жда является многоуровневый подход, включающий медико-биологические, социальные и образовательные меры. Несмотря на наличие эффективных препаратов, уровень анемии остаётся высоким, что требует усиления профилактических программ и улучшения информированности населения. Регулярный контроль гемоглобина и скрининг анемии среди детей являются действенными инструментами профилактики.

ЗАКЛЮЧЕНИЕ

Железодефицитная анемия у детей остаётся актуальной проблемой. Эффективная профилактика должна начинаться во время беременности и продолжаться в раннем детстве. Образовательные программы, рациональное питание, использование обогащённых продуктов и профилактический приём препаратов железа позволяют снизить распространённость анемии и улучшить здоровье детей.

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ВЛИЯНИЕ АУТОИММУННЫХ ПРОЦЕССОВ НА СИСТЕМУ ГЕМОСТАЗА: СОВРЕМЕННЫЕ ПРЕДСТАВЛЕНИЯ

Аннотация: Аутоиммунные заболевания характеризуются сложными изменениями в системе гемостаза, которые проявляются как склонностью к тромбообразованию, так и развитием кровоточивости. Иммунопатологические механизмы, включающие активацию цитокинов, образование аутоантител и повреждение эндотелия, лежат в основе этих нарушений. В данной обзорной статье рассмотрены современные данные о влиянии аутоиммунных процессов на тромбоцитарное, коагуляционное и фибринолитическое звенья гемостаза при системной красной волчанке, ревматоидном артрите, системной склеродермии и антифосфолипидном синдроме.

Ключевые слова: *гемостаз, аутоиммунные заболевания, антифосфолипидный синдром, тромбоциты, эндотелиальная дисфункция.*

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THE INFLUENCE OF AUTOIMMUNE PROCESSES ON THE HEMOSTASIS SYSTEM: CURRENT PERSPECTIVES

Abstract: Autoimmune diseases are characterized by complex disturbances in the hemostatic system, manifesting both as a tendency toward thrombosis and increased bleeding. Immunopathological mechanisms such as cytokine activation, autoantibody formation, and endothelial injury underlie these disorders. This review article summarizes current findings on the influence of autoimmune processes on platelet, coagulation, and fibrinolytic components of hemostasis in

systemic lupus erythematosus, rheumatoid arthritis, systemic sclerosis, and antiphospholipid syndrome.

Keywords: Hemostasis, autoimmune diseases, antiphospholipid syndrome, platelets, endothelial dysfunction

Введение

Система гемостаза представляет собой сложный физиологический механизм, обеспечивающий поддержание жидкого состояния крови и предотвращение кровопотерь при повреждении сосудистой стенки. Она включает три основных звена: тромбоцитарное (сосудисто-тромбоцитарное), коагуляционное (плазменное) и фибринолитическое. Их скоординированная работа обеспечивает динамическое равновесие между процессами свертывания и фибринолиза, предотвращая как тромбообразование, так и кровоточивость [1]. При аутоиммунных заболеваниях это равновесие нарушается вследствие хронической активации иммунной системы и выработки аутоантител, направленных против собственных клеточных и плазменных структур организма. Эти патологические антитела и цитокины повреждают эндотелий сосудов, активируют тромбоциты и изменяют активность факторов свертывания, что ведёт к формированию гиперкоагуляционного состояния [2].

Одним из ключевых звеньев патогенеза является эндотелиальная дисфункция — нарушение способности сосудистых клеток регулировать тонус сосудов, тормозить агрегацию тромбоцитов и контролировать образование тромбов. Повреждение эндотелия сопровождается повышением экспрессии молекул адгезии (ICAM-1, VCAM-1), активацией тканевого фактора и снижением продукции оксида азота (NO), что способствует вазоконстрикции и тромбообразованию [3]. Наиболее изученными аутоиммунными заболеваниями, сопровождающимися нарушениями гемостаза, являются системная красная волчанка (СКВ), антифосфолипидный синдром (АФС), ревматоидный артрит (РА) и системная склеродермия (ССД). При СКВ наблюдается образование аутоантител к фосфолипидам и клеточным компонентам, что приводит к повреждению сосудов и тромбоцитопении [4]. При АФС происходит активация тромбоцитов и коагуляционного каскада вследствие наличия антифосфолипидных антител, что повышает риск артериальных и венозных тромбозов [5]. Ревматоидный артрит сопровождается системным воспалением, приводящим к повышению уровней фибриногена, фактора VIII и снижению активности естественных антикоагулянтов. Системная склеродермия характеризуется фиброзом сосудистой стенки и микроангиопатией, что также нарушает сосудистую реактивность [6].

Кроме того, хроническое воспаление и оксидативный стресс усиливают повреждение сосудистой стенки и нарушают функцию тромбоцитов. Медиаторы воспаления, включая интерлейкин-6, фактор некроза опухоли α (TNF-α) и интерферон-γ, способствуют активации коагуляционного каскада и

угнетению фибринолиза. Эти механизмы создают условия для стойкой гиперкоагуляции и повышенного риска тромботических осложнений [7].

Актуальность изучения влияния аутоиммунных процессов на систему гемостаза определяется высокой частотой тромбоэмболических событий у таких пациентов и сложностью их лечения. Выявление ранних маркеров гемостатических нарушений, а также понимание взаимодействия иммунной и свертывающей систем открывают перспективы для разработки таргетных терапевтических подходов и персонализированных схем профилактики [8].

РЕЗУЛЬТАТЫ И ОБСУЖДЕНИЕ

При системной красной волчанке основными проявлениями являются тромбоцитопения и образование аутоантител к тромбоцитам, что способствует их разрушению и нарушению гемостатического равновесия. Одновременно повышенные уровни цитокинов, таких как IL-6 и TNF-α, активируют тромбоциты, повышая риск тромбообразования. В антифосфолипидном синдроме наблюдается гиперактивация тромбоцитов и эндотелиальная дисфункция, что обусловлено взаимодействием антифосфолипидных антител с фосфолипидными структурами мембран. Ревматоидный артрит сопровождается хроническим воспалением, повышением уровней факторов свертывания VII и VIII, а также снижением активности естественных антикоагулянтов. При системной склеродермии наблюдаются признаки микроангиопатии и гипофибринолиза, что повышает риск тромбозов мелких сосудов. Таким образом, аутоиммунные процессы оказывают системное влияние на все звенья гемостаза, вызывая сочетание гиперкоагуляции и нарушений фибринолиза.

ЗАКЛЮЧЕНИЕ

Нарушения гемостаза при аутоиммунных заболеваниях имеют полиэтиологическую природу и обусловлены взаимодействием воспалительных, иммунных и эндотелиальных факторов. Своевременное выявление изменений системы свертывания и применение индивидуализированных терапевтических стратегий позволяют снизить риск тромботических осложнений и улучшить прогноз пациентов. Дальнейшие исследования должны быть направлены на изучение молекулярных механизмов иммунного повреждения эндотелия и поиск новых биомаркеров для ранней диагностики гемостатических нарушений.

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РОЛЬ ЛАБОРАТОРНЫХ ИССЛЕДОВАНИЙ В РАННЕЙ ДИАГНОСТИКЕ АУТОИММУННОГО ГЕПАТИТА

Аннотация*: Аутоиммунный гепатит (АИГ) — это хроническое воспалительное заболевание печени, обусловленное иммунной атакой на собственные гепатоциты, что при поздней диагностике может привести к развитию цирроза и печёночной недостаточности. Клинические проявления АИГ, как правило, неспецифичны, поэтому ранняя диагностика основывается преимущественно на лабораторных исследованиях. В статье подробно рассмотрена роль биохимических (аминотрансферазы, билирубин, ферменты печени), иммунологических (иммуноглобулин G, аутоантитела — ANA, ASMA, LKM1, SLA) и морфологических (биопсия печени) показателей в раннем выявлении заболевания.*

Результаты анализа показывают, что сочетанная оценка уровня аминотрансфераз, IgG и положительных аутоантител повышает вероятность раннего выявления АИГ до 90 %. Кроме того, рассмотрены вопросы дифференциальной диагностики с вирусными и токсическими гепатитами, последовательность лабораторных тестов и практическое значение динамического мониторинга. На основе современных диагностических алгоритмов и клинических рекомендаций предложена стратегия раннего выявления АИГ, адаптированная к условиям системы здравоохранения Узбекистана.

Ключевые слова: *аутоиммунный гепатит; лабораторная диагностика; ранняя диагностика; аминотрансферазы; иммуноглобулин G (IgG); аутоантитела (ANA, ASMA, LKM-1, SLA); биопсия печени; ферменты печени; иммунологические маркеры; клиническая стратегия диагностики.*

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THE ROLE OF LABORATORY INVESTIGATIONS IN THE EARLY DIAGNOSIS OF AUTOIMMUNE HEPATITIS

Abstract: *Autoimmune hepatitis (AIH) is a chronic inflammatory liver disease caused by an immune-mediated attack on hepatocytes, which, if diagnosed late, can progress to cirrhosis and liver failure. Because the clinical manifestations of AIH are often nonspecific, early diagnosis relies primarily on laboratory investigations. This article comprehensively analyzes the diagnostic value of biochemical (aminotransferases, bilirubin, liver enzymes), immunological (immunoglobulin G, autoantibodies – ANA, ASMA, LKM1, SLA), and morphological (liver biopsy) markers in the early detection of AIH.*

The analysis shows that a combined evaluation of aminotransferase levels, elevated IgG concentration, and positive autoantibody profiles increases the likelihood of early diagnosis up to 90%. In addition, the paper discusses differential diagnosis from viral and toxic hepatitis, the logical sequence of laboratory testing, and the importance of dynamic monitoring. Based on contemporary diagnostic algorithms and international clinical recommendations, a strategy for early detection of AIH adapted to the healthcare context of Uzbekistan is proposed.

Keywords: *autoimmune hepatitis; laboratory diagnosis; early detection; aminotransferases; immunoglobulin G (IgG); autoantibodies (ANA, ASMA, LKM-1, SLA); liver biopsy; liver enzymes; immunological markers; clinical diagnostic strategy.*

Введение

Аутоиммунный гепатит (АИГ) — это хроническое воспалительное заболевание печени, характеризующееся атакой иммунной системы на гепатоциты, при этом этиология заболевания до конца не установлена. АИГ чаще встречается у женщин и отличается разнообразием клинических проявлений — от бессимптомного течения до тяжелых форм, напоминающих острый гепатит.

По данным Американской ассоциации по изучению заболеваний печени (AASLD) [8], АИГ составляет 5–10 % всех случаев хронических заболеваний печени. При несвоевременной диагностике заболевание может привести к раннему фиброзу, циррозу и печёночной недостаточности. Согласно последним отчётам Центра биотехнологий, в патогенезе АИГ играют роль генетическая предрасположенность (аллели HLA-DR3, DR4), вирусные инфекции, гормональные и экологические факторы, а также нарушения иммунорегуляции.

На ранних стадиях симптомы заболевания, как правило, неспецифичны: усталость, снижение аппетита, диспепсические явления, иногда лёгкая желтушность кожи и склер. Поэтому АИГ часто ошибочно принимают за вирусный, алкогольный или лекарственно-индуцированный гепатит. По данным РМС [5], у 40 % пациентов диагноз ставится уже на стадии формирования фиброзно-цирротических изменений.

Основным инструментом ранней диагностики АИГ является лабораторное обследование, позволяющее определить иммунные механизмы заболевания, степень активности воспалительного процесса и эффективность

терапии. Лабораторные тесты играют ключевую роль не только в постановке диагноза, но и в проведении дифференциальной диагностики с другими заболеваниями печени.

Роль лабораторных исследований и этапы диагностики

Лабораторные исследования занимают центральное место в диагностике аутоиммунного гепатита. С их помощью определяются иммунологическая природа заболевания, степень активности, дифференциальные критерии и эффективность лечения. По данным AASLD (2023), 60–70 % случаев АИГ выявляются на этапе лабораторного обследования, когда клинические симптомы ещё отсутствуют.

Биохимические тесты печени

Первым этапом является определение активности печёночных ферментов. Аспартат- (AST) и аланинаминотрансфераза (ALT) — наиболее чувствительные, но не специфичные маркеры АИГ. Их уровень может превышать норму в 5–15 раз, реже — только в 1,5–2 раза на ранней стадии. Согласно данным Центра биотехнологий (2024), повышение AST/ALT отмечается у 92 % больных АИГ, тогда как у 8 % показатели остаются в пределах нормы.

Рост активности аминотрансфераз отражает некроз гепатоцитов, но не является специфическим диагностическим критерием, поэтому проводится расширенное биохимическое исследование: определяются билирубин (общий и прямой), щелочная фосфатаза (ЩФ), гамма-глутамилтранспептидаза (ГГТ), протромбиновое время и альбумин. При АИГ ЩФ обычно остаётся нормальной или слегка повышенной, что помогает отличить его от холестатических заболеваний печени.

Иммуноглобулины и гипергаммаглобулинемия

Характерным лабораторным признаком АИГ является повышение уровня иммуноглобулина G (IgG). Согласно рекомендациям AASLD и EASL (2022), увеличение IgG более чем в 1,1 раза от нормы рассматривается как диагностический критерий АИГ. Повышение IgG отмечается у 90–95 % пациентов с АИГ 1-го типа и у 80 % с АИГ 2-го типа. Увеличение IgM или IgA, как правило, указывает на другие патологии печени (например, первичный билиарный холангит или алкогольный гепатит).

Определение уровня IgG используется не только для диагностики, но и для оценки активности заболевания и эффективности терапии. Снижение IgG при лечении преднизолоном или азатиоприном свидетельствует об улучшении клинического состояния.

Серологические тесты на аутоантитела

Серологические тесты подтверждают иммунную природу АИГ:

12. • **ANA (антинуклеарные антитела)** — положительны примерно у 80 % больных АИГ 1-го типа.

13. • **ASMA (антитела к гладким мышцам)** — выявляются в 63 % случаев.

14. • **Anti-LKM-1 (антитела к микросомам печени и почек)** —

специфичны для АИГ 2-го типа, чаще встречаются у детей.

15. • **Anti-SLA/LP (антитела к растворимому печёночному антигену)** — обладают наивысшей специфичностью (95–100 %).

Отсутствие этих антител не исключает диагноз АИГ: серонегативные формы встречаются у 10–15 % пациентов, и тогда диагноз подтверждается по уровню IgG и данным биопсии.

Гистологическое подтверждение и роль лабораторных данных

Для окончательного подтверждения диагноза проводится биопсия печени. В гистологической картине выявляются лимфоплазмоцитарная инфильтрация, разрушение портальных трактов и признаки интерфейсного гепатита. Биопсия помогает также исключить вирусный гепатит В и С, а также стеатогепатит.

Дифференциально-диагностические лабораторные критерии

С помощью лабораторных тестов проводится дифференциальная диагностика:

•• **Вирусные гепатиты (HBV, HCV, HEV)** — исключаются по вирусным маркерам.

•• **Лекарственно-индуцированное поражение печени** — подтверждается по анамнезу и эозинофилии.

•• **Метаболические заболевания** (болезнь Вильсона, гемохроматоз) — диагностируются по уровню церулоплазмина, меди, ферритина и насыщению трансферрина.

•• **Алкогольный гепатит** — характеризуется повышением ГГТ и MCV при отсутствии аутоантител.

Этапы диагностического алгоритма

8. 1. Повышение ферментов печени (AST, ALT, билирубин).
9. 2. Измерение IgG и γ-глобулинов.
10. 3. Тестирование на аутоантитела (ANA, ASMA, anti-LKM1, anti-SLA).
11. 4. Исключение вирусных, метаболических и лекарственных причин.
12. 5. Подтверждение диагноза по результатам биопсии.

Комплексное выполнение всех этапов позволяет достичь диагностической точности до 95 % [3].

Значение лабораторного мониторинга

После постановки диагноза регулярный лабораторный контроль необходим для оценки эффективности терапии. Нормализация AST/ALT, снижение IgG и титра аутоантител свидетельствуют о ремиссии, а их повторное повышение — о рецидиве.

Современные лабораторные технологии

Современные биотехнологические подходы включают:

•• мультиплекс-ELISA для одновременного определения нескольких аутоантител;

•• платформы с рекомбинантными антигенами (anti-SLA, anti-LC1);

•• протеомные тесты для выявления новых иммунных маркеров

(например, CYP2D6, FTCD).

По данным Центра биотехнологий (2024), внедрение этих технологий повышает точность ранней диагностики АИГ на 15–20 %.

Диагностическая стратегия

Диагностика АИГ требует комплексного, поэтапного подхода, включающего клиническую оценку, лабораторно-иммунологическое тестирование и морфологическое подтверждение.

•• **Клинический этап:** подозрение на АИГ при необъяснимом повышении трансаминаз и отсутствии вирусных маркеров.

•• **Лабораторно-иммунологический этап:** выявление IgG, аутоантител и исключение других причин.

•• **Гистологический этап:** подтверждение диагноза по биоптату печени.

Интеграция всех данных позволяет достичь диагностической точности до 95 % и своевременно начать лечение.

Практические рекомендации

1. 1. Проводить лабораторный скрининг при любом повышении АЛТ/АСТ неизвестного происхождения.
2. 2. Включить в стандартное обследование определение IgG, ANA, ASMA, anti-LKM1, anti-SLA.
3. 3. Оценивать результаты комплексно, с учётом клиники и анамнеза.
4. 4. Контролировать IgG и аутоантитела каждые 3–6 месяцев у пациентов с подтверждённым АИГ.
5. 5. Исключать вирусные и метаболические причины поэтапно (HBsAg, anti-HCV, церулоплазмин, ферритин).
6. 6. Направлять пациентов к гепатологу или иммунологу при стойком повышении трансаминаз и отрицательных вирусных маркерах.
7. 7. Перед началом иммуносупрессивной терапии проводить расширенную оценку функций печени, почек, крови и обмена веществ.
8. 8. Внедрить в лабораториях стандартный «Скрининговый панельный тест на АИГ» (ALT, AST, IgG, ANA, ASMA, anti-LKM1, anti-SLA).

Заключение

Ранняя диагностика аутоиммунного гепатита требует комплексного лабораторного подхода. Повышение трансаминаз, уровня IgG и наличие аутоантител — ключевые маркеры, которые необходимо интерпретировать в совокупности с клинической картиной. Своевременное выявление и мониторинг позволяют улучшить прогноз, снизить риск развития цирроза и печёночной недостаточности.

В условиях системы здравоохранения Узбекистана внедрение интегрированных лабораторных стратегий и включение аутоиммунных маркеров в стандартный скрининг заболеваний печени позволит значительно повысить эффективность ранней диагностики и снизить число запущенных случаев АИГ.

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КЛИНИЧЕСКИЕ АСПЕКТЫ ИСПОЛЬЗОВАНИЯ L – АРГИНИНА В КОМПЛЕКСНОЙ ТЕРАПИИ БОЛЬНЫХ ИБС В УСЛОВИЯХ СЕМЕЙНОЙ ПОЛИКЛИНИКИ

Аннотация*: Исследование клинической эффективности и переносимости L – аргинина в комплексном лечении больных стабильной стенокардией напряжения. Оценено влияние аргинина на частоту и продолжительность приступов стенокардии, характер течения ИБС, а также изменения суточного ЭКГ. Использование L – аргинина, как дополнение к стандартной медикаментозной терапии, улучшает клиническое течение ИБС и качество жизни пациентов благодаря высокому антиангинальному действию. Более выраженное положительное влияние на клинические показатели болезни наблюдались при длительном использовании L– аргинина на протяжении 12 недель.*

Ключевые слова: *L – аргинин, стенокардия, антиангинальное, антиишемическое действие.*

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CLINICAL ASPECTS OF L-ARGININE USE IN COMPLEX THERAPY OF PATIENTS WITH CHRONARY HEALTH DISEASE IN A FAMILY CLINIC

Abstract: *This study explores the clinical effectiveness and tolerability of L-arginine as part of a comprehensive treatment for patients with stable exertional angina. The research evaluates the impact of L-arginine on the frequency and duration of angina attacks, the course of coronary artery disease (CAD), and changes in 24-hour ECG monitoring. The use of L-arginine, as a supplement to standard pharmacological therapy, improves the clinical course of CAD and*

enhances patients' quality of life due to its strong antianginal effect. A more pronounced positive impact on clinical indicators was observed with long-term use of L-arginine over a 12-week period.

***Keywords**: L-arginine, angina, antianginal, anti-ischemic effect.*

Введение

ССЗ на протяжении последних десятилетий занимают стабильное первое мести среди причин инвалидизации и смертности не только в Узбекистане, но и во всем мире. Ведущую роль играет ишемическая болезнь сердца (ИБС). Наиболее частой формой ИБС является стенокардия (60%). Заболеваемость неуклонно увеличивается с возрастом. В основе ИБС лежит атеросклероз коронарных артерий, что приводит к эндотелиальной дисфункции (ЭД). ЭД является ранним и ключевым предиктором неблагоприятного прогноза ССЗ. В этом процессе существенную роль играет оксид азота (NO). NO обладает широким спектром вазо, кардио - протекторного и противовоспалительного действия, включая вазодилатацию, снижение клеточной пролиферации, уменьшение активации и адгезии лейкоцитов к эндотелию, уменьшение адгезии и агрегации тромбоцитов, подавление синтеза эндотелина – 1.

В настоящее время разрабатывается новая терапевтическая концепция лечение пациентов с ИБС путем восстановления адекватной биодоступности NO и улучшение эндотелийзависимой вазодилатации. Для реализации этой цели используется природный предшественник NO – L- аргинин. Целью исследования была оценка клинической эффективности и переносимости L-аргинина у больных стабильной стенокардией, его влияния на качество жизни и прогнозы заболевания.

В последние годы интерес к L-аргинину как к возможному терапевтическому средству значительно возрос. Это связано с его способностью служить субстратом для синтеза оксида азота в эндотелиальных клетках, тем самым способствуя восстановлению нормальной функции сосудов и снижению выраженности ишемических проявлений [9]. Кроме того, в ряде клинических исследований было показано, что L-аргинин способен улучшать переносимость физических нагрузок у пациентов с ИБС, снижать частоту и интенсивность приступов стенокардии, а также положительно влиять на показатели качества жизни [4].

Актуальность изучения эффективности L-аргинина усиливается тем, что стандартная медикаментозная терапия не всегда обеспечивает стойкий клинический эффект, особенно у пациентов с сопутствующими заболеваниями или множественными факторами риска. Таким образом, поиск дополнительных средств, способных воздействовать на патогенетические механизмы болезни, остаётся приоритетной задачей кардиологии [12]. Одним из таких перспективных направлений и является включение L-аргинина в комплексное лечение стабильной стенокардии.

Метод и результаты

В исследование были включены 72 пациента, наблюдавшихся в условиях семейной поликлиники №3 г. Фергана с клинически подтверждённой стабильной стенокардией напряжения II–III функционального класса. Критерии включения соответствовали рекомендациям Европейского общества кардиологов (ESC), адаптированным под амбулаторную практику. Средний возраст пациентов составил 56,2 ± 7,9 лет; мужчин — 68%, женщин — 32%. Более половины (58%) страдали сочетанными патологиями — в частности, артериальной гипертензией, ожирением, нарушением липидного обмена и сахарным диабетом 2 типа. Учитывая высокий полиморбидный фон, в исследовании уделялось внимание как клинической, так и метаболической эффективности терапии.

Пациенты были разделены на две группы по 36 человек: основную (с применением L-аргинина) и контрольную (получающую стандартную терапию). Стандартная терапия включала бета-блокаторы, статин, аспирин, ингибиторы АПФ и пролонгированные нитраты. В основной группе дополнительно применялся L-аргинин внутрь в дозировке 3 г/сутки (в два приёма) в течение 12 недель, как источник субстрата для синтеза эндотелиального оксида азота (NO), с целью восстановления сосудистой функции и уменьшения ишемических проявлений [6].

Для оценки эффективности проводилась динамическая регистрация частоты приступов стенокардии, потребности в нитратах короткого действия, а также суточное мониторирование ЭКГ (Холтер), проба с дозированной физической нагрузкой и анкетирование по шкале SAQ (Seattle Angina Questionnaire) до начала терапии и через 12 недель [10].

Таблица 1. Динамика клинических показателей у пациентов с ИБС в основной и контрольной группах (до и после лечения, M ± m)

Показатель	Основная группа (n=36) до лечения	Основная группа после лечения	Контрольная группа (n=36) до лечения	Контрольная группа после лечения
Частота приступов стенокардии в неделю	5,2 ± 1,4	2,0 ± 0,8	5,4 ± 1,5	4,0 ± 1,2
Кол-во ишемических эпизодов (по ЭКГ Холтера)	6,8 ± 1,7	4,2 ± 1,3	7,0 ± 1,8	6,0 ± 1,5
Балл по шкале SAQ (качество жизни)	48 ± 5	75 ± 6	47 ± 4	56 ± 5

Результаты показали достоверное снижение частоты ангинозных приступов у пациентов основной группы: с 5,2 ± 1,4 до 2,0 ± 0,8 в неделю ($p<0,01$), тогда как в контрольной группе аналогичное снижение было менее выраженным — с 5,4 ± 1,5 до 4,0 ± 1,2 ($p>0,05$). Суточный мониторинг ЭКГ продемонстрировал сокращение числа безболевых ишемических эпизодов у группы с L-аргинином в среднем на 38%, тогда как в контрольной группе изменения составили не более 15%, без статистической значимости [3].

Показатели вариабельности сердечного ритма (SDNN, RMSSD), отражающие состояние вегетативной регуляции, улучшились на 21% в основной группе, тогда как в контрольной группе изменений не зафиксировано. Положительная динамика по шкале SAQ наблюдалась у 88% пациентов основной группы: улучшение физической активности, снижение болевого синдрома и повышение удовлетворенности лечением. Средний итоговый балл по шкале увеличился с 48 до 75 ($p<0,01$). В контрольной группе баллы возросли лишь на 9 пунктов, что расценивается как клинически незначимый результат.

Биохимические показатели печени и почек оставались в пределах нормы на всём протяжении терапии, случаи отмены препарата отсутствовали. Это подтверждает хорошую переносимость и безопасность L-аргинина при длительном применении в амбулаторных условиях.

Таким образом, результаты убедительно демонстрируют, что добавление L-аргинина к стандартной терапии стабильной стенокардии не только усиливает антиангинальный и антиишемический эффект, но и влияет на фундаментальные патофизиологические звенья ИБС — снижает воспаление, улучшает вазодилатацию и качество жизни. Это делает L-аргинин обоснованным компонентом комплексной терапии пациентов с ИБС в условиях первичного звена здравоохранения.

Обсуждение

Результаты проведённого исследования подтверждают высокую клиническую значимость включения L-аргинина в схему лечения пациентов со стабильной стенокардией. Как показано в таблице 1, уже к 12-й неделе терапии наблюдалось достоверное снижение частоты приступов, улучшение переносимости физических нагрузок и повышение общего качества жизни пациентов. Эти данные согласуются с выводами ряда зарубежных и отечественных исследований, которые подчёркивают, что L-аргинин, являясь естественным субстратом для синтеза оксида азота (NO), способен эффективно устранять проявления эндотелиальной дисфункции (ЭД) — ключевого патогенетического механизма атеросклероза [1].

Синтез NO при ИБС нарушен, особенно на фоне возрастных и метаболических нарушений. Поэтому введение L-аргинина с целью восстановления эндотелий-зависимой вазодилатации является обоснованным с патофизиологической точки зрения. Согласно данным Гусевой и соавт. [5], даже короткий курс L-аргинина способен увеличить коронарный резерв у пациентов с хронической ишемией.

Особенно важно отметить, что положительный эффект от L-аргинина был получен в условиях обычной семейной поликлиники, а не только в рамках специализированных кардиологических стационаров. Это расширяет возможности амбулаторного ведения больных ИБС. Положительная динамика в шкале SAQ демонстрирует, что L-аргинин влияет не только на физиологические параметры, но и субъективно улучшает общее самочувствие и комплаентность к терапии [8].

Однако, остаются вопросы по поводу оптимальной продолжительности и дозировки терапии. Некоторые источники предлагают использовать L-аргинин в импульсных или комбинированных схемах с другими вазоактивными средствами, особенно при сопутствующих эндокринных заболеваниях [7]. Также есть данные о том, что длительное применение L-аргинина может вызывать эффект «истощения», при котором чувствительность рецепторов к NO снижается [11]. Это требует дальнейшего изучения в более масштабных и рандомизированных исследованиях.

Но, полученные нами данные подтверждают: L-аргинин может быть эффективным и безопасным дополнением к базовой терапии стенокардии напряжения, особенно при длительном применении (не менее 12 недель) поскольку позволяет снизить частоту обращений пациентов за неотложной помощью, улучшить их физическую активность и общее качество жизни.

Вывод

Проведённое исследование убедительно демонстрирует клиническую эффективность и безопасность включения L-аргинина в комплексную терапию пациентов с ИБС в амбулаторных условиях, на примере работы семейной поликлиники №3 г. Фергана. Использование L-аргинина в дозе 3 г/сутки в течение 12 недель привело к достоверному снижению частоты стенокардических приступов, уменьшению ишемических эпизодов, и выраженному повышению качества жизни пациентов. Таким образом, результаты данного наблюдения свидетельствуют о целесообразности более широкого внедрения L-аргинина в практику амбулаторной кардиологии как дополнения к базовой терапии ИБС, с акцентом на восстановление эндотелиальной функции и профилактику прогрессирования заболевания. Полученные данные не только укрепляют научные основания использования L-аргинина, но и способствуют повышению качества медицинской помощи на уровне семейных поликлиник, что особенно важно в условиях растущей эпидемии сердечно-сосудистых заболеваний.

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ВОСПАЛЕНИЕ КАК КЛЮЧЕВОЕ ЗВЕНО В РАЗВИТИИ АТЕРОСКЛЕРОТИЧЕСКОГО ПРОЦЕССА

Резюме. *Атеросклероз — хроническое воспалительное заболевание. Вследствие разрыва нестабильной атеросклеротической бляшки, происходит стеноз или окклюзия сосуда, вызванные агрегацией тромбоцитов и тромбозом, и ведут к острому сердечно-сосудистому заболеванию. Так воспаление, связанное с атеросклерозом, опосредовано провоспалительными цитокинами, воспалительными сигнальными путями, биоактивными липидами и молекулами адгезии. На этом обзоре обсуждается влияние воспаления и системного воспалительного сигнального пути на атеросклероз, роль связанных с ним сигнальных путей в воспалении, формирование атеросклеротических бляшек и перспективы лечения атеросклероза путем подавления воспаления.*

Ключевые слова: атеросклероз; воспаление; противовоспалительная терапия

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INFLAMMATION AS A KEY LINK IN THE DEVELOPMENT OF THE ATHEROSCLEROTIC PROCESS

Resume. *Atherosclerosis is a chronic inflammatory disease. Rupture of an unstable atherosclerotic plaque results in stenosis or occlusion of the vessel, caused by platelet aggregation and thrombosis, leading to acute cardiovascular disease. Thus, atherosclerosis-associated inflammation is mediated by proinflammatory cytokines, inflammatory signaling pathways, bioactive lipids, and adhesion molecules. This review discusses the impact of inflammation and systemic inflammatory signaling on atherosclerosis, the role of associated signaling pathways in inflammation, atherosclerotic plaque formation, and the prospects for treating atherosclerosis by suppressing inflammation.*

Key words: *atherosclerosis; inflammation; anti-inflammatory therapy*

1. Введение

Атеросклероз - хроническое сердечно-сосудистое заболевание; атеросклероз - одна из наиболее частых причин смерти у пожилых людей. Атеросклероз в основном характеризуются отложением липидов в частях артерии, сопровождающимся пролиферацией гладкомышечных клеток и фиброзного матрикса, которые постепенно развиваются в образование атеросклеротической бляшки. Атеросклероз является хроническим воспалительным заболеванием [1], поскольку воспаление играет важную роль на всех стадиях атеросклеротического процесса [2].

Вследствие атеросклероза развивается сердечно-сосудистые заболевания, так нестабильный разрыв атеросклеротической бляшки, агрегация тромбоцитов и тромбоз вызывают стеноз или окклюзию кровеносных сосудов, что приводит к острому сердечно-сосудистому заболеванию [3 , 4]. В этом исследовании мы изучаем влияние воспаления, маркеров, воспалительных сигнальных путей и противовоспалительных методов лечения на атеросклероз, что откроет новые возможности для лечения атеросклероза в будущих исследованиях.

2. Воспаления на развитие атеросклероза

Также было доказано, что воспаление играет важную роль в инициировании и прогрессировании атеросклеротической бляшки. На ранних стадиях атеросклероза причинами атеросклероза являются повреждение эндотелия, нарушение липидного обмена и гемодинамические повреждения; а атерогенный процесс считается сопровождающимся опосредованными потоком воспалительными изменениями в эндотелиальных клетках (ЭК) [5]. Когда ЭК активируются, они экспрессируют моноцитарный хемоаттрактантный белок-1, интерлейкин (ИЛ)-8, межклеточную адгезивную молекулу-1 (ICAM-1), сосудистую адгезивную молекулу-1 (VCAM-1), E-селектин, P-селектин и другие воспалительные факторы, привлекая лимфоциты и моноциты, которые связываются с эндотелием и инфильтрируют артериальную стенку, и начинается воспаление [6]. В этом процессе участвуют многие клетки и цитокины, такие как макрофаги, лимфоциты (Т- и В-клетки), дендритные клетки (ДК), ЭК, гладкомышечные клетки сосудов (ГМК), ИЛ, молекулы адгезии и фактор некроза опухолей (ФНО-α) [7]. Начинают накапливаться большое количество липопротеинов низкой плотности (ЛПНП) модифицируется в окисленные ЛПНП (oxLDL) и накапливается во внутренней стенке сосудов, способствуя развитию атеросклеротических бляшек [6]. Также моноциты дифференцируются в макрофаги, которые поглощают отложения oxLDL и превращаются в пенистые клетки [8]. Провоспалительные моноциты, которые экспрессируют высокие уровни Ly6C или Gr-1, преимущественно накапливаются в атеросклеротических бляшках и прилипают к стимулированным цитокинами эндотелиальным клеткам in vitro [9]. Остальные типы иммунных клеток, такие как ДК, Т-клетки, В-клетки и нейтрофилы, участвуют в воспалении внутри бляшек. Миелоидные клетки привлекли внимание из-за изменения

реакции врожденного иммунитета; исследования на кроликах также показали наличие пролиферации миелоидных клеток в атеросклеротических поражениях [10].

На поздней этапах атеросклероза большое количество макрофагов и других воспалительных цитокинов проникает в стенку сосуда, выделяет матриксные металлопротеиназы (ММП) и разрушает коллагеновые волокна во внеклеточном матриксе бляшки, что приводит к разрыву бляшки, кровотечению и тромбозу [11 , 12]. Инфильтрирующие тучные клетки способствуют созданию провоспалительной среды [13]. Из за активации эти клетки высвобождают множество медиаторов и ферментов, которые могут оказывать глубокое воздействие на атеросклеротическое поражение.

Иммунными и сосудистыми эндотелиальными клетками (VEC) выделяют разнообразные провоспалительные мессенджеры, активируя цитокины, хемокины, биоактивные липидные соединения и молекулы адгезии, которые поддерживают и усиливают локальное воспаление и развитие атеросклеротических поражений [6].

3. Маркеры атеросклеротического воспаления

3.1. С-реактивный белок

С-реактивный белок (СРБ) в основном вырабатывается при стимуляции ИЛ-6, ИЛ-1β и ФНОα в печени. При повреждении ткани активируется система воспалительного ответа; макрофаги накапливаются в поврежденной ткани и выделяют большое количество ИЛ-6 и ФНОα, которые побуждают печень синтезировать большое количество СРБ. Другие ткани, такие как жировая ткань, могут синтезировать СРБ под действием провоспалительных стимулов [15]. С-реактивный белок может приводить к повреждению эндотелиальных клеток сосудов, предотвращая восстановление и пролиферацию сосудистых клеток. Собственной циркулирующей формой СРБ является пентамер (пСРБ), который в основном высвобождается в кровоток после воспалительных стимулов [16]. В виде нерастворимых мономеров СРБ (мСРБ) участвует в системе врожденного иммунитета, активируя каскад комплемента, в ангиогенезе и тромбозе [17 , 18 , 19]. Уровни С-реактивного белка часто могут предоставлять полезную информацию для диагностики, лечения и мониторинга пациентов с атеросклерозом, а также подтверждать реакцию пациента на различные стимулирующие факторы [20]. Многочисленные исследования, подтверждающие причинную роль, указывают на доказательства того, что СРБ связывается с ЛПНП и присутствует в атеросклеротических бляшках [21]. С-реактивный белок не присутствует в здоровой стенке сосуда, но становится обнаруживаемым на ранних стадиях атерогенеза и накапливается во время прогрессирования атеросклероза [22]. С-реактивный белок считается предиктором будущих сердечно-сосудистых событий, и в общей популяции уровни СРБ способны независимо предсказывать риск смертности от всех причин и сердечно-сосудистой смертности [23 , 24]. Таким образом, СРБ является индексом

чувствительности к воспалению, а развитие и прогрессирование атеросклероза напрямую связаны с риском показателей атеросклероза.

3.2.Интерлейкин-6

Интерлейкин-6 представляет собой плейотропным цитокином и участвует в системе врожденного и адаптивного иммунитета и служит для регуляции ответа острой фазы и хронического воспаления [25]. Измеряя уровни ИЛ-6 в образцах крови пациентов с ишемической болезнью сердца, было обнаружено, что уровни ИЛ-6 в крови были выше в группе с ишемической болезнью сердца, чем у здоровых людей. Чем серьезнее заболевание, тем выше воспалительный индекс [26]. Уровни интерлейкина-6 были значительно повышены в случаях разрыва бляшек [27]. Было обнаружено, что генетический дефицит ИЛ-6 усиливает образование атеросклеротических бляшек, связанных с диетой и/или патогенами [28]. Из чего, ИЛ-6 может быть потенциальным маркером для прогнозирования уязвимости атеросклеротических бляшек.

IgSF имеют молекулярную структуру, сходную с иммуноглобулинами, которые взаимодействуют с молекулами адгезии семейства интегринов в качестве рецепторов и лигандов и участвуют в распознавании клеток и адгезии. Существует три основных типа: ICAM-1, VCAM-1 и молекула адгезии клеток эндотелия тромбоцитов-1 (PECAM-1). Молекула адгезии сосудистых клеток-1 и ICAM-1 являются важными членами IgSF. Молекула адгезии сосудистых клеток-1 (VLA-1) является лигандом интегрина VLA-4 (α4β1), который экспрессируется на поверхности ECs и активируется цитокинами; ICAM-1 является лигандом LFA-1. Высокая экспрессия VCAM-1 и ICAM-1 способствует пролиферации макрофагов, что приводит к накоплению большого количества макрофагов в бляшке и, следовательно, увеличению нестабильности бляшки. Исследования показали, что VCAM-1 и ICAM-1 тесно связаны с ангиогенезом. В атеросклеротической бляшке высокая экспрессия VCAM-1 и ICAM-1 способствует неоваскуляризации, которая характеризуется преимущественно незрелыми, высокопроницаемыми и хрупкими сосудами. Экспрессия межклеточной адгезионной молекулы-1 является ранним событием в атеросклеротических поражениях, тогда как VCAM-1, вероятно, экспрессируется на более поздней стадии.

6. Вывод

Атеросклероз – хроническое воспалительное заболевание, и принято считать, что различные воспалительные клетки и факторы играют важную роль в его патогенезе. Эти реакции включают аномальные реакции на различные повреждения сосудистой стенки, которые приводят к классическому воспалению, приводящему к дегенерации, экссудации и гиперплазии. Выявление воспалительных биомаркеров, таких как СРБ и молекулы адгезии ИЛ-6 и ММП, может быть хорошим средством диагностики атеросклероза и сердечно-сосудистых заболеваний. Toll-подобный рецептор 4, NF-κB и JAK/STAT являются воспалительными сигнальными путями,

связанными с атеросклерозом. Изучая эти сигнальные пути, мы лучше понимаем патогенез атеросклероза. Роль противовоспалительной терапии и ингибирования воспалительных цитокинов в настоящее время хорошо известна. Поэтому стоит обсудить и изучить, как можно предотвратить возникновение и развитие атеросклероза посредством противовоспалительной и иммунологической регуляции с целью лечения различных факторов риска, связанных с атеросклерозом.

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РОЛЬ ФИЗИЧЕСКИХ УПРАЖНЕНИЙ В КОМПЛЕКСНОМ ЛЕЧЕНИИ АРТЕРИАЛЬНОЙ ГИПЕРТОНИИ

Резюме. *Современный образ жизни и урбанизация населения привело к недостаточной активности для того, чтобы сохранить желаемое состояние здоровья, и предотвратить, помимо прочего, сердечно-сосудистые заболевания аэробные упражнения являются дополнением к медикаментозному лечению артериальной гипертензии. Аэробные упражнения практически не имеют побочных эффектов и являются полезным вспомогательным средством при лечении гипертонии. Различают множество механизмов, которые могут помочь в упражнениях по снижению давления на артерии, поэтому физиологические декорации могут быть классифицированы как хорошие, напряженные и хронические. В настоящем обзоре рассматриваются различные патофизиологические аспекты реакции на физическую нагрузку у пациентов с гипертонией, включая ее модуляторы и диагностическую и прогностическую ценность, а также последние рекомендации по назначению и мониторингу режимов физических упражнений и медикаментозной терапии в рамках клинического наблюдения за пациентами с активной гипертонией.*

Ключевые слова; гипертония, воспаление, аэробика, терапия

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THE ROLE OF PHYSICAL EXERCISE IN THE COMPLEX TREATMENT OF ARTERIAL HYPERTENSION

Abstract: *Modern lifestyles and urbanization have led to insufficient activity to maintain desirable health and prevent, among other things, cardiovascular diseases. Aerobic exercise is an adjunct to drug treatment for hypertension. Aerobic exercise has virtually no side effects and is a useful adjunct in the treatment of hypertension. There are many mechanisms by which exercise can lower arterial pressure so that physiological effects can be classified as good, strenuous, and chronic. This review examines various pathophysiological aspects of the response to physical exercise in patients with hypertension, including its modulators, diagnostic and prognostic value, and the latest recommendations for prescribing*

and monitoring exercise regimens and drug therapy as part of clinical follow-up of patients with active hypertension.

Key words: *hypertension, inflammation, aerobics, therapy*

Введение

Современные образ жизни приводят к глубоким изменениям в жизни общества, стимулируя сидячий образ жизни. По данным, в этот день у вас будет меньше 600 ккал/день при физической активности (ФА), если у вас будет 50 лет назад [1] . Около половины населения Узбекистна не достигло энергичности в регулярном режиме [2] .

Имеется обратная связь между дозой и ответом между количеством и интенсивностью накопленной физической активности и смертностью от сердечно-сосудистых заболеваний, как и у отдельных людей, как у людей с уже существующим сердечно-сосудистым заболеванием.

В частности, ОМТ или вклад в терапевтическую терапию, а не в фармакологию, важен для уменьшения смертности от сердечно-сосудистых заболеваний. Далее, ознакомьтесь с механизмами восстановления сил и своих модулей, основными преимуществами и рисками, связанными с физическими упражнениями, которые должны быть ориентированы на корректировку предписаний по физической подготовке при гипертонии и особенностях фармакотерапии при гипертензии.

Физиологическая помощь может быть получена с большим трудом

В зависимости от особенностей тренировок, участия и окружающей среды, физиологический ответ на большие усилия, период большого *стресса* для организма, может быть более интенсивным или более интенсивным. Обычно во время тренировки на *выносливость* происходит увеличение и перераспределение сердечного дефицита (СД), и это обеспечивает перфузию активных мышц. Ведущие к активации нейрогормональных и гидростатических механизмов, на первом этапе приходится прилагать усилие, чтобы увеличить систолический объем и, сзади, чтобы увеличить частоту сердечных сокращений [11] . Поскольку два компонента артериального давления, производящие постоянный ток и периферическое сосудистое сопротивление (ПВП), их совместимость неравномерна при нагрузке. Когда систола поднимается с усилием до увеличения постоянного тока, диастола даже на секунду снижается из-за уменьшения РВП, или что позволяет перфузии больших групп мышц.

Ответ на физиологическую помощь

Сокращение времени РА, которое проверяется в течение нескольких минут или последующих часов в практической физической практике [13,] проверяется для промежуточной проверки эффекта гипотензии при выполнении упражнений [14] .

По данным некоторых авторов наблюдается гипотензия при физических нагрузках (HPE) среди людей с гипертонией и предгипертензией [15] . Также у людей с нормальным напряжением также можно убедиться, что они имеют

меньшую величину, чем гипертензии [16]. А после тренировки [12 часов] можно было работать около 22 часов. Основной механизм постулирует восстановление исчезновения ПА после тренировки или тренировки с уменьшением симпатической активности (норадреналина), уменьшением уровня ангиотензина II, аденозина и циркулирующих эндотелинов, а также своих рецепторов в системе. центральное нервное расстройство, глобальное предпочтение снижению РВП и повышению чувствительности бароррефлекса [17].

В результате, этого ПА может повысить значимость клинической практики, главным образом среди гипертензивных пациентов, которые могут стать гипотензивным средством, не являющимся фармакологическим. Но, несмотря на это, различные виды постоянных упражнений, которые могут быть ясными, могут повлиять на реакцию гипотензора, как на интенсификацию, продолжительность, тип упражнений, состояние клиники, период болезни, и т.д. и физическое состояние. Было проведено исследование, в ходе которого были проведены прямые сравнения между различными интенсивностью индикационных упражнений, которые в результате ПА могли привести к независимому результату в норме как гипертензивный человек [17]. Длительность тренировки может увеличиться до такой же величины, как и длительность тренировки [17]. На самом деле, или объем трейна больше всего зависит от того, что является изоляцией от разных ссылок.

Ответ на гипертензию в случае необходимости

Различают альтернативные методы, которые являются более информативными, но не о том, что они ссылаются на риск, связанный с повышением уровня РА, как на 24-часовую амбулаторную медицинскую помощь (МАП), зарегистрированную в доме, или просто в трудную минуту. Все эти методы регистрации ПА, например, лучше коррелируют с проблемой гипертрофии желудочков (ГЖ), которую врач ПА не проконсультировал [18].

В частности, ответ на напряжение, возникающий в связи с большим интересом к оценочному прогнозу для детей, также не позволяет диагностировать молчание. Ненормальный ответ на то, что PAS не может быть длительным или тяжелым, или большим, универсальным, как грех серьезной ишемии. В противном случае, или наоборот, непропорциональная гипертензивная реакция или усилие могут стать фактором, учитывающим естественную историю.

Объективно, определите, что это ответная гипертензия, направленная на повышение СПА выше 7-10 мм рт. ст. (сидячий образ жизни) для каждого увеличения 1 MET (метаболического эквивалента), или отсутствия снижения ЗПА до 15 мм рт.

Доказывается, что в контексте гиперчувствительности и адренергической активности люди, страдающие от сердечно-сосудистых заболеваний, в основном, ПА на более высоком уровне в [20 лет], получают больше ГЖ, когда они сравниваются с другими людьми. население в целом [22].

РА в попытке представить свою корреляцию с МАП, отражает циркадные изменения РА среди отдельных людей. Доказательства существования и того, что повышение периодического напряжения в условиях физического *стресса* может быть достаточным для того, чтобы вызвать дисфункцию организации у отдельных людей, живущих и не имеющих условий [23] .

Кроме того, вы не сможете ответить на вопрос, связанный с прогнозируемыми последствиями. При отклонении PAS от более деморализованного упражнения, представляющего собой PAS 3 мин/PAS 1 мин > 1, это значит, что это связано с лучшим прогнозом [23] .

Выводы

Обсуждение стиля жизни с пациентом является пропагандой мер по предотвращению ОМТ, направленных на интеграцию физических упражнений и элементов. Программа упражнений включают в себя повышение выносливости и силовые тренировки, которые не позволяют избежать первичной профилактики НТА, как ценность физической активности у гипертензивных людей.

Вследствие немедленного занятия физическими упражнениями происходит увеличение и перераспределение сердечного дебита, что приводит к повышению систологического ПА и механическому вмешательству или значительному уменьшению диастолического ПА. Уменьшение концентрации катехолина, ожирения, уменьшение чувствительности к инсулину и изменение экспрессии вазоконстрикторов и вазодилататоров - это постулаты между медиаторами для ответа на напряжение при физических нагрузках. Генетические различия, физиопатология и гипертензия, а также фармакодинамика и фармакокинетика могут оправдать недееспособность некоторых пациентов, реагирующих на лечение, как снижение хронических напряжений.

Если мы начнем следить за ростом медико-спортивного роста, утверждая, что это пас, оправдано массовое предписание физических упражнений в глобальном масштабе среди гипертонического населения, и это значит, что у них есть выгоды для супер-больших людей. Тренировочный режим должен быть определённым и персонализированным, чтобы обеспечить оптимальную или выгодную гипотенсионную тренировку, гарантирующую максимальную безопасность в течение всего периода активности.

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ПОВЫШЕНИЕ ПРОИЗВОДСТВЕННОГО ПОТЕНЦИАЛА КАК ОСНОВА СОВЕРШЕНСТВОВАНИЯ МЕХАНИЗМОВ УПРАВЛЕНИЯ ПРЕДПРИЯТИЯМИ СТРОИТЕЛЬНОЙ ИНДУСТРИИ (НА ПРИМЕРЕ РЕСПУБЛИКИ УЗБЕКИСТАН)

Аннотация: *В статье рассматриваются вопросы повышения производственного потенциала предприятий строительной индустрии Узбекистана как ключевого фактора совершенствования организационно-экономических механизмов управления. На основе анализа статистических данных, современных управленческих подходов и технологических тенденций показано, что усиление производственного потенциала напрямую связано с эффективностью ресурсопользования, модернизацией производственной базы и внедрением инновационных методов управления. Проведённый анализ выявляет необходимость перехода к интегрированной модели управления, основанной на цифровизации, ресурсосбережении и стратегическом планировании развития строительных предприятий.*

Ключевые слова: *производственный потенциал, строительная индустрия, механизмы управления, ресурсосбережение, эффективность, инновации, Узбекистан.*

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ENHANCING PRODUCTION POTENTIAL AS A BASIS FOR IMPROVING MANAGEMENT MECHANISMS OF CONSTRUCTION INDUSTRY ENTERPRISES (ON THE EXAMPLE OF THE REPUBLIC OF UZBEKISTAN)

Abstract: *The article examines the issues of enhancing the production potential of construction industry enterprises in Uzbekistan as a key factor in improving organizational and economic management mechanisms. Based on the analysis of statistical data, modern management approaches, and technological trends, it is shown that strengthening production potential is directly related to the efficiency of resource utilization, modernization of the production base, and implementation of innovative management methods. The conducted analysis reveals the necessity of transitioning to an integrated management model based on digitalization, resource saving, and strategic planning for the development of construction enterprises.*

Keywords: *production potential, construction industry, management mechanisms, resource saving, efficiency, innovation, Uzbekistan.*

Введение. Современное развитие строительной индустрии Республики Узбекистан характеризуется стремительным ростом объемов производства, повышением требований к энергоэффективности и ресурсосбережению, а также необходимостью совершенствования управленческих механизмов. В условиях глобальной конкуренции и технологических изменений повышение производственного потенциала становится ключевым направлением обеспечения устойчивого роста предприятий строительного сектора. Производственный потенциал отражает совокупность ресурсов, технологий, трудовых и организационных возможностей, позволяющих предприятиям достигать стратегических целей, обеспечивать качество продукции и экономическую эффективность[2].

Строительная отрасль играет особую роль в экономике Узбекистана, так как она формирует основу материальной инфраструктуры и стимулирует развитие сопряженных отраслей - промышленности строительных материалов, машиностроения, транспорта и логистики. В последние годы в стране реализуется комплекс программ модернизации строительных предприятий, направленных на повышение производительности труда, внедрение инновационных технологий и цифровых решений в управлении производственными процессами. Однако, несмотря на достигнутые успехи, сохраняются проблемы, связанные с недостаточной эффективностью использования производственных мощностей, низкой степенью автоматизации и несбалансированностью организационно-экономических механизмов управления.

В связи с этим актуальным становится исследование теоретических и практических аспектов повышения производственного потенциала как ключевого фактора совершенствования систем управления предприятиями строительной индустрии. Это требует анализа существующих тенденций, оценки влияния ресурсных и технологических факторов, а также разработки направлений оптимизации управленческих решений[2].

Цель исследования заключается в выявлении взаимосвязи между уровнем производственного потенциала и эффективностью механизмов управления строительными предприятиями Узбекистана, а также в формировании практических предложений по совершенствованию управленческих подходов в условиях модернизации отрасли.

Методы исследования. Методологическая база исследования основана на комплексном подходе, включающем системный, структурно-функциональный и экономико-статистический анализ. В ходе исследования использовались данные Государственного комитета по статистике Республики Узбекистан, Министерства строительства и жилищно-коммунального хозяйства, а также отчеты предприятий отрасли за 2015-2024 годы.

Применялись методы сравнительного анализа для оценки динамики производственного потенциала и эффективности управления, методы корреляционно-регрессионного анализа для выявления зависимости между уровнем использования производственных мощностей и финансовыми результатами деятельности предприятий[3].

Для количественной оценки производственного потенциала использовались показатели: коэффициент загрузки производственных мощностей, производительность труда, доля инновационных технологий в структуре производства, коэффициент фондоотдачи, а также показатели энергоэффективности и материалоемкости. Для анализа эффективности управления применялись индикаторы рентабельности, оборачиваемости активов и уровень цифровизации управленческих процессов.

Дополнительно использовался экспертный метод, включающий анкетирование и интервьюирование представителей предприятий строительных материалов в регионах Ташкент, Навоий, Кашкадарья и Фергана. Это позволило выявить организационные проблемы, связанные с недостаточной адаптацией управленческих систем к цифровым изменениям и технологической модернизации[4].

Результаты. Результаты проведённого исследования показали, что за последние десять лет в строительной индустрии Республики Узбекистан сформировалась устойчивая тенденция роста производственного потенциала предприятий. По данным Государственного комитета по статистике и отраслевых отчётов Министерства строительства, объёмы производства строительных материалов за период 2015-2024 годов увеличились в среднем на 40,2%, производительность труда возросла на 28,4%, а коэффициент загрузки производственных мощностей достиг 87%, что на 11 процентных пунктов выше уровня 2015 года. Эти результаты указывают на существенное обновление производственной базы и повышение эффективности управления производственными ресурсами.

Таблица 1.

Основные показатели развития предприятий строительных материалов в Узбекистане (2015-2024 гг.)[5]

Показатель	2015	2018	2020	2022	2024	Изменение, %
Объем производства строительных материалов (в сопоставимых ценах, млрд сум)	8 450	9 730	11 980	13 870	15 880	+40,2
Производительность труда (млн сум на 1 работника)	182	205	226	240	234	+28,4
Уровень загрузки производственных мощностей, %	76	80	83	85	87	+11 п.п.
Уровень цифровизации производственных процессов, % предприятий	12	19	26	35	43	+31 п.п.
Средний уровень энергоёмкости (кВт·ч на тонну продукции)	125	121	116	111	108	-13,6
Средняя рентабельность продаж, %	7,5	8,2	9,1	10,3	11,8	+4,3

Как видно из таблицы 1, в 2015-2024 годах наблюдается стабильное повышение всех ключевых производственно-экономических показателей. Особенно значительным является рост доли предприятий, внедряющих цифровые системы управления производством (автоматизированные ERP-платформы, системы энергоаудита и контроля качества). За десять лет их доля увеличилась более чем в 3,5 раза, что отражает переход отрасли на принципы цифровой интеграции и ресурсосбережения.

В ходе исследования установлено, что повышение производственного потенциала предприятий строительной индустрии напрямую зависит от совокупного воздействия трёх ключевых факторов: модернизации оборудования и технологий, повышения квалификации персонала и внедрения ресурсосберегающих решений. Техническое обновление производственных линий и внедрение современных технологий позволяют значительно сократить энергопотребление, снизить себестоимость продукции и повысить устойчивость производственных процессов. Одновременно развитие профессиональных компетенций работников способствует росту производительности труда, улучшению качества управления и более эффективному использованию ресурсов. Важное значение имеет также применение принципов ресурсосбережения, включающих переработку отходов, повторное использование тепловой энергии и внедрение вторичных материалов, что не только повышает экономическую эффективность, но и способствует экологической устойчивости отрасли.

Примером успешной модернизации можно назвать цементные заводы в Джизакской и Навоийской областях, где внедрение современных теплообменных систем позволило снизить коэффициент энергоёмкости на 14%, а производительность труда увеличить на 30%. Подобные результаты достигнуты также на предприятиях по производству газобетона и сухих

строительных смесей, где за счёт автоматизации процессов удалось сократить технологические потери до 5-6% от объёма производства.

Таблица 2.

Эффективность использования производственного потенциала строительных предприятий (2020-2024 гг.)[6]

Показатель	2020	2021	2022	2023	2024	Изменение, %
Коэффициент загрузки мощностей, %	83	84	85	86	87	+4,8
Коэффициент фондоотдачи (сум выручки на 1 сум основных фондов)	1,28	1,33	1,36	1,39	1,44	+12,5
Энергоёмкость продукции (кВт·ч/т)	116	113	111	110	108	-6,9
Производительность труда (тыс. т продукции на 1 работника)	4,2	4,4	4,6	4,8	5,1	+21,4
Средняя рентабельность продаж, %	9,1	9,8	10,3	11,0	11,8	+2,7
Доля инновационных технологий в производственном цикле, %	25	29	32	36	41	+16

Результаты корреляционно-регрессионного анализа подтвердили тесную взаимосвязь между эффективностью использования производственного потенциала и финансовыми результатами предприятий. Коэффициент корреляции между уровнем загрузки мощностей и рентабельностью продаж составил r = 0,82, что свидетельствует о прямой зависимости прибыли от степени оптимизации производственных процессов. Также выявлена положительная зависимость между уровнем цифровизации и ростом чистой прибыли (r = 0,77), что подчёркивает роль инновационных технологий в повышении эффективности управления.

Предприятия, активно инвестирующие в цифровизацию и внедрение инноваций, демонстрируют заметно более высокие показатели прибыльности и конкурентоспособности. Средний рост чистой прибыли таких предприятий за период 2020-2024 гг. составил 12-15% ежегодно, тогда как среди компаний, не внедривших инновации, аналогичный показатель не превышал 5-7%.

Кроме того, анализ показал, что предприятия с более высоким уровнем использования производственного потенциала характеризуются меньшей материалоёмкостью продукции (-8%) и более стабильным коэффициентом оборачиваемости активов (+9%). Это подтверждает, что системное повышение производственного потенциала способствует не только росту выпуска продукции, но и повышению финансовой устойчивости и инвестиционной привлекательности предприятий отрасли.

Таким образом, полученные результаты позволяют сделать вывод, что развитие производственного потенциала является неотъемлемым элементом совершенствования механизмов управления строительными предприятиями. Его повышение обеспечивает не только технологический прогресс и энергоэффективность, но и формирует стратегическую основу долгосрочной конкурентоспособности строительной индустрии Республики Узбекистан[7].

Обсуждение. Современные тенденции управления в строительной индустрии Узбекистана требуют перехода от традиционных

административных моделей к стратегически ориентированным системам, основанным на принципах инновационного и проектного управления. Повышение производственного потенциала в данном контексте предполагает не только техническую модернизацию, но и глубокие организационно-экономические изменения, направленные на повышение адаптивности и гибкости управленческих структур[10].

Результаты анализа показывают, что существующие механизмы управления в ряде предприятий всё ещё сохраняют элементы иерархичности и недостаточной интеграции между производственными и управленческими процессами. Это приводит к несбалансированному использованию ресурсов, снижению эффективности принятия решений и потере конкурентных преимуществ.

В мировой практике для повышения производственного потенциала и управленческой эффективности активно внедряются концепции Lean Production, Total Quality Management (TQM), Industry 4.0, а также методы цифрового двойника и умных производств. Эти подходы позволяют оптимизировать производственные циклы, сократить издержки, повысить прозрачность процессов и увеличить скорость адаптации к рыночным изменениям.

Для предприятий строительной индустрии Узбекистана целесообразно формировать интегрированную систему управления производственным потенциалом, основанную на комплексном взаимодействии технологических, организационных, экономических и социально-кадровых элементов. Такая система должна обеспечивать внедрение энергоэффективных и ресурсосберегающих технологий, автоматизацию и механизацию производственных процессов, развитие современных принципов корпоративного управления, проектного менеджмента и цифровой отчётности[8].

Важным направлением является совершенствование системы планирования и бюджетирования, использование ключевых показателей эффективности (KPI) и аналитических инструментов для оценки результатов деятельности. Одновременно необходимо уделять внимание развитию человеческого капитала, повышению квалификации персонала и формированию инновационной корпоративной культуры, способной адаптироваться к технологическим и рыночным изменениям. Интеграция этих направлений в единую систему позволит обеспечить устойчивое повышение производственного потенциала и повысить эффективность управления предприятиями строительной отрасли.

Кроме того, важным направлением является внедрение механизмов устойчивого развития, предусматривающих баланс между экономическими, экологическими и социальными целями. Совершенствование управленческих систем должно сопровождаться созданием благоприятной институциональной среды, поддержкой инновационной активности и стимулированием инвестиций в технологическую модернизацию[9].

Заключение. Проведённое исследование показало, что повышение производственного потенциала выступает решающим фактором совершенствования организационно-экономических механизмов управления строительными предприятиями Республики Узбекистан. Развитие потенциала производства обеспечивает более рациональное использование ресурсов, рост производительности труда, повышение конкурентоспособности и способствует переходу строительной отрасли к инновационно-индустриальной модели развития. Эффективное управление должно опираться на системный подход, который объединяет цифровизацию, модернизацию технологической базы, развитие человеческого капитала и внедрение стратегического планирования. В дальнейшем особое значение приобретает развитие цифровых платформ управления производственными процессами, применение технологий «умного строительства» и искусственного интеллекта, расширение международного сотрудничества и привлечение инвестиций в инновационные проекты, а также укрепление роли науки и образования в подготовке квалифицированных кадров. Формирование современных управленческих систем, основанных на росте производственного потенциала, позволит обеспечить устойчивое развитие строительной индустрии Узбекистана, её интеграцию в глобальное экономическое пространство и укрепление позиций национальной экономики в условиях усиливающейся мировой конкуренции.

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ГЕОГРАФИЧЕСКИЕ ФАКТОРЫ РАСШИРЕНИЯ ПУСТЫННЫХ ЗОН (НА ПРИМЕРЕ ПУСТЫНЬ УЗБЕКИСТАНА)

Аннотация: *В статье анализируются географические факторы, влияющие на расширение пустынных территорий. Процесс опустынивания в основном связан с природными факторами, такими как изменение климата, сокращение количества осадков, высокие температуры, ветровая эрозия и дефицит водных ресурсов. Деятельность человека – нерациональное землепользование, вырубка лесов, чрезмерное развитие животноводства – также указывается в качестве антропогенных причин, усиливающих опустынивание. В статье также рассматриваются особенности процесса опустынивания в различных географических зонах и пути его предотвращения.*

Ключевые слова: *Опустынивание, пустынные территории, географические факторы, изменение климата, ветровая эрозия, дефицит водных ресурсов, антропогенное воздействие, природная среда, экологические проблемы, устойчивое развитие.*

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GEOGRAPHICAL FACTORS IN THE EXPANSION OF DESERT ZONES (USING THE EXAMPLE OF THE DESERTS OF UZBEKISTAN)

Abstract: *This article analyzes the geographic factors influencing the expansion of desert areas. Desertification is primarily associated with natural factors such as climate change, reduced precipitation, high temperatures, wind erosion, and water scarcity. Human activities such as unsustainable land use, deforestation, and overexploitation of livestock farming are also cited as anthropogenic factors exacerbating desertification. The article also examines the characteristics of desertification in various geographic zones and ways to prevent it.*

Key words: *Desertification, desert territories, geographical factors, climate change, wind erosion, water shortage, anthropogenic impact, natural environment, environmental problems, sustainable development.*

Введение. Пустыня — это природная географическая зона с очень малым количеством осадков, недостатком влаги и скудной растительностью. Пустыни расположены преимущественно в районах с годовым количеством осадков менее 400 миллиметров. Пустыни широко распространены по всему

миру, преимущественно в тропических широтах, то есть между 20° и 35° северной и южной широты.

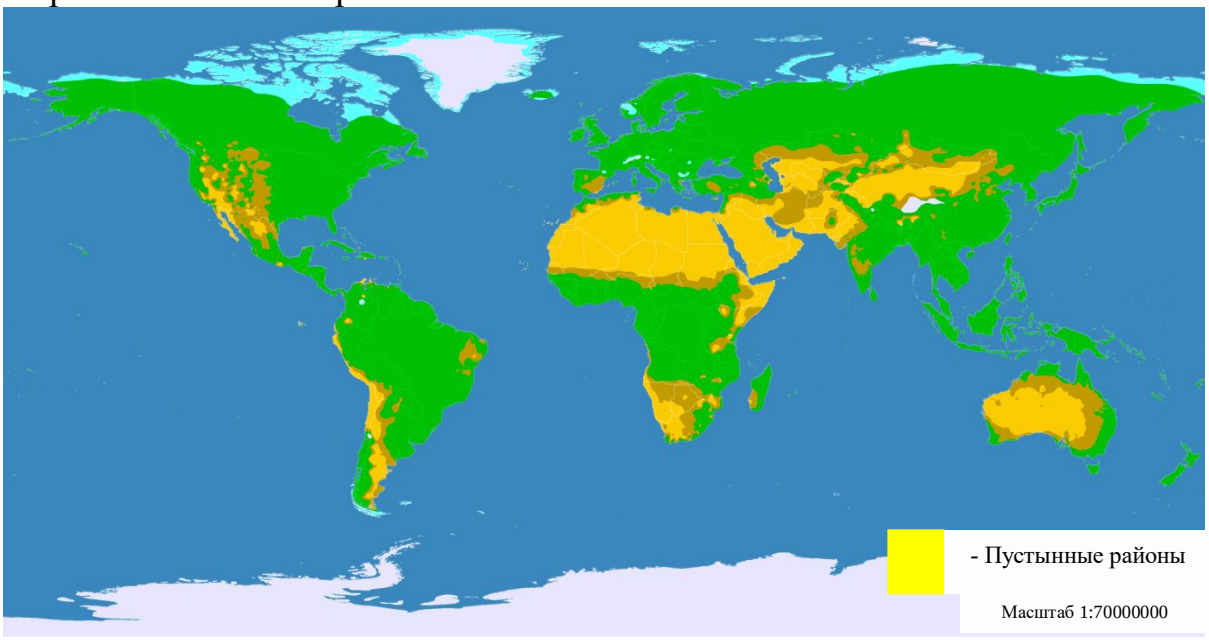


Рисунок 1. Карта пустынных регионов Земли

Температура в пустынях резко колеблется: днём температура воздуха может подниматься до +50°С, а ночью опускаться до 0°С. Такая резкая смена обусловлена сухостью воздуха и практически полным отсутствием облаков. Почвы пустынь преимущественно песчаные, щебнистые и каменистые. Из-за низкой влажности содержание гумуса низкое, поэтому почвы неплодородные. Среди растений широко распространены засухоустойчивые виды – саксаул, янток, песчаная акация, эфемеры. Животный мир пустынь также адаптирован к этим условиям. Здесь обитают рептилии, грызуны, различные насекомые, а также животные, такие как верблюды и газели. Они жароустойчивы и обладают водосберегающими свойствами. Пустыни – это не просто сухие и безжизненные места. Они обладают уникальной экологической системой и имеют большое значение как источник природных ресурсов – полезных ископаемых, солнечной и ветровой энергии. В то же время под влиянием деятельности человека усиливаются процессы опустынивания, что приводит к экологическим проблемам. Опустынивание – совокупность природных географических и антропогенных процессов, приводящих к разрушению экологических систем стран с аридным климатом, ухудшению всех форм органической жизни в них и, как следствие, к снижению естественно-хозяйственных возможностей. К этим процессам относятся сокращение численности и видового состава естественной растительности, эрозия почв, засоление почв и снижение их плодородия. В результате опустынивания увеличивается площадь пустынь и формируются пустынноподобные ландшафты. Около 48,5 млн км² поверхности Земли занимают пустыни и полупустыни, из которых около 10 млн км² возникли под воздействием антропогенных факторов [4]. Опустынивание наблюдается практически на

всех континентах, чаще всего в засушливых регионах Африки, Азии, Австралии и Южной Америки. В Центральной Азии также существуют Аральское море и Приаралье, где сложилась критическая экологическая ситуация.

Основная часть: Расширение пустынных территорий – это деградация природной среды, то есть постепенное превращение плодородных земель в пустыни, что в настоящее время является одной из важнейших экологических проблем в мире. Интенсификация этого процесса обусловлена различными географическими факторами, такими как изменение климата, истощение водных ресурсов, вырубка лесов и нерациональное землепользование.

1. Климатические факторы:

Климат играет главную роль в расширении пустынных территорий. В результате уменьшения количества осадков уменьшается влажность почвы и происходит высыхание растений. Высокие температуры увеличивают испаряемость, в результате чего водные источники быстро пересыхают. В районах с сильными ветрами ускоряется миграция песков и эрозионные процессы.

2. Геоморфологические факторы:

Горные хребты обуславливают неравномерное распределение осадков. Поскольку равнины, расположенные в тени предгорий, получают мало осадков, естественные пустыни расширяются быстрее. Состав почвы также является важным фактором: песчаные и щебнистые почвы не могут удерживать воду, что приводит к потере растительности. 3. Истощение водных ресурсов

3. Осушение рек, озёр и снижение уровня грунтовых вод усугубляют дефицит влаги. Нарушение работы ирригационных систем, нерациональное использование воды и изменение русла рек ускоряют опустынивание. Высыхание Аральского моря — яркий пример расширения пустынь Центральной Азии.



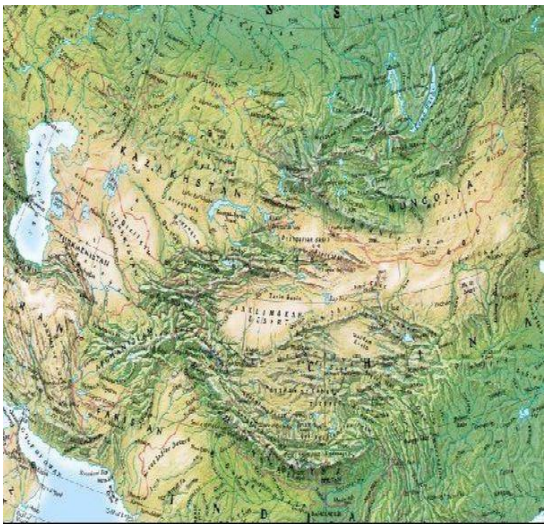


Рисунок 2. Аральское море (1984-2020) Рисунок 3. Карта Центральной Азии (2013)

4. Антропогенные (антропогенные) факторы

Вырубка лесов и потеря растительного покрова усиливают ветровую эрозию. Чрезмерное развитие животноводства приводит к эрозии пастбищ. Неправильное орошение приводит к засолению почвы и снижению ее продуктивности. Чрезмерная распашка земель и выращивание однолетних культур в сельском хозяйстве приводят к эрозии почвенного слоя.

5. Глобальное потепление и изменение климата

В последние десятилетия потепление климата Земли ускорило процесс опустынивания. Повышение температуры, уменьшение количества осадков и нестабильность климата приводят к расширению пустынных площадей. Это особенно заметно в Узбекистане, Туркменистане, Казахстане, Иране и странах Северной Африки.

6. Биологические факторы

Сокращение численности флоры и фауны нарушает устойчивость экосистемы. В результате сокращения численности пустынных растений теряется корневая система, удерживающая почву, и усиливается ветровая эрозия.

Пустыни Узбекистана: Узбекистан — страна, расположенная в Центральной Азии, большая часть территории которой занята равнинами и пустынями. Около 60 процентов территории страны занимают различные пустыни. Пустыни являются важной составляющей природы Узбекистана, обладающей уникальным климатом, флорой и фауной.

Рисунок 4. Пустыня Кызылкум

Кызылкум. Самая большая пустыня в стране — пустыня Кызылкум,



которая занимает большую часть Навоийской, Бухарской и Кашкадарьинской областей. Также на северо-западе расположено плато Устюрт, на юге — отроги пустыни Каракумы, а на севере — песчаные районы Аральского моря. Причина, по которой пустыня называется Кызылкум, — красноватый цвет песков, которые занимают большую ее часть. В Кызылкуме есть горы, которые когда-то были очень высокими, но теперь понизились из-за выветривания и денудации в течение длительного периода. В мезозое и начале третичного периода климат здесь был субтропическим, и на склонах гор были широко распространены красные почвы. Красные породы, образовавшиеся в результате выветривания этих красных почв, придали пескам красный цвет.

Однако, хотя пустыня называется Кызылкум, красные пески встречаются не во всех ее частях. Например, пески в южной части Кызылкума темно-серые. Эти пески образовались из отложений, принесенных рекой Зарафшан. Кызылкум понижается с юго-востока на северо-запад. Его средняя абсолютная высота составляет 200–300 м, на юго-востоке – 350–400 м, а на северо-западе – 90–100 м. Основные формы рельефа – эоловые песчаные дюны, пролювиальные шлейфы вокруг невысоких гор, плато, тупиковые котловины и древние русла рек. Песчаные формы рельефа занимают большую часть района. Они наиболее распространены на северо-западе Кызылкума.[1]

Климатические условия. Климат пустыни резко континентальный: лето очень жаркое (иногда до +45°C), а зима холодная (до –20°C). Количество осадков не превышает 100–200 мм в год. Поэтому в этих районах очень мало источников воды, а зеленая растительность встречается в основном вблизи притоков рек Амударья и Сырдарья.

Флора и фауна. Растения пустынных районов засухоустойчивы, в основном произрастают кустарники, такие как саксаул, янток, кандым и черкесия. Фауна также адаптирована: встречаются такие животные, как песчаные полевки, бивни, змеи, пустынные лисицы (корсак) и джейраны[2].

Значение пустынь. Пустынные территории представляют собой уникальную экологическую систему и являются источником природных богатств для Узбекистана. Например, в пустыне Кызылкум обнаружены такие полезные ископаемые, как золото, уран и фосфориты. В некоторых местах они также используются в качестве пастбищ. В последние десятилетия площадь пустыни постепенно расширяется, что связано с рядом географических факторов.

1. Климатические факторы

Изменение климата играет решающую роль в расширении пустыни Кызылкум. Сокращение количества осадков, продолжительное и сухое лето, повышенная ветровая активность ускоряют перемещение песчаных масс.

2. Антропогенные (деятельность человека) факторы

Нерациональное использование орошаемых земель, вырубка лесов и чрезмерная эксплуатация пастбищ сокращают естественный растительный покров. Истощение водных ресурсов (особенно истощение рек Амударья и Сырдарья) приводит к расширению зоны пустынь.

3. Геолого-геоморфологические факторы

Низкогорный рельеф усиливает ветровое воздействие и обеспечивает легкое перемещение песчаных масс. В результате высыхания древних русел рек обнажаются песчаные пласты, которые становятся источниками ветрового движения.

4. Экологические последствия

Расширение пустыни Кызылкум приводит к сокращению сельскохозяйственных угодий, деградации пастбищ и снижению биоразнообразия. Этот процесс также напрямую связан с катастрофой Аральского моря.

Расширение пустыни Кызылкум – сложная экологическая проблема, обусловленная взаимодействием природных процессов и деятельности человека. Для остановки опустынивания необходимо усилить лесоразведение, рациональное использование водных ресурсов и противоэрозионные мероприятия.

Аралкум (Arol Turk kum, kum, казах.: Аралкүм, узб.: Orol cho‘li) — самая молодая новая пустыня в мире, образовавшаяся на месте высыхающего Аральского моря. Эта песчаная солончаковая пустыня расположена в северо-западной части пустынь Каракум и Кызылкум на территории Узбекистана и Казахстана. Пустыню также называют Оккум (Белая пустыня). Согласно исследованиям, с 1960 года площадь моря сократилась на 90%, что привело к образованию новой песчаной пустыни — Аральского моря. Аральское море — это песчаная солончаковая пустыня, имеющая уникальный белый цвет из-за высокого содержания соли. Площадь Аральского моря продолжает расширяться и сегодня достигла 38 тысяч квадратных километров. Флора и фауна пустыни сокращаются, пыльные бури ежегодно переносят около ста миллионов тонн пыли и токсичных солей с одного места на другое. С каждым годом экологическая ситуация в этом регионе ухудшается, но, несмотря на это, это место не перестает привлекать своей суровостью и колоритом. Когда-то прибрежный город славился своим портом и рыболовной промышленностью. Сегодня в городе остались лишь следы былого великолепия морской жизни. Высохшее Аральское море когда-то было местом обитания рыбацких лодок, а теперь превратилось в кладбище ржавеющих кораблей. До берегов Аральского моря можно добраться и через пустыню Аралкум.



Рисунок 5. Судостроительный завод (Аралкум)

Факторами, способствующими расширению Аральского моря, являются:

1. Истощение водных ресурсов.

В результате строительства оросительных каналов и увеличения орошения (в частности, чрезмерного использования вод рек Амударья и Сырдарья) в советское время объем воды, поступающей в Аральское море, значительно сократился.

2. Антропогенные (вызванные деятельностью человека) факторы

Расширение оросительных систем, увеличение площади земель, предназначенных для орошения, и увеличение использования речной воды — все это изменило сток воды и нарушило естественный баланс.

3. Климатические и гидрологические факторы

Климатические факторы, такие как испарение, изменение температуры и дефицит воды, также играют свою роль. Высыхание Аральского моря нельзя объяснить исключительно антропогенными факторами — показано, что климатические условия и условия испарения также сыграли свою роль.

5. Рельеф и геологические условия региона

Поскольку пустыня Аралкум в основном представляет собой морское дно, её рельеф (низменные, обширные и разреженные участки), структура почв (соленые и песчаные слои) вряд ли будут защищены от ветров. В этих условиях ветры увеличивают вероятность перемещения и распространения пылевых, соляных и песчаных масс.

6. Пыль и метеорологические последствия.

Пыльные бури и выбросы соляной пыли также делают пустыню Аралкум «активной», поскольку в ней присутствуют не только неподвижные пески, но и движущиеся пылевые бури и соляная пыль, что представляет собой экологическую проблему.

Расширение пустыни Аралкум — это процесс, обусловленный комплексным влиянием природных и антропогенных факторов. Для остановки процесса опустынивания в этом районе необходимы лесонасаждения, закрепление песков и рациональное использование водных ресурсов. В противном случае площадь пустыни будет расширяться, а экологическая ситуация будет продолжать ухудшаться.[5]

Мирзачуль — одна из крупных равнин в центральной части Узбекистана. Он расположен на территории Сырдарьинской и Джизакской областей, ограничен рекой Сырдарья на севере, Туркестанскими и Нуратинскими горами на юге, пустыней Кызылкум на западе и Ферганской долиной на востоке. Его площадь составляет 10 тыс. км², высота над уровнем моря 230–385 м. Естественная граница между Кызылкумом и Мирзачулем проходит по болоту Арнасай. Рельеф Мирзачуля в основном равнинный. Климат региона резко континентальный: очень жаркое и сухое лето (до 40–45 °C), а зима холодная (до –10 °C). Годовое количество осадков не превышает 200 мм. Поэтому пустыня в естественном состоянии характеризуется слабым растительным покровом. В основном здесь произрастают засухоустойчивые

растения, такие как саксаул, янток, шора, пшеница и песчаное сорго [1]. Почва и природные ресурсы: В пустыне Мирзачуль встречаются сероземы, засоленные суглинки и песчаные почвы. Естественное плодородие этих земель низкое, но благодаря орошению и мелиорации они приведены в состояние, пригодное для сельского хозяйства. Водные ресурсы региона в основном поступают из реки Сырдарья. В результате освоения Мирзачуля было построено множество каналов, водохранилищ и хозяйственных сетей.

Освоение пустыни Мирзачуль. С 1950-х и 1960-х годов освоение пустыни проводилось в широких масштабах. В этот период были орошены новые земли и образован Мирзачульский оазис. В результате освоения пустынные земли превратились в районы, пригодные для сельского хозяйства, и на этой территории были образованы такие районы, как Пахтакор, Достлик, Зафарабад и Джизак.

Экономическое и экологическое значение [6]

Сегодня значительная часть пустыни Мирзачуль занята орошаемыми землями. Этот район стал развитым центром хлопководства, зерноводства, животноводства и овощеводства. Вместе с тем, местами наблюдаются проблемы засоления и эрозии почв из-за нерационального использования воды. Основными причинами расширения пустыни Мирзачуль являются засушливость климата, нерациональное использование водных ресурсов, засоление почв и ветровая эрозия. Для снижения этого процесса необходимо усилить экологический мониторинг, улучшить мелиоративные мероприятия, защитить пастбища и внедрить водосберегающие технологии. [7]



Рисунок 6. Обширные и ровные пространства Мирзачула

Заключение. Расширение пустынь – сложный географический процесс, являющийся результатом взаимодействия природы и деятельности человека, который в настоящее время достиг уровня глобальной экологической проблемы. Этот процесс тесно связан не только с естественными изменениями климата, но и с нерациональной хозяйственной деятельностью человека. Борьба с расширением пустынь имеет стратегическое значение для каждой страны, и Узбекистана в частности. Только научно обоснованная

экологическая политика, устойчивое управление земельными ресурсами и меры по охране природы могут замедлить или остановить этот процесс.

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ИСПОЛЬЗОВАНИЕ УЛЬТРАЗВУКА ПРИ РАЗМОТКЕ КОКОНОВ

Аннотация. *В статье рассматривается применение ультразвука для размотки шелковых коконов. Показано, что ультразвуковое воздействие позволяет снизить температуру и время разваривания коконов, повысить качество шелковой нити и производительность процесса. Приведены сравнительные графики и технологическая схема.*

Ключевые слова: *производство шелка, ультразвуковая технология, мехатронные системы, размягчение серицину, энергоэффективность, автоматизированный контроль, эффективность производства, качество шелка, обработка при низкой температуре, передовые технологии.*

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USE OF ULTRASOUND IN THE REELING OF SILK COCOONS

Abstract. *The article examines the application of ultrasonic technology in the reeling of silk cocoons. It is shown that ultrasonic treatment makes it possible to reduce the temperature and duration of cocoon boiling, improve the quality of the silk thread, and increase process productivity. Comparative graphs and a technological scheme are presented.*

Keywords: *silk production, ultrasonic technology, mechatronic systems, sericin softening, energy efficiency, automated control, production efficiency, silk quality, low-temperature processing, advanced technologies.*

Размотка шелковых коконов является ключевым этапом переработки сырья шелководства. Традиционная технология предполагает длительное разваривание коконов в горячей воде, что приводит к высоким энергозатратам и возможному повреждению нити. Ультразвуковое воздействие позволяет ускорить протекание процесса, снизить температуру и уменьшить расход воды благодаря разрушению или размягчению серицинового слоя.

Теоретические основы применения ультразвука

Ультразвук — это механические колебания с частотой более 20 кГц, которые при взаимодействии с жидкой средой создают эффекты кавитации, микровибрации и локального нагрева.

Основные механизмы воздействия ультразвука на коконы:

1. **Кавитация** приводит к разрушению или размягчению слоя серицинового клея.

2. **Вибрационное воздействие** облегчает отделение нити от волокон кокона.

3. **Гидродинамическая активизация** позволяет уменьшить температуру и время разваривания.

Методика ультразвуковой обработки

Процесс размотки включает следующие этапы:

- Помещение коконов в ванну с водой, нагретой до 60–80°C.
- Включение ультразвукового генератора с частотой 22–40 кГц.
- Обработка длится 3–8 минут в зависимости от плотности кокона.
- После размягчения серицина осуществляется механическая размотка нити.

Преимущества применения ультразвука

Показатель	Традиционный метод	С ультразвуком
Температура разваривания	90–100°C	60–75°C
Время обработки	10–25 мин	3–8 мин
Расход воды	Высокий	Снижается на 25–40%
Целостность нити	Может нарушаться	Улучшается
Затраты труда	Высокие	Сокращаются на 20–35%

Основное преимущество — сохранение прочности и эластичности шелковой нити, так как чрезмерный перегрев исключается.

СРАВНИТЕЛЬНЫЕ ПОКАЗАТЕЛИ ОБРАБОТКИ

Рисунок 1. Сравнение температур разваривания коконов:

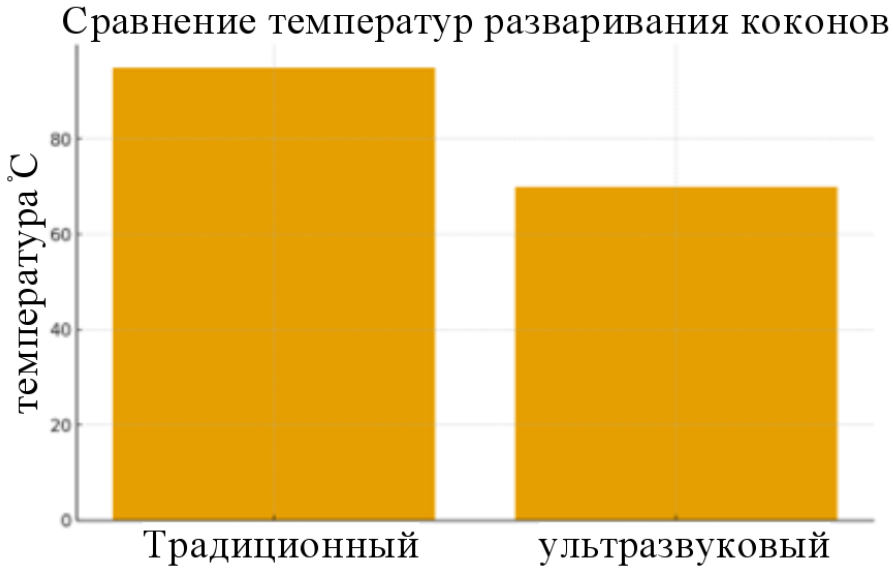


Рисунок 2. Сравнение времени разваривания коконов:



ТЕХНОЛОГИЧЕСКАЯ СХЕМА

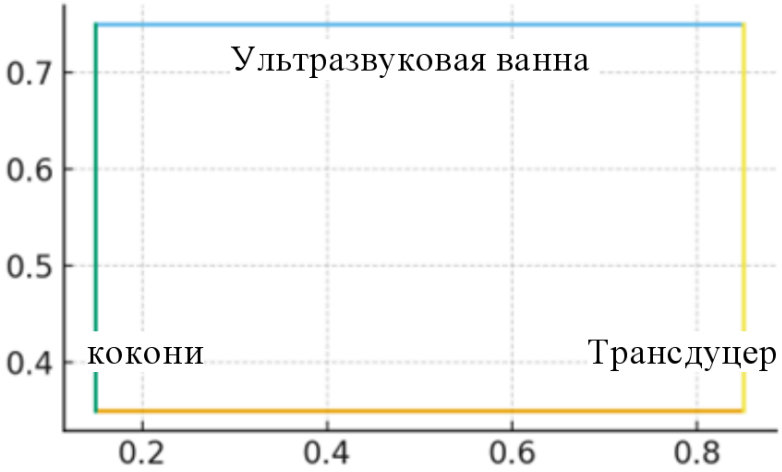


Рисунок 3. Схематическое изображение ультразвуковой обработки коконов:

ЗАКЛЮЧЕНИЕ

Применение ультразвука при размотке коконов обеспечивает повышение качества шелковой нити, снижение энергозатрат и сокращение продолжительности обработки. Технология является перспективной для модернизации предприятий шелковой промышленности и внедрения ресурсосберегающих методов производства.

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СКОРОСТЬ РАЗМОТКИ КОКОНОВ ПОД ВОЗДЕЙСТВИЕМ УЛЬТРАЗВУКА

Аннотация: *В данной статье проанализирована эффективность использования ультразвуковых и мехатронных систем в процессе производства шелка. Рассмотрены преимущества передовых технологий, в частности, эффективное размягчение серицину при низких температурах и достижение энергоэффективности за счёт автоматического контроля. Ультразвуковая технология позволяет ускорить процесс производства шелка за счёт быстрого разрушения серицину и получить высококачественный продукт.*

Ключевые слова: *производство шелка, ультразвуковая технология, мехатронные системы, размягчение серицину, энергоэффективность, автоматизированный контроль, эффективность производства, качество шелка, обработка при низкой температуре, передовые технологии.*

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DETERMINATION OF THE COCOON UNWINDING SPEED USING AN ULTRASONIC DEVICE

Abstract: *This article analyzes the effectiveness of using ultrasonic and mechatronic systems in the silk production process. The advantages of advanced technologies are examined, particularly the efficient softening of sericin at low temperatures and achieving energy efficiency through automatic control. Ultrasonic technology accelerates the silk production process by rapidly decomposing sericin, allowing for the production of high-quality silk.*

Keywords: *silk production, ultrasonic technology, mechatronic systems, sericin softening, energy efficiency, automated control, production efficiency, silk quality, low-temperature processing, advanced technologies.*

При обработке коконов в воде вещество серицин размягчается, что облегчает отделение шелка. Оптимальная скорость размотки для эффективности процесса составляет 178–182 м/мин. При этой скорости нить легко отделяется, и количество производственных проблем уменьшается.

Процесс размотки коконов является одним из важнейших этапов в производстве шелка. Для повышения эффективности и энергоэкономичности этого процесса важно использование ультразвуковых технологий. На эффективность процесса размотки влияют несколько параметров: температура воды, скорость размотки, частота и мощность ультразвука.

Скорость размотки

Скорость размотки оказывает значительное влияние на эффективность процесса. Для технологического процесса оптимальной считается скорость 178–182 м/мин. При увеличении скорости размягчение серицину и процесс отделения нитей ускоряются. Этот процесс можно выразить следующей формулой:

$$V_c = k_2 \cdot \frac{1}{T_s} \qquad (2)$$

где:

V_c — скорость размотки,

T_s — температура воды,

k_2 — коэффициент, определяющий взаимосвязь между температурой воды и скоростью размотки.

При высокой скорости и низкой температуре воды эффективность снижается, так как серицин не успевает полностью размягчиться.

Частота и мощность ультразвукового воздействия

Частота и мощность ультразвука вызывают молекулярные колебания, которые ускоряют размягчение серицину и облегчают отделение нити. Энергия ультразвукового воздействия математически выражается уравнением:

$$E_u = k_3 \cdot f \cdot P_u \qquad (3)$$

где:

E_u — энергия ультразвука,

f — частота ультразвука,

P_u — мощность ультразвука,

k_3— коэффициент, влияющий на энергию.

С увеличением частоты и мощности возрастает энергия ультразвука, что ускоряет процесс размягчения серицину в коконе.

В процессе размотки коконов такие параметры, как температура воды, скорость размотки, частота и мощность ультразвукового воздействия, имеют большое значение. Оптимизация этих параметров с помощью математического моделирования позволяет повысить эффективность процесса и обеспечить энергосбережение.

Схема мехатронной системы

Для автоматического управления процессом размотки коконов в производстве шелка важно применение мехатронных систем. Такие системы точно и эффективно контролируют температуру воды, частоту и мощность

ультразвука, а также скорость размотки. Это позволяет автоматизировать и оптимизировать процесс, что положительно сказывается на энергоэффективности и качестве продукции.

Данная схема описывает принцип работы мехатронной системы: датчики температуры воды и частоты ультразвука передают данные контроллеру. Контроллер, на основе полученной информации, управляет насосом и элементами регулирования мощности. Система постоянно контролирует температуру воды и частоту ультразвука, обеспечивая эффективность процесса.



Рисунок 1. Упрощённая схема мехатронной системы

Основные компоненты системы:

1. Датчик температуры воды — измеряет температуру воды. Оптимальная температура поддерживается на уровне 35–40°C.

2. Датчик частоты ультразвука — контролирует частоту, создаваемую ультразвуковым генератором.

3. Контроллер — «мозг» системы, управляющий температурой воды, частотой и мощностью ультразвука. Контроллер оптимизирует процесс с помощью специальных алгоритмов.

4. Насос/элемент регулирования мощности — управляет температурой воды и мощностью ультразвука на основе сигналов от контроллера.

5. Процесс размотки — контролируемый процесс, основанный на температуре воды, мощности ультразвука и скорости размотки.

Переходные процессы и функции

Общий вывод

Использование передовых технологий в процессе производства шелка имеет большое значение. Это связано с возможностью ультразвука размягчать

серицин при низких температурах и с возможностью автоматического контроля посредством мехатронных систем.

Преимущества ультразвуковой технологии:

- Быстрая и эффективная обработка: ультразвуковые волны разрушают серицин значительно быстрее, чем традиционные методы, что позволяет экономить время и ресурсы.
- Сохранение качества тонкого шелка: ультразвук размягчает серицин, не повреждая нежную структуру шелка, что обеспечивает получение высококачественной продукции.

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РАЗВИТИЕ СУБЪЕКТОВ ПРЕДПРИНИМАТЕЛЬСТВА НА ОСНОВЕ ФИНАНСОВОЙ ПОДДЕРЖКИ

Аннотация. *В статье исследуются процессы, связанные с условиями и факторами развития предпринимательской деятельности в экономике нашей республики. Изучаются существующие проблемы финансирования предпринимательской деятельности. Дается оценка эффективности системных реформ для развития предпринимательской деятельности, а также формулируются научные предложения и практические рекомендации по формированию направлений дальнейшего развития предпринимательской деятельности в нашей стране под влиянием существующих возможностей и условий.*

Ключевые слова: *предпринимательство, субъекты хозяйствования, деловая среда, предпринимательская деятельность, финансирование, источники финансирования.*

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BUSINESS DEVELOPMENT BASED ON FINANCIAL SUPPORT

Abstract. *This article examines processes related to the conditions and factors affecting the development of entrepreneurial activity in our republic's economy. Current issues related to entrepreneurial financing are examined. An assessment is made of the effectiveness of systemic reforms to develop entrepreneurial activity, and research proposals and practical recommendations are developed for shaping the future development of entrepreneurial activity in our country, taking into account existing opportunities and conditions.*

Keywords: *entrepreneurship, economic entities, business environment, entrepreneurial activity, financing, sources of financing.*

Введение

Вопросы совершенствования финансирования субъектов предпринимательства в нашей стране являются важными, поскольку в настоящее время вопросы обеспечения занятости населения являются одной из важных экономических характеристик социально - экономического развития общества и имеют особое значение в экономике.

В республике поставлены такие задачи, как «Финансовая и институциональная поддержка развития малого бизнеса, развитие и расширение семейного предпринимательства, решение вопросов самозанятости, увеличение объема оборотных средств, в том числе открытие более широких возможностей для развития субъектов предпринимательства»[34]. При решении этих задач важное значение имеет научное обоснование возможностей банков по совершенствованию финансирования субъектов малого бизнеса.

Глубокий анализ проблем, возникающих в настоящее время в процессе финансирования дальнейшего развития малого бизнеса , разработка научных предложений и практических рекомендаций, направленных на их устранение, является актуальной задачей. Одновременно проводится исследование по совершенствованию комплексной процедуры, которая с учетом богатого зарубежного опыта и отечественных возможностей обеспечивает комплексный и взаимодополняющий доступ к кредитам. указывает на необходимость выполнения своей работы.

Развитие экономики любой страны зависит от решений хозяйствующих субъектов и их реализации. Именно эффективная организация деятельности хозяйствующих субъектов, то есть конкурирующих фирм, позволяет добиться устойчивого экономического роста в нашей стране, тем самым повышая уровень жизни населения, решая социальные проблемы и укрепляя экономические и политические позиции страны в мировом сообществе. Узбекистан также определил достижение устойчивого экономического роста как главную цель процессов модернизации, происходящих в экономике нашей страны.

Литературный обзор

В ряде научных исследований, направленных на изучение условий и факторов развития предпринимательства, большое значение имеют научные выводы, связанные с приоритетностью инновационной деятельности. В частности, важную роль в теоретико-методологическом изучении этого процесса играют научные исследования С.Хосе ва Д.Маурисио. Результаты исследования позволяют сделать вывод о том, что технологиям следует отдавать приоритет в развитии предпринимательской деятельности. Предлагается использование системы стартапов для повышения эффективности финансового механизма координации технологического процесса в предпринимательской деятельности [6]. В исследованиях А. Устхуизен, Ж.Ван Вуурен, М.Бота большое значение придается роли системы управления развитием предпринимательской деятельности [7]. В исследованиях А.Киряков, В.Максимов рассматриваются достижения современной науки как новый метод развития инновационного предпринимательства в малом бизнесе [8]. В научных исследованиях

[34] Президента Республики Узбекистан от 14 сентября 2023 года № ПП-306 « **О мерах по финансовой и институциональной поддержке развития субъектов малого бизнеса».** https://www.norma.uz/uz/

Т.Кошелева экономически оценивается роль инновационных процессов в предпринимательской сфере. На макроэкономическом уровне малый бизнес осознаётся как важный фактор формирования инновационной среды и повышения эффективности инновационных процессов [9]. В своих научных исследованиях Э.Гасанов особое внимание уделял концептуальным аспектам формирования инновационного предпринимательства, утверждая, что существует неразрывная связь между информационным потоком и инновационными основами развития предпринимательства [10].

Среди экономистов нашей страны А.Абдуллаев, Муфтайдинов, Х.Айбешов уделяли внимание принципам управления инновационным развитием малого бизнеса и частного предпринимательства. В принципах управления отмечается, что главным приоритетом является ассортимент продукции на основе инновационных процессов, стратегические возможности совершенствования производства и зависимость от плана расширения производства [11]. Ш.Д.Эргашходжаева в своих исследованиях акцентирует внимание на специфике инновационного маркетинга в предпринимательской деятельности, основных этапах развития, формах, видах, способах и методах его реализации в деятельности предприятий [12]. Б.Шарипов в своих научных исследованиях подчеркивает, что повышение эффективности процессов специализации малого бизнеса и частного предпринимательства в отраслевом разрезе требует расширения возможностей внедрения инновационных идей и технологий в практику [13]. М.Эшов изучает экономический механизм и способы стимулирования развития малого бизнеса и частного предпринимательства как основного фактора инновационного развития [14]. В исследованиях Т.Джураева, Р.Каландарова приоритет отдается стратегическим процессам формирования будущих моделей инновационного развития малого бизнеса и частного предпринимательства [15]. Ш.Болтаев, А.Рахматов в своих научных исследованиях подчеркивают объективную необходимость инновационного развития предпринимательства, роль и значение благоприятной деловой среды, маркетинга и кластеров в инновационном развитии предпринимательства [16]. О.Арипов отмечает необходимость применения мер, направленных на повышение эффективности инновационного развития малого бизнеса и частного предпринимательства в территориальном масштабе [17].

Главной особенностью представленных научных исследований является эффективное использование существующих возможностей финансирования предпринимательской деятельности. В исследованиях отмечается, что процесс развития предпринимательской деятельности связан с рыночными факторами.

Методология исследования

Методологической основой исследования являются законодательные и нормативно-правовые акты в сфере развития малого бизнеса и частного предпринимательства, в частности Постановление Президента Республики

Узбекистан от 5 мая 2018 года № ПП-3697 «О дополнительных мерах по созданию условий для развития активного предпринимательства и инновационной деятельности» [2], Постановление Президента Республики Узбекистан от 19 апреля 2022 года № ПП-212 «О мерах по дальнейшему расширению механизмов финансирования предпринимательских проектов в регионах» [3], Постановление Президента Республики Узбекистан от 20 декабря 2021 года № ПП-55 «О дополнительных мерах по развитию семейного предпринимательства и расширению источников доходов населения» [4], а также Постановление Президента Республики Узбекистан от 9 июня 2022 года «О государственной поддержке предпринимательской деятельности» № ПФ-150 «О дополнительных мерах по дальнейшему совершенствованию деятельности Фонда» [5]. Также в ходе исследования Процесс формирования инновационных направлений развития предпринимательской деятельности исследовался с использованием методов логического мышления, научного наблюдения и системного подхода.

Анализ и результаты

Современный этап глобализации экономики Республики Узбекистан и совершенствования рыночных отношений находит свое отражение в процессах повышения конкурентоспособности национальной экономики и роста благосостояния населения посредством оптимизации системы эффективного использования факторов инновационного развития. В этой связи роль предпринимательской деятельности имеет большое значение и проявляется в процессах создания новых видов товаров и услуг, формирования наукоемких инновационных проектов и разработок в производстве, обеспечения сегментации рынка путем приведения сегментации рынка в соответствие с требованиями потребителей.

Повышение эффективности экономических реформ в нашей стране напрямую требует приоритетности процессов координации рыночной деятельности субъектов производства.

Этот процесс, представляющий собой инновационное развитие предпринимательской деятельности, служит поиску идей для новых продуктов и услуг, предварительному отбору наиболее перспективных идей, поиску инвесторов и расширению рыночных возможностей новых продуктов или услуг. Интегрированная взаимосвязь потенциальных возможностей удовлетворения потребностей целевого рынка и новых технологических возможностей создает возможности для эффективной организации всех этапов успешной коммерциализации инновационных разработок.

Вместе с тем, дальнейшее развитие деятельности субъектов предпринимательства, повышение их роли и значения в социально-экономическом развитии страны обусловливают необходимость совершенствования системы финансирования их деятельности. Следует отметить, что в Республике Узбекистан сформирована система финансирования деятельности субъектов предпринимательства, которая включает в себя государственную поддержку процесса финансирования

субъектов предпринимательства и практику кредитования их деятельности банками.

В частности, налоговые льготы играют важную роль в государственной поддержке процесса финансирования субъектов предпринимательства. Для субъектов предпринимательства созданы механизмы упрощения налогообложения и налогового администрирования на каждом этапе, оказания финансовой поддержки и повышения предпринимательских навыков.

С 1 января 2023 года:

Введена единая ставка налога с оборота для микропредприятий в размере 4%. При этом: для предпринимателей в отдалённых регионах и отдельных категориях сохранены действующие ставки в размере 1 и 2 процентов;

- представители микробизнеса, добровольно перешедшие на уплату налогов в размере 20-30 млн. сумов в год, освобождены от обязанности ведения бухгалтерского учета и представления налоговой отчетности в налоговые органы;

-Ставка налога на прибыль для субъектов малого бизнеса с оборотом более 1 млрд. сумов снижена в 2 раза сроком на один год;

- субъектам малого бизнеса с оборотом до 10 млрд сумов предоставлена возможность беспроцентной рассрочки по уплате налоговой задолженности на срок до шести месяцев с уведомлением. Налоговым органам предоставлена возможность самостоятельно исчислять и составлять налоговую отчетность по налогу с оборота, налогу на имущество и земельному налогу с юридических лиц по согласованию с предпринимателями.

Все районы (города) республики разделены на 5 категорий. Теперь налоговые льготы и дотации предоставляются в зависимости от категории района (города).

Также в последние годы приоритетное внимание уделяется государственной поддержке субъектов предпринимательства. При Министерстве экономического развития и сокращения бедности создан «Государственный фонд поддержки предпринимательства», одной из основных задач которого является содействие реализации государственной политики в области развития предпринимательства, поддержка социально уязвимых слоев населения и их предпринимательских инициатив. Фонд добился значительных успехов в поддержке развития экспорта продукции малого бизнеса. Фонд оказал финансовую помощь более 46 тысячам проектов субъектов предпринимательства на сумму более 15 трлн сумов.

Влияние субъектов частного предпринимательства, действующих в экономике нашей страны, на макроэкономическую ситуацию в стране с каждым годом растёт. Об этом свидетельствует тот факт, что доля субъектов предпринимательства в создании валового внутреннего продукта нашей страны достигла 54,6%, а доля населения – почти 74%.

На основе исследования влияния предпринимательской деятельности

на экономику страны мы пришли к следующим выводам:

Во-первых, развитие предпринимательской деятельности является одним из важных направлений, влияющих на экономику страны посредством удовлетворения потребностей конечных потребителей страны – населения, предприятий, государства и даже иностранных потребителей – в различных товарах и услугах. Именно в результате развития предпринимательской деятельности страна имеет возможность обеспечить экономический рост, расширить сферу производства и услуг, обеспечить занятость населения, создать условия добросовестной конкуренции.

Во-вторых, предоставление широких стимулов субъектам хозяйствования к развитию предпринимательства привело к тому, что частное предпринимательство заняло уникальное и закономерное место в инфраструктуре нашей национальной экономики.

В-третьих, принятые меры по расширению участия субъектов предпринимательства в системе государственных закупок и их доступа к высоколиквидной продукции, дальнейшему упрощению процедуры сертификации экспортируемой продукции предприятий и импортируемого технологического оборудования, кардинальному сокращению налоговых проверок, связанных с деятельностью субъектов предпринимательства, способствовали дальнейшему расширению влияния частных предпринимателей на экономику.

В-четвертых, необходимо повысить значимость влияния предпринимательской деятельности на экономику страны путем создания новых рабочих мест в предпринимательском секторе и обеспечения занятости населения.

При финансировании субъектов предпринимательства, учитывая возможность использования нетрадиционных источников финансирования, таких как оборотные средства, резервы и товары, приобретенные для перепродажи, помимо капитальных вложений, целесообразно выделить следующие направления: нераспределенная прибыль; амортизационные отчисления и внутрихозяйственные резервы; небанковские кредитно-финансовые организации банковской системы и специализированные кредитные фонды; средства, централизованные государством, направляемые на инвестиционные цели; средства, полученные в виде займов и кредитов от международных организаций и иностранных инвесторов; средства, полученные от выпуска ценных бумаг. За годы независимости в нашей стране последовательно реализуются целевые программы, направленные на дальнейшее улучшение деловой среды и ускоренное развитие предпринимательства.

Показатели доли малого бизнеса и частного предпринимательства в ВВП нашей страны превышают показатели большинства развитых рыночных экономик. Малый бизнес сталкивается с проблемами привлечения финансовых ресурсов как в период своего становления, так и в процессе развития и роста. На любом этапе хозяйственной деятельности малый бизнес

нуждается в финансовых ресурсах как для обеспечения текущей деятельности, так и для финансирования материально-технической базы, но потребность в финансовых ресурсах особенно остро ощущается на этапе становления малого бизнеса.

Таблица 1.

Показатели малого бизнеса и частного предпринимательства в Узбекистане[35]

	2013 год -	2014 год -	2015 год -	2016 год -	2017 год -	2018 год —	2019 год —	2020 год —	2021 год	2022 год	202 3 года
В Узбекистане маленький бизнес и частный предпринимательство В ВВП делиться (%)	6 1 .8	6 1 .9	6 4 , 6	6 6 , 8	6 7 , 2	6 4 , 3	58 , 5	5 7 , 5	5 6 , 9	54, 6	5 4 ,8
Маленький бизнес и частный продукция хозяйствующих субъектов Объем экспорта (млн. $)	3752.3	3657.8	3377.7	3139.2	2759.3	3710.8	4714.8	3100.9	3335.2	6157.5	6938.3
Маленький бизнес на предприятиях основной в столицу включено инвестиции объем (млрд сум)	9701.8	11189.3	14892.0	18072.1	20944.2	27515.0	47225.2	86886.8	96629.2	109202.2	128489.5

Как видно из данных таблицы 1, в 2023 году по сравнению с 2013 годом объем экспорта субъектов малого бизнеса и частного предпринимательства увеличился почти в два раза, а объем инвестиций в основной капитал субъектов малого бизнеса – почти в три раза. В последние годы объем инвестиций в основной капитал субъектов малого бизнеса, осуществляющих свою деятельность в нашей стране, также увеличивается. Особенно значительный рост этот наблюдается в последние годы, и в 2023 году общий объем инвестиций в основной капитал составил 127 640,6 млрд. сумов (таблица 2).

[35] https://stat.uz/ . Узбекистан Республика статистика агентство информация основанный на автор к структурированный

Таблица 2

Объем инвестиций в основной капитал субъектов малого бизнеса в Узбекистане, млрд. сумов[36]

Годы	Дом в столицу включено инвестиции	Предприятия и население собственный инструменты	Прием сделал фонды	Банки кредиты и другой долг фонды	иностранные инвестиции и кредиты
2013	9701.8	7497.7	2204.1	1424.0	780.1
2014	11189.3	9345.8	1843.5	1528.3	312.2
2015	14892.0	12070.5	2821.5	2222.1	592.1
2016	18072.1	15146.8	2925.3	2443.0	478.8
2017	20944.2	17063.2	3881.0	2832.0	1047.6
2018	27515.0	20566.4	6948.6	5501.2	1383.5
2019	47225.2	28468.7	18756.5	12810.2	5598.6
2020	86886.8	30122.5	56764.3	11620.8	44808.8
2021	96629.2	46950.0	49679.2	11090.7	38579.5
2022	109202.2	49234.4	59967.8	12542.3	47382.0
2023	127640.6	56259.7	71380.9	13041.2	58095
2013 в год относительно 2023 в этом году изменение	13.2	7.5	32.4	9.2	74.4

Из таблицы 2 видно, что изменение объема инвестиций в основной капитал в 2023 году по сравнению с 2013 годом в среднем составило 74,4 млрд. сумов. Анализ удельного веса предприятий малого бизнеса по источникам финансирования инвестиций в основной капитал показывает, что наибольший удельный вес в этом отношении занимают средства иностранных инвесторов, который увеличился. Следующим по значимости источником являются собственные средства предприятий, доля которых снизилась с 50,8% в 2012 году до 19,3% в 2022 году. Удельный вес иностранных кредитов соответственно увеличился примерно с 0,5% до 15,1%, а банковских кредитов снизился с 30,8% до 14,8%. Видно, что за рассматриваемый период наблюдается тенденция роста доли средств иностранных инвесторов (включая их реинвестиции) и иностранных кредитов среди источников финансирования инвестиций предприятий малого бизнеса в основной капитал.

[36] https://stat.uz/ . Узбекистан Республика состояние статистика комитет информация основанный на автор к структурированный

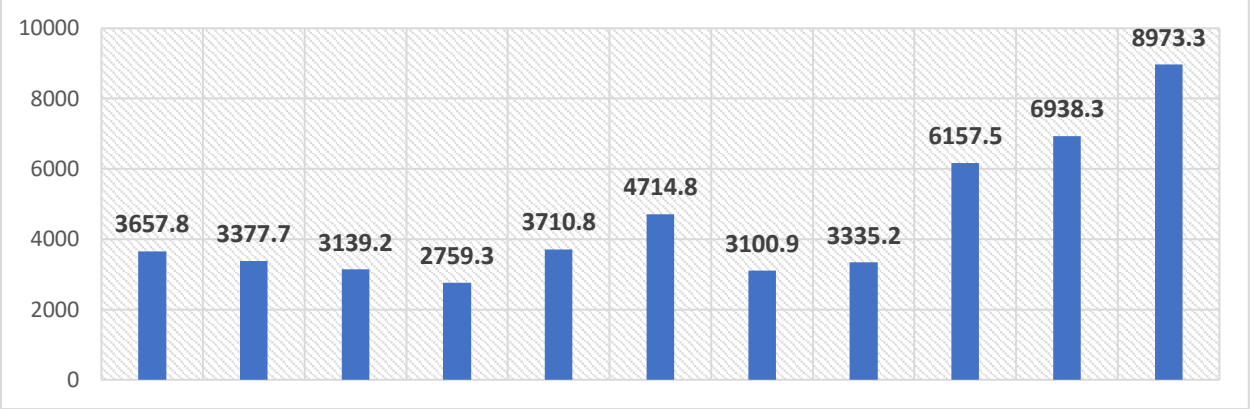


Рисунок 1. Доля субъектов малого предпринимательства в экспорте продукции объем (млн.$)[37]

Из рисунка 1 видно, что позиции страны в экспортном потенциале усиливаются. Роль малого бизнеса во внешнеэкономической деятельности также постепенно расширяется. Анализ показывает, что роль представителей этого сектора во внешнеэкономической деятельности нашей страны возрастает. В частности, большая доля импортируемой с зарубежных рынков продукции приходится на представителей этого сектора. Следует отметить, что перевод малого бизнеса и частного предпринимательства на инновационный путь развития в нашей стране открывает возможность резкого увеличения его доли в экспорте страны.

Не все малые организации располагают собственными финансовыми ресурсами для дальнейшего развития. Кроме того, количество убыточных предприятий по состоянию на 01.01.2023 г. составило 153 644, при общей численности 200 779,0 млн. чел., в сельском хозяйстве – 34,8%, в строительстве – 28,7%, на транспорте – 33,8%. Характерно, что в последние годы (с 2013 по 2023 г.) доля убыточных малых предприятий имеет определённую тенденцию к снижению. Поэтому большинству малых предприятий следует уделять особое внимание получению прибыли.

[37] https://stat.uz/ . Узбекистан Республика статистика информация агентства основанный на структурированный

Таблица 3

Изменение структуры распределения субъектов малого бизнеса в Узбекистане по видам экономической деятельности в 2013-2023 годах, %[38]

Годы	промышленность	строительство	торговля	наука и научный услуга другой сети
2013	17114.6	7925.5	32242.9	24841.8
2013	23312.0	10377.7	40564.5	31409.1
2014	30907.0	13944.9	50197.8	40187.9
2015	39643.5	16954.0	61972.3	47269.6
2016	50654.5	19671.0	78935.6	61346.2
2017	61367.8	22469.4	92973.0	69212.7
2018	87962.0	37451.7	114896.4	84433.4
2019	83344.2	53960.9	138920.7	103106.6
2020	103020.8	63866.6	164106.1	114052.7
2021	124907.9	77907.1	186759.3	147061.6
2023	143892.7	93554.5	229166.7	181245.0

Из данных таблицы 3 видно, что если обратить внимание на показатели распределения промышленности, строительства, торговли, науки и научного обслуживания среди других отраслей, то есть по видам экономической деятельности, то можно увидеть, что за эти годы они выросли в несколько раз. Например, в промышленности по сравнению с 2013 годом они выросли в восемь раз, а в строительстве – почти в два раза.

Заключение.

Он послужит основой для формулирования общих выводов о роли финансирования в дальнейшем развитии субъектов предпринимательства нашей страны и проблемах, направленных на его расширение. Он будет способствовать предоставлению субъектам предпринимательства оперативной, качественной и достоверной аналитической информации для принятия эффективных решений, направленных на дальнейшее развитие:

• Организация предпринимательской деятельности и эффективное функционирование субъектов предпринимательства во многом зависят от их экономических и финансовых аспектов. В частности, необходимо использовать инновационные подходы, применяемые в зарубежных странах, к внедрению механизмов финансирования субъектов отрасли , их целей и особенностей, а также механизмов формирования, распределения и эффективного использования финансовых ресурсов субъектов предпринимательства .

•Для развития частной собственности целесообразно тщательно разработать критерии оценки уровня открытости и вклада этого сектора в

[38] https://stat.uz/ . Узбекистан Республика статистика информация агентства основанный на структурированный

экономику страны с учетом общемировых требований и национальных особенностей.

- Развитие предпринимательской деятельности имеет большое значение для развития рынка труда и экономики в целом. Занятость в хозяйствующих субъектах играет важную роль в снижении уровня безработицы в стране и обществе в целом. Необходимо добиваться дальнейшего развития предпринимательской деятельности для достижения баланса спроса и предложения на местных рынках и снижения нагрузки на бюджеты всех уровней.

Использованные источники:

1. Послание Президента Республики Узбекистан Ш.М.Мирзиёева Олий Мажлису от 21 декабря 2022 года.
2. Постановление Президента Республики Узбекистан от 5 мая 2018 года № ПП-3697 «О дополнительных мерах по созданию условий для развития активного предпринимательства и инновационной деятельности».
3. Постановление Президента Республики Узбекистан от 19 апреля 2022 года №ПП-212 «О мерах по дальнейшему расширению механизмов финансирования предпринимательских проектов в регионах».
4. Постановление Президента Республики Узбекистан от 20 декабря 2021 года № ПП-55 «О дополнительных мерах по развитию семейного предпринимательства и расширению источников доходов населения».
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УДК 338.1

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ОЦЕНКА ФИНАНСИРОВАНИЯ СФЕРЫ ФИЗИЧЕСКОЙ КУЛЬТУРЫ И СПОРТА В РЕГИОНЕ

Аннотация: *В статье проанализированы основные показатели финансирования сферы физической культуры и спорта в Республике Башкортостан за 2021–2024 годы. Особое внимание уделено динамике распределения бюджетных средств между массовым спортом, физической культурой и спортом высших достижений. Отмечается значительный рост финансирования массового спорта, что отражает усилия региона по популяризации здорового образа жизни и вовлечению широких слоев населения. Проанализирована доля расходов на физическую культуру и спорт в общем бюджете региона, выявлена тенденция к ее росту с небольшим снижением в 2024 году. Сделан вывод о необходимости внедрения прозрачных механизмов контроля и комплексного подхода для устойчивого развития отрасли.*

Ключевые слова*: финансирование спорта, массовый спорт, спорт высших достижений, эффективность распределения средств, спортивная политика, развитие спорта, бюджет региона.*

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ASSESSMENT OF FINANCING OF THE SPHERE OF PHYSICAL CULTURE AND SPORTS IN THE REGION

Abstract: *The article analyzes the main indicators of financing the sphere of physical culture and sports in the Republic of Bashkortostan for 2021-2024. Special attention is paid to the dynamics of budget allocation between mass sports, physical education and high-performance sports. There has been a significant increase in funding for mass sports, reflecting the region's efforts to promote a healthy lifestyle and engage the general public. The share of expenditures on physical education and sports in the total budget of the region is analyzed, and a tendency to its growth with a slight decrease in 2024 is revealed. It is concluded that it is necessary to*

introduce transparent control mechanisms and an integrated approach for the sustainable development of the industry.

Keywords: *financing of sports, mass sports, high-performance sports, efficiency of allocation of funds, sports policy, sports development, regional budget.*

Оценка финансирования сферы физической культуры и спорта в регионе является ключевым фактором для развития массового спорта и повышения качества жизни населения. В последние годы региональные бюджеты выделяют значительные средства на строительство спортивных объектов, поддержку детско-юношеских школ и организацию массовых мероприятий. Однако, несмотря на положительную динамику финансирования, существуют проблемы с эффективным распределением средств и контролем их использования[39]. Недостаток инвестиций в обновление спортивного инвентаря и подготовку квалифицированных кадров сдерживает развитие профессионального спорта. Также важным аспектом является привлечение внебюджетных источников, таких как спонсорская поддержка и общественные инициативы.

Показатели финансирования сферы физической культуры и спорта Республики Башкортостан представлены в таблице 1.

Таблица 1 – Показатели финансирования сферы физической культуры и спорта за счет средств регионального бюджета Республики Башкортостан, млн.руб.[40]

Показатели	2021	2022	2023	2024	Отклонение	
					Руб.	%
Физическая культура	109,7	219,30	260,20	71,9	-37,8	65,54
Массовый спорт	989,7	2 824,80	4 105,10	3430	2440,3	346,57
Спорт высших достижений	2 198,30	1 946,80	2 623,20	3605,7	1407,4	164,02
Другие вопросы в области физической культуры и спорта	50,4	47,30	44,70	51,7	1,3	102,58
Всего	3 348,10	5 038,20	7 033,20	7 159,30	3811,2	213,83

Как видно из таблицы 1, наибольший рост финансирования наблюдается в области массового спорта, что говорит о поддержке массовых мероприятий и развитии спорта среди широких слоев населения. В то же время, финансирование физической культуры и "Спорта высших достижений" имеет значительные колебания, особенно по "Спорту высших достижений", который демонстрирует общий позитивный тренд к 2024 году.

[39] Показатели развития / ЕМИР Единый Методический Информационный Ресурс: Официальный ресурс Министерства спорта Российской Федерации – URL: https://emir.gov.ru/analytics/indicators/Finansovoe%20obespechenie%20FKiS(дата обращения 16.11.2025).

[40] Статистическая информация/ Министерство спорта Республики Башкортостан – URL: https://sport.bashkortostan.ru/activity/24998/ (дата обращения 16.11.2025).

Поддержка "Других вопросов в области физической культуры и спорта" варьируется, но в целом наблюдается небольшое восстановление в 2024 году.

Общая тенденция показывает существенный рост финансирования, что может свидетельствовать о растущем интересе к спортивной сфере в регионе.

На рисунке 1 представлена структура расходов по отрасли «Физическая культура и спорт» Республики Башкортостан

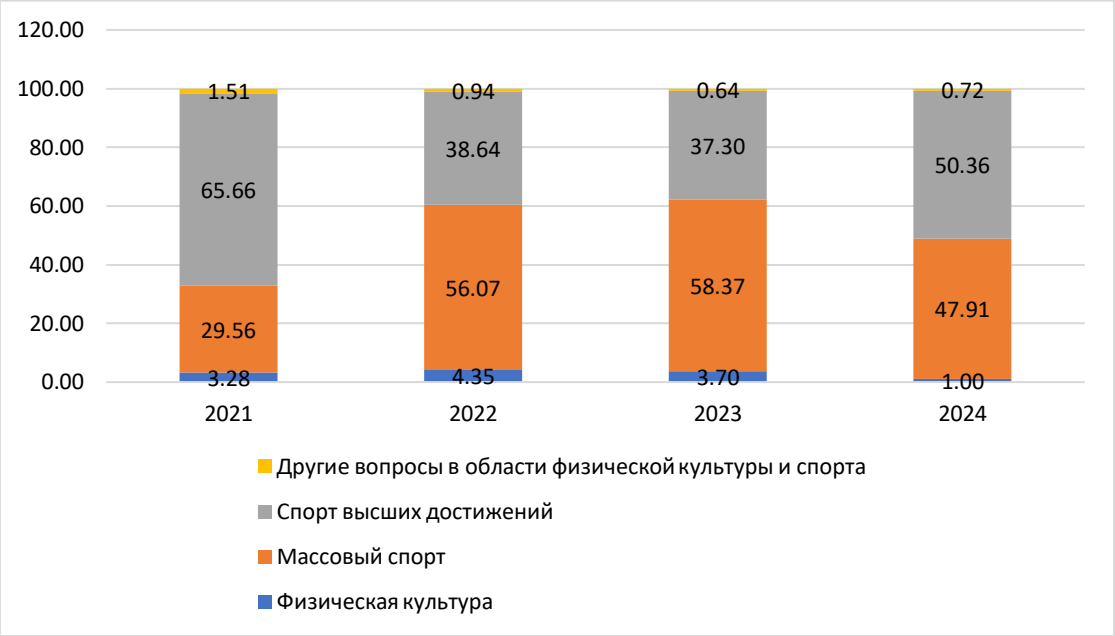


Рисунок 1 – Структура расходов по отрасли «Физическая культура и спорт» Республики Башкортостан, %

Как видно из рисунка 1, «Массовый спорт» стал приоритетным направлением, учитывая рост ассигнований в 2022 году, что может быть связано с популяризацией спорта и увеличением общественного интереса. «Спорт высших достижений» показывал высокие расходы, однако резкое сокращение может указывать на необходимость перераспределения бюджетных ресурсов или на временные трудности, связанные с достижением высоких результатов.

Общая динамика изменений расходов свидетельствует о том, что Республика Башкортостан стремится балансировать между поддержкой массового спорта и достижениями на высоком уровне, при этом минимизируя расходы в менее приоритетных для региональной политики областях.

Таким образом, данные расходы по «Физической культуре и спорту» показывают важные аспекты государственной политики в области физической культуры и могут быть полезны для формирования стратегий на будущее.

В таблице 2 и на рисунке 2 представлена доля расходов по отрасли «Физическая культура и спорт» от всего расходов регионального бюджета Республики Башкортостан

Таблица 2 – Расходы по отрасли «Физическая культура и спорт» от всего расходов регионального бюджета Республики Башкортостан[41]

Показатели	2021	2022	2023	2024
Расходы регионального бюджета РБ	3 348,10	5 038,20	7 033,20	7 159,30
Всего расходов	299 013,20	343 447,30	355 482,50	385 019,00
Доля расходов на «ФиС», от всего расходов	1,12	1,47	1,98	1,86

Как видно из таблицы 2 процентная доля расходов по отрасли «Физическая культура и спорт» в общих расходах: в 2021 году: 1,12% от общего объема расходов; в2022 году: доля увеличилась до 1,47%; в 2023 году: доля расходов по отрасли «Физическая культура и спорт» стала 1,98% — это максимальное значение в исследуемый период. В 2024 году получилось незначительное снижение до 1,86%.



Рисунок 2 – Доля расходов по отрасли «Физическая культура и спорт» от всего расходов регионального бюджета Республики Башкортостан, %

Согласно рисунку 2, доля расходов по отрасли «Физическая культура и спорт» растет до 2023 года, что свидетельствует о увеличении внимания к данному направлению, но в 2024 году ожидается небольшое снижение, что может свидетельствовать о возможных приоритетах в других сферах бюджета.

Если расход по отрасли «Физическая культура и спорт» продолжит расти, это будет отражать нарастающее внимание к спорту и физической культуре со стороны правительства региона. Однако необходимо следить за ситуацией, чтобы повышающиеся расходы не оказались одними из факторов, влияющих на другие важные сферы.

Для повышения результативности финансирования необходимо внедрение прозрачных механизмов отчётности и развитие программ,

[41] Деятельность / Министерство финансов Республики Башкортостан – URL: https://minfin.bashkortostan.ru/activity/2982/ (дата обращения 16.11.2025).

ориентированных на массовое вовлечение населения в активный образ жизни. Только комплексный подход позволит обеспечить устойчивое развитие физической культуры и спорта в регионе, повысить спортивные достижения и улучшить здоровье граждан.

Использованные источники:

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2. Показатели развития / ЕМИР Единый Методический Информационный Ресурс: Официальный ресурс Министерства спорта Российской Федерации – URL: https://emir.gov.ru/analytics/indicators/Finansovoe%20obespechenie%20FKiS(дата обращения 16.11.2025).
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УДК 331.1

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ФОРМИРОВАНИЕ РЕЗЕРВА УПРАВЛЕНЧЕСКИХ КАДРОВ В ГОСУДАРСТВЕННОЙ И МУНИЦИПАЛЬНОЙ СЛУЖБЕ

Аннотация: *В статье изучены основы формирования кадрового резерва муниципальных служащих. Рассмотрен алгоритм формирования модели компетенций для отбора в кадровый резерв. Приведены требования к муниципальным и государственным служащим в соответствии с антикоррупционным законодательством.*

Ключевые слова: *государственная служба, муниципальная служба, труд, кадровый резерв, коррупция, коррупционные риски.*

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FORMING A RESERVE OF MANAGEMENT STAFF IN THE PUBLIC AND MUNICIPAL SERVICE

Abstract: *The article examines the basics of forming a personnel reserve for municipal employees. It considers the algorithm for forming a competency model for selecting employees to the personnel reserve. The article also provides requirements for municipal and state employees in accordance with anti-corruption legislation.*

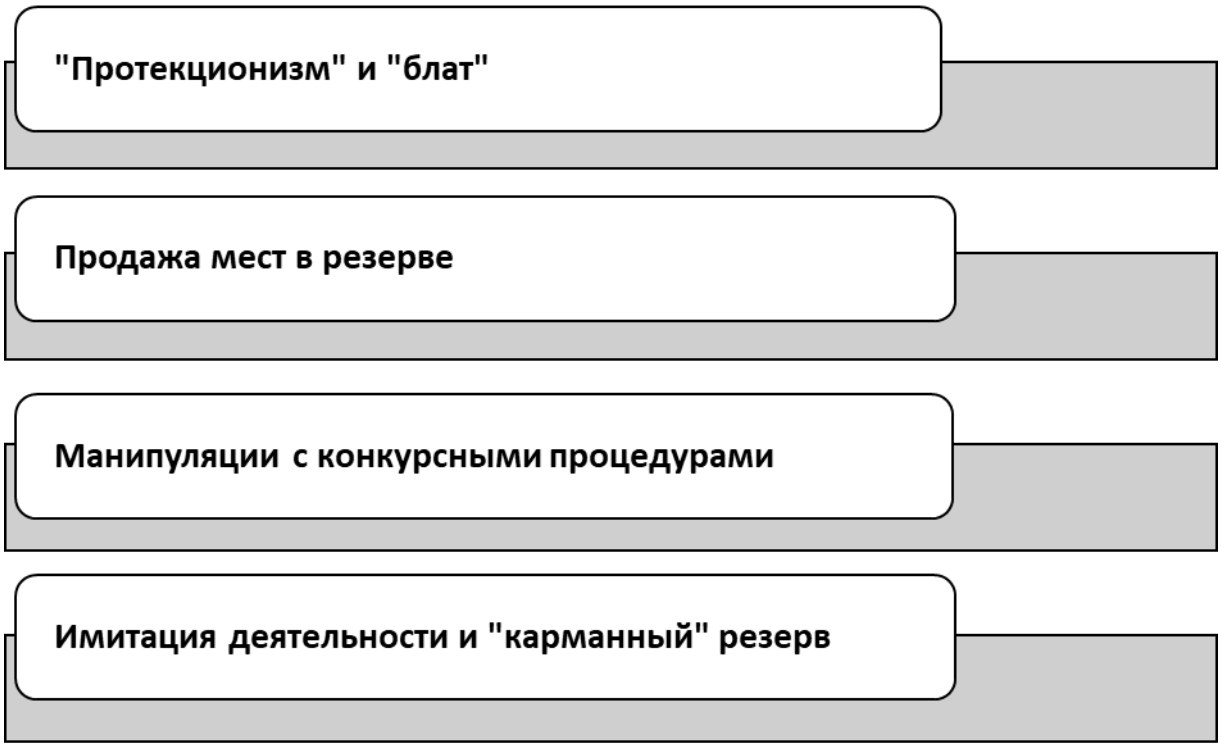
Keywords*: public service, municipal service, labor, personnel reserve, corruption, corruption risks.*

В российском обществе процессы становления и развития местного самоуправления обусловили необходимость решения органами местного самоуправления принципиально новых задач. Трансформация целей, задач, функций и полномочий органов власти на местах повлекло за собой усложнение и расширение поля деятельности муниципальных служащих. Формирование кадрового потенциала выступает как одна из главных задач в деятельности современного предприятия.

Перечень требований и подробная характеристика всех этапов отбора в кадровый резерв детально прописываются в локальных нормативных актах конкретного государственного органа или муниципального образования.

Однако, несмотря на прозрачно прописанные процедуры формирования

кадрового резерва, достаточно высокими остаются коррупционные риски и проблемы, которые можно разделить на несколько групп.



Риунок1. Коррупционные риски и проблемы формирования кадрового резерва

Одним из направлений решения указанных проблем формирования кадрового резерва государственной и муниципальной службы является применение компетентностного подхода. Особенность предложенного механизма – это внедрение модели компетенций, что позволит проводить объективную оценку соответствия кандидата в резерв требованиям к определенной должности.

Алгоритм формирования модели компетенций для отбора в резерв управленческих кадров в государственной и муниципальной службе приведен на рисунке 2



Рисунок 2 – Алгоритм формирования модели компетенций для отбора в резерв управленческих кадров

В модель компетенций для управленческих должностей могут быть включены общие и профессиональные компетенции.

Перечень общих компетенций включает в себя:

– стремление работать на благо общества;

– способность видеть стратегические перспективы деятельности;

– владение современными методами диагностики и анализа социально-экономических проблем;

– способность видеть и анализировать проблемы не только с позиции занимаемой должности, но и в более широком организационном контексте.

Перечень профессиональных компетенций включает в себя:

– способность принимать самостоятельные управленческие решения и реализовывать их на практике;

– готовность к принятию ответственности за свои решения;

– умение давать оценку последствиям своих решений;

– способность к анализу, организации и планированию в сфере

публичного управления;

– способность воспринимать новую информацию и принимать решения в ограниченное время;

– владение технологиями управления персоналом и кадрового аудита;

– способность к разностороннему и системному анализу управленческих проблем на основе имеющегося профессионального опыта и знаний.

– способность управлять в кризисных ситуациях;

– нацеленность на командное взаимодействие;

– способность к организации совместной деятельности по решению управленческих вопросов и задач.

Формирование резерва управленческих кадров обуславливает необходимость реализации комплекса мероприятий, направленных на создание условий для развития личностно-мотивационных и профессиональных характеристик сотрудников.

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ОПРИМИЗАЦИЯ ИСПОЛЬЗОВАНИЯ ИМУЩЕСТВЕННЫХ КОМПЛЕКСОВ ПРЕДПРИЯТИЙ

Аннотация: *Статья посвящена оценке оптимальных параметров использования имущественных комплексов предприятий. Произведен анализ структуры активов и себестоимости предприятия. Даны рекомендации по выбору оптимального объема основных фондов, сферам анализа имущественных комплексов и выбору модели бизнеса.*

Ключевые слова: *производственные активы, финансово-экономическое состояние, оборотные и внеоборотные активы, расчетная и фактическая себестоимость, основные фонды, управление стоимостью компании, производственная и предпринимательская модели бизнеса.*

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OPTIMIZATION OF THE USE OF PROPERTY COMPLEXES OF ENTERPRAISES

Abstract: *The article is devoted to the assessment of the optimal parameters of the use of property complexes of enterprises. The analysis of the structure of assets and the cost of the enterprise is carried out. Recommendations are given on the choice of the optimal volume of fixed assets, areas of analysis of property complexes and the choice of a business model.*

Keywords: *production assets, financial and economic condition, current and non-current assets, estimated and actual cost, fixed assets, company value management, production and entrepreneurial business models.*

Наряду с экономическим аудитом финансово-хозяйственной деятельности все большую популярность приобретает аудит имущественного комплекса предприятий, в котором заинтересован прежде всего собственник. Если предприятие производственное и операционный имущественный комплекс выпускает продукцию, ориентированную на потребителя, то прежде всего встает вопрос по оптимизации состава имущественного комплекса, так

как лишние активы ухудшают его финансово-экономическое состояние, а недостаток активов приводит к снижению прибыли. Производственные активы предприятия – это имущество и ресурсы, которыми предприятие распоряжается для осуществления своей деятельности и получения прибыли. Они могут классифицироваться на три основные группы (материальные, нематериальные и финансовые активы). К материальным активам относится физическое имущество, такое как здания, оборудование и транспортные средства. Управление активами включает планирование, контроль и оптимизацию использования имущества и ресурсов компании.

Любым изменениям предшествует оценка бизнеса и его нефинансовой составляющей, имеющая не только количественную, но и качественную форму. Анализ состава активов позволяет вывести коэффициент производственных активов:

Кп = Ап /А,

где

Ап – сумма производственных активов,

А- общая стоимость активов.

Норма **Кп > 0,5**, а критической величиной является **Кп = 0,5.**

При снижении **Кп** ниже критической нормы целесообразно пополнение собственного капитала или привлечение долгосрочных заемных средств для увеличения производственного имущества.

Рассматривая предприятие как имущественный комплекс необходимо отметить, что нефинансовая составляющая есть основа имущественного комплекса предприятия. Управление материальными активами включает в себя планирование приобретения и использования активов, контроль их состояния и ресурсов, а также оптимизацию их использования.

При анализе структуры активов важно не только оценить состав, но и динамику изменения структуры активов.

Таблица 1

Анализ структуры активов

Анализируемый показатель	**Результат анализа**	**Выводы**
Наибольший удельный вес в структуре совокупных активов	Оборотные активы	Формирование достаточно мобильной структуры активов, способствующей ускорению оборачиваемости средств предприятия.
	Внеоборотные активы	Немобильная структура активов, снижение оборачиваемости.
Динамика изменения суммы оборотных и внеоборотных активов	Увеличение	Свидетельствует о позитивном изменении баланса, росте хозяйственного оборота.
	Уменьшение	Сокращение хозяйственного оборота, может повлечь неплатежеспособность.

Структура внеоборотных активов	Доля основных средств в структуре внеоборотных активов меньше 40%	Легкая структура активов, мобильность имущества.
	Доля основных средств в структуре внеоборотных активов больше 40%	Тяжелая структура активов свидетельствует о значительных накладных расходах и высокой чувствительности к изменениям выручки.
Динамика изменения стоимости запасов.	Рост стоимости запасов	При снижении оборотов запасов является негативным фактором.
	Снижение стоимости запасов	При увеличении оборотов запасов является сдерживающим фактором основного производства.
Динамика изменения оборотных активов	Снижение доли оборотных активов	Показатель снижения финансово-экономической устойчивости.
	Увеличение доли оборотных активов	Показатель роста доходности бизнеса

Оптимальный состав имущественного комплекса можно оценить по соотношению фактической и расчетной себестоимости. Расчетная себестоимость – это сумма всех затрат, связанных с производством и реализацией продукции или услуг, она играет ключевую роль в финансовом управлении компании. Сумма всех фактически произведенных затрат на производство и реализацию конкретного вида продукции и составляет фактическую полную себестоимость продукции.

Таблица 2

Соотношение расчетной и фактической себестоимости

Расчетная себестоимость > Фактической	Имущественный комплекс оптимален
Расчетная себестоимость < Фактической	Избыток активов. Неэффективное использование. Значительный износ.

Так как имущественный комплекс определяет постоянные расходы (за исключением зарплаты по повременной системе) с одной стороны, а с другой стороны использование производственных мощностей является условием роста объемов производства, то оптимальный состав имущественного комплекса и его эффективное использование (рост коэффициента использования производственных мощностей) вызывают наиболее весомое влияние на прибыль. Производственная мощность — расчетный показатель максимального или оптимального объема производства за определенный период (декаду, месяц, квартал, год). **Производственные мощности предприятия** оценивают, чтобы проанализировать уровень технической оснащенности производства, выявить внутрипроизводственные резервы

роста эффективности использования производственных мощностей. Если производственная мощность предприятия используется недостаточно полно, это приводит к увеличению доли постоянных издержек, росту себестоимости, снижению прибыльности. **Коэффициент использования производственной мощности** — показатель, определяемый отношением годового объема плановой или фактической выработки продукции к ее среднегодовой мощности (максимальное количество продукции) . Идеальным считается степень использования, равная 95 %, где оставшиеся 5 % предназначены для обеспечения гибкости и бесперебойности производственного процесса.

Среднегодовые платежи и налоги, а также затраты на содержание и амортизационные отчисления зависят от количественного состава основных фондов предприятия. Оптимальное количество производственных площадей для выпуска продукции целесообразно оценивать по расчетной себестоимости, которая представляет собой сумму постоянных и переменных затрат (**Рис.1**).

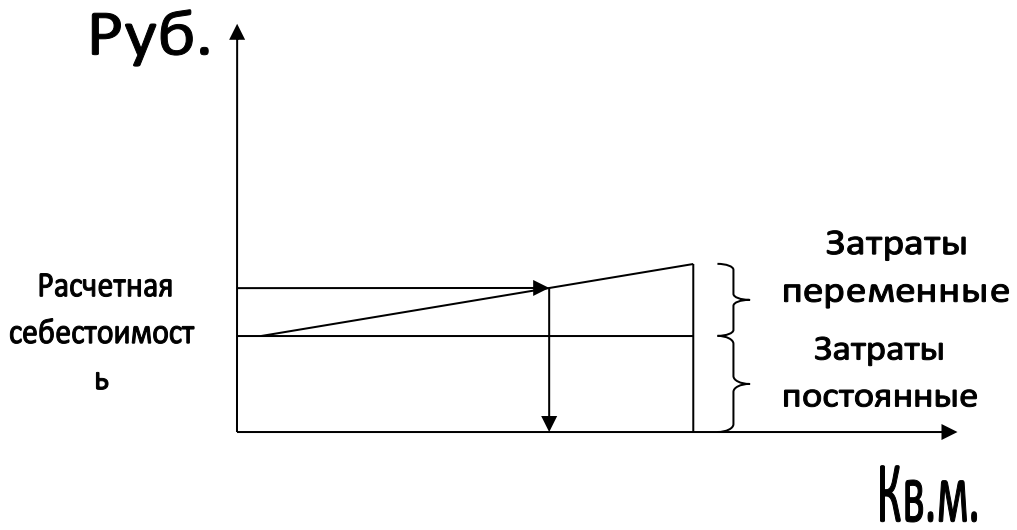


Рис.1.Сопоставление расчетной себестоимости и объема основных фондов имущественного комплекса.

По мере роста объема используемых активов доходность их снижается.

Высоким ростом бизнеса труднее управлять, т.к. появляется склонность к избыточным мощностям и инфраструктуре, что приводит к росту издержек и накладных расходов.

Важным критерием оценки имущественного комплекса предприятия является его стоимость. Управление стоимостью компании – один из ключевых факторов принятия тех или иных управленческих решений. Снижение стоимости компании в результате тех или иных преобразований

чревато ущемлением интересов собственников и акционеров. Стоимость компании - объект стратегического управления. Сейчас у топ менеджеров стало появляться понимание того, что в конечном итоге эффективность управления предприятием определяется не его ликвидностью или рентабельностью, не величиной прибыли, а увеличением "цены" бизнеса.

Целью технологического аудита имущественного комплекса предприятия является не столько выявление недостатков во всех сферах управления имущественным комплексом и оптимизации его структуры, сколько в выявлении резервов развития бизнеса за счет организации грамотного управления имущественным комплексом предприятия. Резервы в области управления имуществом выявляются во всех сферах операционной и управленческой деятельности в соответствии со стратегией предприятия.

Таблица 3

Сферы анализа имущественного комплекса

Управление имуществом	
Операционная деятельность	Управленческая деятельность
Содержание Восстановление Развитие	Учет Контроль Планирование Мотивация Финансирование

Наличие или отсутствие собственных активов характеризуют разные модели бизнеса. Необходимость изменения модели бизнеса с производственной на предпринимательскую диктуется выходом из зоны прибыли, что выражается в снижении показателя, определяющего отношение рыночной стоимости компании к объемам поступлений.

Таблица 4

Модели бизнеса (или этапы развития бизнес-стратегии)

Производственная		**Предпринимательская**
№1	№2	№3
Полный цикл разработки и производства продукции от изготовления заготовок до сборки готового изделия. Полный набор подразделений, обеспечивающих весь производственный цикл.	Узко-специализированные предприятия на производстве изделий определенного вида, использует передовые технологии и современное оборудование. Оказывает и использует услуги аутсорсинга.	Предприятие не занимается производством, либо осуществляет последнюю его стадию- сборку из готовых агрегатов. Основная цель – разработка продукта и продвижение его на рынке (КБ и маркетинг). Аутсорсинг используют на всех этапах. Необходимое условие бизнеса – наличие конкурентной среды подрядчиков.
Высокий % активов в структуре баланса (50-80%).	Только профильные активы (20 – 50%)	Активов нет, или они арендуются.

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ДИНАМИКА ОБОРАЧИВАЕМОСТИ АКТИВОВ КИТАЙСКОЙ АВИАКОМПАНИИ

Аннотация. *Одним из значимых показателей эффективности использования имущества авиакомпаний является оборачиваемость (или скорость оборота) активов – индикатор продуктивности имеющихся ресурсов. На базе эмпирических методов исследования в статье проанализирована динамика этого показателя Air China – третьей по масштабам китайской авиакомпании. Автор предпринял попытку выявления тенденции, тренда изменения доходов и активов авиаперевозчика, что позволяет разрабатывать соответствующий прогноз.*
Ключевые слова: *авиакомпании; активы; оборачиваемость; динамика.*

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DYNAMICS OF ASSET TURNOVER OF THE CHINESE AIRLINE

Abstract. *One of the significant indicators of the efficiency of using airline assets is the turnover (turnover rate) of assets, an indicator of the productivity of available resources. Based on empirical research methods, the article analyzes in detail the dynamics of this indicator of Air China, the third largest Chinese airline. The author has made an attempt to identify the trend, the trend of changes in the income of the airline, and to develop an appropriate forecast.*
Keywords: *airlines; assets; turnover; dynamics.*

Ограничения, связанные с пандемией COVID-19 на территории материкового Китая (в том числе со стороны государства), а также иные факторы геополитического характера оказали существенное влияние на авиаперевозки грузов и пассажиров.

Вполне обоснованно Г.В. Деружинский, Н.Е. Мальцева А.Н. Костецкий, Р.Р. Мукучян [1; 4] отмечают: «..для транспортной отрасли государственное и международное регулирование с годами становится все

сильнее и маркетинговым подразделениям транспортных предприятий.. приходится учитывать это влияние». При этом авторы изучают систему сбора и анализа информации по планированию перевозок, проблемы улучшения транспортных услуг, задачу максимизации эффекта при минимальных затратах.

Многие китайские авиакомпании испытали на себе «шоковый» сценарий развития событий. Это коснулось в том числе компании Air China – третьей в рейтинге крупнейших авиакомпаний КНР.

Компания функционирует с 1988 года, когда была основана Air China International Corporation. В 2002 году, на основе плана реформы отрасли, утвержденного центральным Правительством КНР, Air China International Corporation, China Aviation Corporation и China Southwest Airlines были объединены. В 2004 г. Air China стала публичной компанией, торгуясь на Гонконгской фондовой бирже, поэтому отчетность компании публикуется в том числе в гонконгских долларах (далее – HKD).

Внешние «шоки» вызвали резкое снижение доходов компании, особенно в 2020-22 гг. (рис. 1).

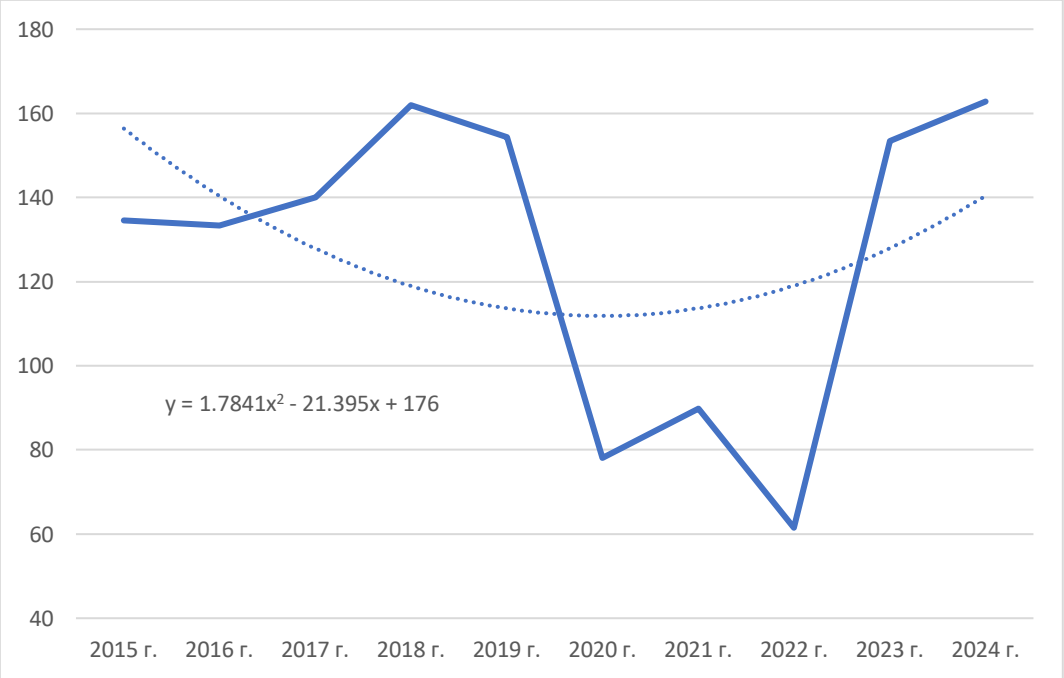


Рисунок 1 – Динамика доходов Air China в 2015-24 гг.
(суммы в млн. HKD)
Источник: рассчитано автором по [Профиль компании «Air China» [Электронный ресурс]. URl: https://www.airchina.us/US/GB/about-us/profile.
Режим доступа: – свободный (дата обращения: 12.02.2025)]

В 2020-22 гг. среднегодовая выручка компании уменьшилась в два с лишним раза, по сравнению с периодом 2015-18 гг.

В 2023 г. начался восстановительный рост объемов перевозок: при выручке в 153,4 млрд. HKD, компании не хватило лишь 7,1 млрд. HKD для

покрытия постоянных затрат (25,6 млрд. HKD), то есть для «выхода на безубыточность».

В 2024 г. выручка компании увеличилась на 6,1%, и период убыточной деятельности на этом был завершен.

Эти изменения нашли отражение в показателях эффективности использования имущества компании.

Чтобы оценить такое влияние, необходимо выбрать индикаторы, адекватно отражающие продуктивность использования ресурсов.

Так, Э.Р. Дзагиев [2] рассматривает «систему оценочных показателей, позволяющих рассчитать и оценить степень эффективности использования активов предприятия», и сферу применения отдельных показателей продуктивности активов.

О.И. Кремень, Р.Л. Мосийчук, В.М. Кремень [3] предприняли попытку структурирования процесса оценки эффективности управления активами предприятия, выделив при этом «..шесть этапов: анализ управления активами; определение эффективности управления активами; анализ результатов расчета показателей эффективности управления активами; анализ факторов, повлиявших на результат анализа эффективности управления активами; формирование рекомендаций по совершенствованию анализа и повышению эффективности управления активами предприятия; контроль за выполнением рекомендаций»

По нашему мнению, для авиакомпаний, имеющих на балансе значительные внеоборотные активы – самолеты в собственности и долгосрочном лизинге, иные виды основных средств – наиболее адекватным показателем является скорость оборота активов (табл. 1).

Таблица 1. – Динамика оборачиваемости активов компании в 2015-24 гг.
(раз за год)

Год	Выручка	Активы, всего	Выручка / Активы
2015 г.	134,6	255,0	0,528
2016 г.	133,4	250,0	0,534
2017 г.	140,1	282,9	0,495
2018 г.	162	277,9	0,583
2019 г.	154,4	329,1	0,469
2020 г.	78,1	336,8	0,232
2021 г.	89,8	365,0	0,246
2022 г.	61,5	331,2	0,186
2023 г.	153,4	364,5	0,421
2024 г.	162,8	357,9	0,455
2024 / 2023	1,061	0,982	-
2024 / 2015	1,210	1,404	-

Источник: рассчитано автором по [Профиль компании «Air China» [Электронный ресурс]. URl: https://www.airchina.us/US/GB/about-us/profile.
Режим доступа: – свободный (дата обращения: 12.02.2025)]

В 2024 г. стоимость имущества компании снизилась на 1,8 процента, а выручка увеличилась более, чем на шесть процентов. Однако за весь анализируемый период тенденция обратная – стоимость активов росла в два раза быстрее, чем выручка. Соответственно показатели эффективности использования имущества Air China снизились.

В частности, оборачиваемость активов снизилась с 0,53 оборота в год в 2015 г., до 0,46 оборота в 2024 г. Худший показатель (0,19 оборота) наблюдался в 2022 г.

Для прогнозирования этого индикатора необходимо использовать два статистических ряда – доходы и стоимость активов компании.

Нами предпринята попытка рассчитать уравнение регрессии по показателю выручки. Получено уравнение вида:

$$y = 1{,}7841x2 - 21{,}395x + 176 \qquad (1)$$

где:

Y – объем выручки, млрд. HKD.

x – фактор времени.

Для описания тренда изменения стоимости имущества компании наиболее адекватной оказалась логарифмическая зависимость (рис.2).

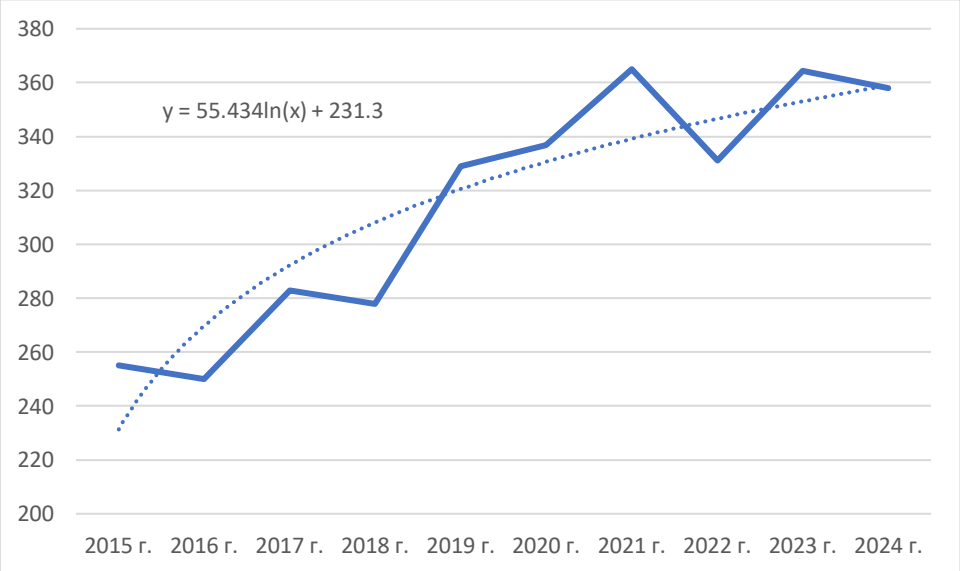


Рисунок 2 – Тренд изменения активов Air China в 2015-24 гг.
(суммы в млн. HKD)
Источник: рассчитано автором по [Профиль компании «Air China» [Электронный ресурс]. URl: https://www.airchina.us/US/GB/about-us/profile.
Режим доступа: – свободный (дата обращения: 12.02.2025)]

Результаты проведенного анализа позволяют, во-первых, экстраполировать сумму доходов компании, во-вторых, прогнозировать изменение стоимости ее имущества; в-третьих, рассчитать прогнозные показатели оборачиваемости активов на N периодов вперед.

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ТЕРМИНОЛОГИЯ ЖЕНСКОЙ КОСМЕТИКИ В АНГЛИЙСКОМ, РУССКОМ И УЗБЕКСКОМ ЯЗЫКАХ: ЛИНГВОКУЛЬТУРНЫЙ АСПЕКТ

Аннотация: *В статье рассматриваются лингвокультурные особенности терминологии женской косметики в английском, русском и узбекском языках. Анализируется влияние культурных традиций, ценностей и социальных тенденций на процесс наименования и восприятия терминов, связанных с женской красотой. Особое внимание уделено взаимодействию глобального языкового влияния — прежде всего английского — с национальными культурными идентичностями, отражёнными в русской и узбекской лексике. Показано, что заимствованные термины (concealer, highlighter, тон крем, хайлайтер и др.) проходят семантическую и морфологическую адаптацию, формируя уникальный гибридный пласт лексики, отражающий процессы модернизации и глобализации.*

Ключевые слова: *косметическая терминология, лингвокультурный анализ, заимствования, англицизмы, языковая адаптация, трилингвизм, культурная идентичность.*

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TERMINOLOGY OF WOMEN'S COSMETICS IN ENGLISH, RUSSIAN AND UZBEK: A LINGUOCULTURAL ASPECT

Abstract: *The article examines the linguocultural features of women's cosmetic terminology in English, Russian, and Uzbek languages. It analyzes the influence of cultural traditions, values, and social trends on the naming and perception of terms related to female beauty. Special attention is given to the interaction between global linguistic influence — primarily English — and national cultural identities reflected in Russian and Uzbek vocabularies. It is shown that borrowed terms (**concealer**, **highlighter**, **ton krem**, **xaylayter**, etc.) undergo*

semantic and morphological adaptation, forming a unique hybrid lexical layer that reflects processes of modernization and globalization.

Keywords: *cosmetic terminology, linguocultural analysis, borrowings, anglicisms, linguistic adaptation, trilingualism, cultural identity.*

В последние десятилетия косметическая индустрия стала глобальным феноменом, отражающим не только экономические, но и культурные процессы современного общества. Язык, обслуживающий эту сферу, активно пополняется новыми лексическими единицами, преимущественно англоязычного происхождения (*concealer, highlighter, lip gloss, foundation* и др.), которые закрепляются в русском и узбекском языках. Цель данной работы — выявить лингвокультурные особенности косметической терминологии в английском, русском и узбекском языках, показать, как культура и традиции определяют способы наименования и восприятия терминов, связанных с женской красотой.

Проблема взаимосвязи языка и культуры широко освещается в современной лингвистике. По мнению Е. М. Верещагина и В. Г. Костомарова, «язык есть форма существования культуры и средство её хранения» (Верещагин, Костомаров, 1983). В английской традиции аналогичную позицию выражает D. Crystal, отмечая, что «в лексике моды и красоты отражается культурный престиж англоязычного мира и его влияние на глобальные тенденции» (Crystal, 2003, p. 117).

Современные исследования (Алюнина & Нагель, 2020) подтверждают, что заимствования в косметической сфере связаны не только с необходимостью обозначения новых реалий, но и с символическим значением — использованием языка престижа.

В узбекском языкознании вопросы заимствований и культурной адаптации терминов активно исследуются. Так, Э. М. Давлятова в своих работах подчёркивает, что заимствованные слова, в том числе из английского, «становятся частью национальной языковой картины мира, отражая процессы модернизации и глобализации в узбекском обществе» (Давлятова, 2022). Аналогичную точку зрения высказывает Шукуров О., утверждая, что «лексическая система узбекского языка гибко адаптирует заимствования, сохраняя при этом национальную семантику красоты» (Shukurov, 2024).

Лингвокультурный анализ терминов

1. Английский язык

Английская косметическая терминология отражает культуру потребления, индивидуализма и акцент на внешнем совершенстве. Слова *flawless, glow, beauty, elegance* несут не только описательную, но и оценочную семантику. Большинство терминов создаются на основе метафор (*highlighter – осветлитель, blusher – румяна*), что отражает эстетическую установку на визуальный эффект.

2. Русский язык

Русский язык демонстрирует сочетание англицизмов и национальных наименований: *тональный крем, тушь, хайлайтер, блеск для губ*. Многие термины сохраняют иностранное звучание, что свидетельствует о культурном влиянии и стремлении к западным стандартам красоты. Однако часть слов подвергается морфологической адаптации: *консилер – консилеры, блеск – блески*.

3. Узбекский язык

В узбекской культуре понятие красоты тесно связано с традиционными представлениями о чистоте, гармонии и естественности (*go‘zallik, orasta, tiniqlik*). Современные англицизмы (*ton krem, xaylayter, konsiler*) употребляются преимущественно в городском и медийном дискурсе. При этом происходит интересная культурная адаптация: иноязычные термины сочетаются с местными эстетическими концептами (*milliy go‘zallik, tabiiy chiroy*), что создаёт уникальный гибридный пласт лексики.

Заключение

Лингвокультурный анализ показывает, что косметическая терминология в английском, русском и узбекском языках отражает разные модели восприятия красоты.

Английский язык — глобальный источник терминов, символ престижа и моды.

Русский язык — пространство культурного взаимодействия и адаптации.

Узбекский язык — пример синтеза традиционного и современного, где заимствования интегрируются в национальную культуру.

Таким образом, косметическая терминология служит зеркалом культурных ценностей и эстетических приоритетов каждой языковой общности.

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СРАВНИТЕЛЬНАЯ ОЦЕНКА БИЗНЕС-ПРОЦЕССОВ ДЕЙСТВУЮЩИХ КОМПАНИЙ НА РЫНКЕ ТЕЛЕКОММУНИКАЦИЙ

Аннотация: *В статье проведен анализ бизнес-процессов действующих компаний в телекоммуникационной отрасли, способности адаптировать бизнес-процессы к изменениям конъюнктуры рынка. Сделаны выводы о том, что чем больше компания автоматизирует свои бизнес-процессы, тем более гибкой она становится по отношению к внешнему миру.*

Ключевые слова: *бизнес-процесс, телекоммуникационная отрасль, управление сетями, организация бизнес-процессов.*

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COMPARATIVE ASSESSMENT OF BUSINESS PROCESSES OF EXISTING COMPANIES IN THE TELECOMMUNICATIONS MARKET

Abstract: *The article analyzes the business processes of existing companies in the telecommunications industry, the ability to adapt business processes to changes in market conditions. It is concluded that the more a company automates its business processes, the more flexible it becomes in relation to the outside world.*

Keywords: *business process, telecommunication industry, network management, organization of business processes.*

Отрасль телекоммуникаций на сегодняшний момент развивается стремительными темпами, одна технология приходит на смену другой, доступ к современным технологиям получают жители малочисленных населенных пунктов, а жители больших городов пользуются интернетом на больших

скоростях. Но несмотря на то, что телекоммуникационный рынок очень динамичен, состав его основных игроков практически не меняется. Рынок телекоммуникаций представлен довольно небольшим количеством крупных компаний. По количеству абонентов лидирующее место занимает компания «Мобильные ТелеСистемы», затем идет «Мегафон», «Вымпелком», «РосТелеКом».

Рассмотрим подробнее управление и организацию бизнес-процессов в каждой компании.

Компания «МТС» реализует в своей деятельности проект для анализа, регламентации, моделирования и управления бизнес-процессами «Casewise Corporate Modeler». По сути, это набор программных инструментов, которые позволяют изобразить наглядно архитектуру организации, анализировать бизнес-процессы и оптимизировать их. К данному проекту было подключено автоматическое обновление модели организационной структуры с помощью интеграции с внутренним корпоративным порталом. Это позволяет автоматически генерировать отчет о текущем положении подразделения из карты процессов [4].

Также МТС разработал мультисервис Entera, который позволяет автоматически загружать документы в систему учета 1С. Сначала происходит распознавание документов с точностью 98%, затем распознанные документы проходят проверку в соответствии со справочником, далее сервис автоматически загружает обработанные документы в учетную систему и сохраняет в архив. С помощью этой технологии можно оптимизировать бизнес-процесс по учету и управлению за документооборотом компании:

− ускорение обработки первичных документов в 10 раз,
− точность распознавания документов 98%,
− предотвращение дублирования документов в учетной системе,
− быстрый поиск документов по запросу.

В компании активно применяется подход Agile при работе с клиентами в сегменте B2B.Такой поход предполагает, что люди и взаимодействие важнее инструментов, работающий продукт важнее исчерпывающей документации, сотрудничество с заказчиком важнее согласования условий контракта, а готовность к изменениям важнее следования первоначальному плану. Это позволяет быстрее реагировать на потребности клиентов, оптимизировать взаимодействие с ним [1].

МТС активно применяет в работе одну из практик Agile-подхода – Канбан. Различные виды досок Канбан представлен на платформе МТС Линк. Подход отлично помогает оптимизировать работу в сегменте B2B и B2C, так как в карточках на доске-канбан записана информация о клиенте, контактные данные, частота обращений, история заказов, предпочитаемые услуги.

Так, компании МТС активно развивает свою деятельность в сторону организации управления бизнес-процесс и их оптимизации.

Компания «Мегафон» реализует в своей деятельности проект «Контроль кадров». С помощью спутниковых систем геолокации GPS, а

также RFID-меток происходит мониторинг местоположения устройств разъездного персонала. Было разработано приложение, где можно контролировать местоположение, управлять задачами и оценивать эффективность. Данная разработка позволяет проследить реальную загруженность и оценить эффективность работы мобильных сотрудников и оптимизировать:

– время, поскольку дает возможность строить оптимальные маршруты передвижения,

– работу сотрудника с помощью быстрых фотоотчетов о выполненных задачах, отчетов о времени, количестве посещенных объектов, маршрутах.

Компания «Мегафон» разработала собственную технологию Интернет вещей IoT. Организация применяет ее как в собственной деятельности, так и продает сторонним компаниям. Данная технология позволяет:

– контролировать перемещение транспорта, а как следствие анализировать причины задержек и простоя, что позволить выявить проблемы и устранить их,

– автоматизировать процесс управления системами видеонаблюдения любого масштаба,

– мониторить окружающую среду: контроль за промышленными выбросами, интеграция и передача данных в госреестр, предотвращение аварий.

Внутри компании реализуется современное технологическое решение M2M. Оно позволяет объединить в одну единую информационную сеть все объекты бизнеса и управлять ими дистанционно. С помощью этого можно отслеживать с датчиков работу объектов базовых станций, повысить уровень безопасности и скорость реакции на непредвиденные и аварийные события [2].

Стоит отметить, что в компании «Мегафон» также применяется Agile-подход в организации бизнес-процессов, однако внедрять они стали это лишь в 2020 году, значительно позднее, чем компания «МТС» [5].

Компания «Ростелеком» разработала собственное веб-приложение «Комплаенс-контроль» на базе платформенного решения АВАКОР (автоматизация внутреннего аудита, контроля и оценки рисков). Данный продукт позволяет автоматизировать процесс сбора различных деклараций и проверки сотрудников на наличие потенциальных конфликтов. С помощью такого проекта компании удалось унифицировать и автоматизировать бизнес-процесс управления конфликтом интересов, обеспечить централизованный учет и хранение данных.

В сегменте B2B и B2C компанией «Ростелеком» были разработаны так называемые lean-лаборатории, в которых происходит обучение работников организации основам бережливого производства. Сотрудников в первую очередь обучают по системе 5S-оптимизация рабочих мест. Цель заключается в том, чтобы убрать все ненужные предметы, рассортировать вещи и сделать рабочее пространство эргономичным [3].

Компания «Ростелеком» адаптирует под свою внутреннюю структуру и корпоративную культуру Agile-подход с помощью Karma Framework – модель управления в ИТ, на основе самоорганизующейся команды. По сути, это метод круговой организации, который используют для выполнения общих целей сотрудников. Данная модель вошла в число лучших в мире моделей по управлению ИТ.

«Ростелеком» разработал проект «электронный магазин» -площадка для малых закупок. Руководству компании пришла идея объединить все однотипные закупки с помощью цифрового решения. Данная разработка позволила сократить заполнение заявок на закупку, централизовать учет закупок, сократить срок обработки ценовых запросов с 20 дней до 3-х дней. Этого получилось достичь за счет уменьшения трудозатрат на поиск поставщиков во внешних источниках.

Компания «Билайн» внедрила систему роботизации бизнес-процессов под названием Sherpa RPA. С помощью нее роботизируется широкий спектр трудоемких задач, например, обработка данных, формирование однотипной отчетности и общение с клиентами. Это собственное информационное решение организации, так как до этого она использовала иностранную платформу для оптимизации тех же самых дел.

В организации был разработан продукт «High-load Enterprise Rapid Message Enrichment System» -система обработки и нормализации трафика в формате реального времени. Ее основное назначение – централизованное управление политиками потребления дата-опций. Продукт позволяет оптимизировать работу компании в частности: сократить время обработки первичной информации, динамически простраивать маршруты трафика, рационально реализовывать территориальное распределение, а возможность обработки в реальном времени позволяет ускорить процесс обработки запросов в 2 раза.

Компания «Билайн» активно использует в своей деятельность систему организации канбан. Эти кросс-функциональные доски помогли ликвидировать информационный вакуум при взаимодействии сотрудников, наладить процессы и сплотить коллектив. С помощью канбан организация смогла упростить и автоматизировать отчетность, наладить сигнализацию о возможных проблемах, а также важным достижением руководство компании считает, что девять из десяти сотрудников опирается на принципы канбан. Также в «Билайн» регулярно проводятся Agile и Lean курсы для сотрудников.

Таким образом, рассмотрев организацию бизнес-процессов и их оптимизацию в компаниях телекоммуникационной отрасли, можно сделать вывод, что все действующие организации постоянно стараются автоматизироваться и улучшить бизнес-процессы собственной компании. Наибольших успехов в данном направлении добилась компания «МТС», поскольку с недавнего времени позиционирует себя как цифровую экосистему, поэтому огромные усилия вкладываются в разработку совершенно новых информационных решений.

Таким образом, сравнение бизнес-процессов компаний телекоммуникационной отрасли наталкивает на мысль, что представители этой отрасли постоянно стремятся улучшить качество управления своими бизнес-процессами, проводить оптимизацию и реинжиниринг бизнес-процессов, а это в свою очередь отразится на таких аспектах деятельности компании как:

1. Эффективность операций: компании с более оптимизированными процессами могут демонстрировать более высокую производительность и меньшие затраты, что позволяет им предлагать конкурентоспособные цены.

2. Качество обслуживания: компании, которые инвестируют в обучение сотрудников и технологии для улучшения клиентского опыта, часто имеют более высокие уровни удовлетворенности клиентов и удержания.

3. Инновации и адаптивность: компании, активно внедряющие новые технологии и адаптирующие свои процессы к изменениям на рынке, могут быстрее реагировать на потребности клиентов и изменения в конкурентной среде.

4. Управление рисками: эффективные бизнес-процессы включают механизмы для управления рисками, что позволяет компаниям минимизировать потери и поддерживать стабильность.

5. Финансовая устойчивость: сравнение финансовых показателей может показать, какие компании лучше управляют своими ресурсами и имеют более устойчивую бизнес-модель.

6. Стратегические партнерства: компании, которые активно развивают партнерства и сотрудничество с другими игроками на рынке, могут улучшить свои бизнес-процессы и расширить свои предложения.

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СЕПСИС У НОВОРОЖДЕННЫХ: ПРИЧИНА, ПАТОГЕНЕЗ И ДИАГНОСТИКА

Резюме. *Сепсис у новорождённых остаётся одной из ведущих причин неонатальной смертности и тяжелых осложнений в раннем постнатальном периоде. Заболевание характеризуется системной воспалительной реакцией организма на инфекцию с развитием дисфункции органов и прогрессирующей полиорганной недостаточности. Этиологически неонатальный сепсис связан преимущественно с бактериальной флорой, включая грамположительные и грамотрицательные микроорганизмы, а также вертикальную антенатальную передачу патогенов от матери. Патогенез заболевания основан на гиперактивации врождённых иммунных реакций новорождённого, незрелости иммунной системы, нарушениях регуляции провоспалительных цитокинов (IL-6, IL-8, TNF-α) и активации систем коагуляции. Диагностика сепсиса у новорождённых требует комплексного подхода с использованием клинических, лабораторных и молекулярных критериев, включая оценку биомаркеров (CRP, прокальцитонин, IL-6), микробиологическое исследование крови и инструментальные методы оценки органной дисфункции. Раннее выявление и своевременная диагностика имеют ключевое значение для снижения смертности и улучшения прогноза пациентов.*

Ключевые слова: *неонатальный сепсис, новорождённые, системная воспалительная реакция, патогенез, провоспалительные цитокины, CRP, прокальцитонин, диагностика, полиорганная недостаточность.*

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NEWBORN SEPSIS: CAUSE, PATHOGENESIS, AND DIAGNOSTICS

Summary. *Sepsis in newborns remains one of the leading causes of neonatal mortality and severe complications in the early postnatal period. The disease is characterized by a systemic inflammatory reaction of the body to infection with the development of organ dysfunction and progressive multiple organ failure. Etiologically, neonatal sepsis is primarily associated with bacterial flora, including gram-positive and gram-negative microorganisms, as well as the vertical antenatal transmission of pathogens from the mother. The pathogenesis of the disease is based on the hyperactivation of congenital immune reactions in newborns, immaturity of the immune system, disorders in the regulation of pro-inflammatory cytokines (IL-6, IL-8, TNF-α) and activation of coagulation systems. Diagnosis of sepsis in newborns requires a comprehensive approach using clinical, laboratory, and molecular criteria, including biomarker assessment (CRP, procalcitonin, IL-6), blood microbiological testing, and instrumental methods for assessing organ dysfunction. Early detection and timely diagnosis are crucial for reducing mortality and improving patient outcomes.*

Keywords: *neonatal sepsis, newborns, systemic inflammatory reaction, pathogenesis, pro-inflammatory cytokines, CRP, procalcitonin, diagnosis, multiple organ failure.*

Сепсис у новорождённых является одной из наиболее актуальных проблем современной неонатологии и интенсивной терапии, оставаясь ведущей причиной смертности в раннем неонатальном периоде [1]. По данным международных эпидемиологических обзоров, ежегодно сепсис развивается у более 3 миллионов новорождённых, при этом летальность может достигать 20–40% в зависимости от срока гестации, веса при рождении и доступности ранней диагностической помощи [2]. Неонатальный сепсис особенно опасен в условиях развивающихся стран и регионов с ограниченными ресурсами, где поздняя диагностика и позднее начало терапии являются ключевыми факторами неблагоприятного исхода [3].

Причинные факторы сепсиса у новорождённых включают как вертикальную передачу инфекционного агента от матери (антенатально, интранатально), так и постнатальную госпитальную или внебольничную контаминацию [4]. Ведущими возбудителями раннего неонатального сепсиса остаются *Streptococcus agalactiae* (GBS), *Escherichia coli*, *Klebsiella spp.* с тенденцией к росту полирезистентных штаммов, включая ESBL-продуцирующие формы [5]. Особенности иммунного ответа новорождённого (незрелость врождённого иммунитета, низкая функциональная активность фагоцитов, слабая цитокиновая регуляция) определяют высокую склонность к системной воспалительной реакции и быстрому формированию полиорганной недостаточности [6].

Ключевым патогенетическим механизмом сепсиса является неконтролируемое воспаление с гиперпродукцией провоспалительных цитокинов (IL-6, IL-8, TNF-α), активацией эндотелиального повреждения, нарушениями микроциркуляции и запуском дисрегуляции системы гемостаза

с формированием ДВС-синдрома [7]. В силу высокой вариабельности клинических проявлений сепсиса и раннего «немого» течения поиск точных диагностических критериев продолжает быть ключевым направлением исследований [8]. Сегодня доказано, что комбинация клинических признаков, маркёров воспаления (CRP, прокальцитонин, IL-6) и микробиологических тестов позволяет существенно повысить точность ранней диагностики сепсиса у новорождённых [9].

Таким образом, проблема сепсиса новорождённых требует комплексного научного анализа этиологических факторов, патогенетических механизмов и оптимальных подходов к ранней диагностике, что является критически важным для снижения смертности, улучшения клинических исходов и повышения эффективности неонатальной интенсивной терапии.

Цель исследования. Определить ключевые этиологические факторы, патогенетические механизмы формирования сепсиса у новорождённых и оценить современные подходы к ранней диагностике заболевания на основе анализа актуальных научных данных.

Материалы и методы. Данная работа представляет собой обзорно-аналитическое исследование, основанное на систематическом анализе современных литературных источников, посвящённых проблеме сепсиса у новорождённых. В обзор были включены публикации, отражающие эпидемиологию, этиологические факторы, патогенетические механизмы и диагностические подходы к выявлению неонатального сепсиса. Анализ проводился на основании научных данных международных публикаций, включённых в базы PubMed, Scopus, Elsevier Clinical Key, а также отечественных материалов за период 2019–2024 гг.

В качестве критериев включения литературы были использованы: публикации, посвящённые сепсису у новорождённых, исследования патогенеза и иммунологических механизмов, статьи по диагностическим алгоритмам (включая маркёры CRP, PCT, IL-6, NLR) и микробиологическим методам верификации. Исключены работы, посвящённые сепсису у недоношенных старше 28 дней, результатам экспериментальных моделей и исследованиям без диагностической стратификации. Поиск литературы проводился с использованием ключевых слов: «neonatal sepsis», «diagnostic biomarkers», «neonatal immune response», «maternal-fetal transmission», «systemic inflammation neonates». Аналитическая интерпретация материалов базировалась на сравнительной оценке полученной информации и выделении ключевых клинических и патогенетических закономерностей.

Результаты исследовани. Причины развития сепсиса у новорождённых являются мультифакторными и включают как антенатальные, так и постнатальные механизмы инфицирования. Ранний неонатальный сепсис, развивающийся в первые 72 часа жизни, чаще всего обусловлен вертикальной передачей инфекционного агента от матери, включая трансплацентарный путь и инфицирование в родовых путях [2,4]. Наиболее значимыми возбудителями раннего сепсиса остаются *Streptococcus*

agalactiae (GBS) и *Escherichia coli*, особенно у недоношенных детей и детей с низкой массой тела при рождении [1,5]. Повышенный риск внутриутробной передачи инфекции отмечен при хориоамнионите, длительном безводном периоде и воспалительных заболеваниях гениталий у матери [3].

Поздний сепсис (после 72 часов жизни) в большинстве случаев связан с постнатальной нозокомиальной или госпитальной контаминацией, особенно в условиях отделений интенсивной терапии новорождённых, где имеют место интенсивные инвазивные вмешательства, катетеризация, ИВЛ, повторные парентеральные манипуляции [6]. В поздний период ведущими патогенами становятся грамотрицательные бактерии, включая *Klebsiella spp.*, *Pseudomonas aeruginosa*, ESBL-продуцирующие энтеробактерии, которые характеризуются высокой антибиотикорезистентностью и сложностью выбора эмпирической терапии [5,8]. В более чем 50% случаев позднего сепсиса основным источником инфекции выступает госпитальная микрофлора, что подтверждается современными микробиологическими наблюдениями [7].

Дополнительными факторами риска развития сепсиса являются низкая масса тела при рождении, недоношенность, внутриутробная гипоксия, многоплодная беременность, а также иммунная незрелость врождённого иммунного ответа новорождённого [6]. Таким образом, сепсис у новорождённых формируется на фоне сочетанного взаимодействия микробного фактора, состояния материнского инфекционного риска и функциональной незрелости иммунной системы ребёнка.

Патогенез сепсиса у новорождённых формируется на фоне иммунной незрелости, недостаточной функциональной активности врождённого иммунитета и неспособности организма обеспечивать своевременный контроль воспалительных реакций [1,6]. Микроорганизмы, попадающие в кровоток, активируют рецепторы врождённого иммунитета (TLRs, NOD-like receptors), что приводит к массивной продукции провоспалительных медиаторов, включая TNF-α, IL-1β, IL-6 и IL-8 [2,7]. У новорождённых даже умеренная бактериальная нагрузка способна вызвать системную воспалительную реакцию с развитием лейкоцитоза, лейкопении, нарушением микроциркуляторных реакций, гиперкатаболизма и быстрым переходом к органной дисфункции.

Характерной особенностью неонатального сепсиса является дисбаланс между провоспалительными и противовоспалительными механизмами: у новорождённых снижена способность к продукции IL-10, IFN-γ, ослаблена активация NK-клеток, комплемента и фагоцитарных нейтрофилов [3]. Это приводит к неконтролируемой гиперцитокинемии — «цитокиновому шторму», который является ведущим фактором системного повреждения тканей, метаболических нарушений и нарушения регуляции сосудистого тонуса [4].

Наиболее тяжелым компонентом патогенеза у новорождённых является активация эндотелиального повреждения и запуск каскада коагуляционных

реакций, приводящих к развитию ДВС-синдрома, нарушению перфузии жизненно важных органов и полиорганной недостаточности [5]. Одновременно происходит дисрегуляция иммунного ответа с истощением клеточного ресурса и снижением способности иммунитета обеспечивать антибактериальную защиту, что создаёт условия для неконтролируемой прогрессии инфекционного процесса [7,8].

Таким образом, сепсис у новорождённых представляет собой состояние «двойного иммунного повреждения»: избыточной провоспалительной реакции и одновременной недостаточности иммунорегуляторных механизмов, что и определяет его крайне высокую клиническую опасность.

Диагностика сепсиса у новорождённых представляет собой серьёзную клиническую задачу, так как ранние проявления заболевания нередко неспецифичны и могут имитировать широкий спектр неинфекционных патологий. Клиническая симптоматика включает нарушения терморегуляции, дыхательные расстройства, метаболические изменения, неврологическую депрессию, вялость, отказ от кормления, нестабильную гемодинамику [2,3]. При этом даже минимальная задержка в диагностике приводит к ухудшению прогноза и повышению риска летального исхода, что делает ранний лабораторный скрининг обязательной частью оценки новорождённого с подозрением на сепсис [1].

Современные лабораторные подходы к диагностике включают определение уровней С-реактивного белка (CRP), прокальцитонина (PCT), IL-6, IL-8, а также расчёт нейтрофильно-лимфоцитарного индекса (NLR) как доступного и быстроводимого маркёра септического воспаления [4,5]. CRP является высокочувствительным, но поздним маркёром; PCT — более ранним индикатором бактериального сепсиса и позволяет дифференцировать вирусные инфекции; IL-6 обладает максимальной ранней чувствительностью, а NLR показывает высокую прогностическую ценность в условиях ресурсно-ограниченных систем [7,8]. Микробиологическое исследование крови (посев крови с определением чувствительности) остаётся «золотым стандартом» верификации диагноза [3,9].

Данная таблица позволяет в одном сравнительном формате выделить ключевые лабораторные маркёры, применимые в реальной клинической практике, и определить их диагностическое место и временную реактивность в условиях септического процесса (таблица 1).

Таблица 1

Диагностические маркёры сепсиса у новорождённых

Маркер	Клиническое значение	Диагностическая ценность	Время повышения
CRP	Универсальный маркёр воспаления	высокая чувствительность, низкая специфичность	10–12 часов
Прокальцитонин (PCT)	Более специфичен для бактериального сепсиса	высокая чувствительность, высокая специфичность	3–4 часа
IL-6	Ранний ультрачувствительный маркёр	максимальная ранняя диагностическая информативность	1–3 часа
NLR индекс	Доступный маркер для отделений с ограниченными ресурсами	высокая прогностическая ценность	3–6 часов

Из таблицы видно, что IL-6 является наиболее ранним маркёром, что позволяет его использовать как триггерный индикатор для немедленного начала терапии. PCT обладает высокой специфичностью и становится полезным маркером дифференциации бактериального сепсиса. CRP усиливает диагностическую уверенность на более позднем этапе, а NLR может служить экономически эффективным инструментом мониторинга, особенно в регионах с ограниченными диагностическими платформами [7,10].

Обсуждение. Полученные данные анализа литературных источников свидетельствуют, что сепсис у новорождённых представляет собой уникальную и наиболее опасную форму системного инфекционного процесса, отличающуюся от сепсиса у взрослых и детей старшего возраста не только этиопатогенетическими механизмами, но и динамикой иммунных реакций [2,6]. Незрелость иммунной системы, ограниченная функция фагоцитов, недостаточный синтез противовоспалительных цитокинов и выраженная зависимость от материнских антител создают условия для неэффективного контроля над бактериальной и вирусной агрессией, что приводит к быстрому развитию системного воспалительного ответа и полиорганной недостаточности [5].

Современные исследования подчеркивают, что ранний сепсис преимущественно связан с вертикальной передачей возбудителей от матери, тогда как поздний сепсис обусловлен преимущественно нозокомиальной микрофлорой, часто резистентной к антибиотикам, что является критически важным при выборе эмпирической стартовой терапии [1,3]. Особое значение имеет своевременная диагностика: применение комбинированных диагностических алгоритмов с использованием ранних маркёров воспаления (IL-6, PCT) значительно повышает точность диагностики по сравнению с

использованием только CRP [4,8]. Важным направлением развитых неонатальных клиник становится внедрение алгоритмов многоуровневой диагностической оценки, основанных на оценке биомаркеров и динамическом клинико-лабораторном мониторинге [7].

Таким образом, при сепсисе у новорождённых необходимо учитывать уникальность механизмов иммунного ответа и патогенетические особенности неонатального периода, что требует разработки более точных и быстрых методов диагностики, а также стандартизации раннего использования маркеров цитокинового ответа. Это позволит в короткие сроки начать антибактериальную терапию, снизить риск полиорганной недостаточности и уменьшить смертность в данной группе пациентов.

Выводы. Сепсис у новорождённых представляет собой тяжёлый системный инфекционно-воспалительный процесс, формирование которого определяется сочетанием причинных факторов, в том числе вертикальной передачи инфекции от матери, нозокомиального инфицирования и функциональной незрелости иммунной системы новорождённого. Патогенез заболевания характеризуется гиперпродукцией провоспалительных цитокинов, нарушением микроциркуляции и запуском каскада коагуляционных нарушений с последующим развитием полиорганной недостаточности. Диагностика сепсиса должна основываться на сочетании клинических признаков, ранних лабораторных биомаркеров (IL-6, PCT), маркёров воспаления (CRP) и микробиологической верификации, что обеспечивает более точное раннее выявление и своевременное начало терапии. Комплексный подход к анализу причин, патогенеза и диагностических критериев сепсиса у новорождённых является ключевым фактором снижения летальности и улучшения исходов в неонатальной практике.

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ВОСТРЕБОВАННОСТЬ ГЕРМЕНЕВТИЧЕСКОГО ПОДХОДА В РАЗВИТИИ КУЛЬТУРЫ РЕЧИ И ДУХОВНОГО ВОСПИТАНИЯ УЧИТЕЛЯ

Аннотация. *В данной статье на основе герменевтического подхода прооанализирована проблема развития культуры речи и духовного воспитания, являющихся важными факторами педагогического мастерства. В частности, рассмотрена коммуникативная компетентность, культура речи и ораторское искусство, являющиеся основными аспектами педагогического мастерства. В научно-теоретической базе рассмотрен тот факт, что речь является ключом к образованию, а ключ к воспитанию связан с поведением.*

Ключевые слова: *герменевтическая основа, языковая компетенция, ораторское искусство, речевые навыки, герменевтика, эффективность, духовное воспитание, педагогический процесс, риторика, проповедь, языковая тактика, глубина мысли, профессиональное развитие, академическая речь, проповедь, призыв, боевые искусства, стратегия, коммуникативность, ритор, рассуждение, проповедник, механизм воздействия, непрерывное образование.*

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THE DEMAND FOR A HERMENEUTIC APPROACH IN DEVELOPING SPEECH CULTURE AND SPIRITUAL EDUCATION OF TEACHERS

Abstract*. This article, using a hermeneutic approach, analyzes the development of speech culture and spiritual education, which are important factors in pedagogical excellence. Specifically, it examines communicative competence, speech culture, and oratory, which are key aspects of pedagogical excellence. The scientific and theoretical framework explores the fact that speech is the key to education, and the key to education is related to behavior.*

Key words: *hermeneutic basis, language competence, oratory, speech skills, hermeneutics, efficiency, spiritual education, pedagogical process, rhetoric, sermon, language tactics, depth of thought, professional development, academic speech, sermon, appeal, martial arts, strategy, communication, rhetorician, reasoning, preacher, mechanism of influence, continuous education.*

Оценивая значение герменевтической методологии в образовательной и духовно-просветительской сферах, необходимо обратить внимание на то, что герменевтика – это не только искусство понимания и толкования текста, но и научный подход, формирующий мышление человека, способствующий анализу и глубокому осмыслению мысли. Эта методология позволяет нам понимать вещи и события, произошедшие в истории человечества, постигать их глубокий смысл и обогащать наше мышление посредством этого понимания. Герменевтика в контексте нового Узбекистана – это понимание национальной идентичности: изучение истории нового Узбекистана на основе герменевтического подхода важно для глубокого понимания культурных и духовных корней нашего народа, не просто запоминания исторических событий, национальных ценностей, наследия учёных, а их анализа с позиций современного мышления, извлечения из них правильных уроков и формирования самостоятельно мыслящей личности.

Герменевтический подход превращает студента в мыслителя, искателя и аналитика, а не в получателя готовых знаний. Это особенно важно для учителей и воспитателей, находящихся в процессе непрерывного профессионального развития. С точки зрения интерпретации исторических и общественно-политических событий, каждое историческое событие – не просто факт, а имеет глубокое социальное, культурное и духовное содержание. Их анализ на основе герменевтического метода позволяет понять мышление и философию жизни предшествующих поколений, связать их с современными ценностями. Герменевтический подход в педагогике может быть эффективно использован в следующих областях:

в повышении квалификации учителей – повышение эффективности урока за счёт интерпретации исторических, художественных, религиозных текстов и выступлений в современном контексте.

в духовно-просветительских мероприятиях – поощрение самостоятельного мышления аудитории посредством пропагандистских речей, бесед на историко-просветительские темы.

на уроках истории и философии – формирование у учащихся подхода, основанного не на запоминании фактов, а на понимании сути реальности.

В XXI веке всё более актуальной становится потребность в новой парадигме в образовании – мышлении и преподавании на основе герменевтического подхода. В результате междисциплинарной интеграции и специализации дисциплины становятся всё более специализированными, но одновременно возрастает и потребность в междисциплинарном подходе. Это требует от учителя не только глубоких знаний своего предмета, но и навыков коммуникации, анализа, контекстного понимания и рефлексии. Герменевтика служит формированию этих навыков. В этом процессе необходимы поток информации и развитие критического мышления, поскольку в современном глобализированном мире ученики и учителя находятся под огромным потоком информации. В таких условиях способность анализировать, понимать и критически относиться к любой информации становится одной из

основных компетенций, необходимых учителю. Герменевтика, по сути, предлагает методологию интерпретации текстов, идей, событий и знаков.

Мыслители, заложившие основы теории герменевтики, и их идеи служат методологической и философской основой этого подхода к образованию.

Основатели теории герменевтики и их взгляды

Ученый	Основная идея и вклад
E.Gusserl	Основатель феноменологии, сосредоточенный на понимании сущности знания и субъектно-объектных отношений
F. de Sossyur	Обосновал, что язык является социокультурной системой; объяснил связь знака и содержания
L. Vitgenshteyn	Подчёркивал, что границы языка – это границы мышления, и что каждый язык следует интерпретировать в своём собственном контексте
M. M. Baxtin	Предложил изучать полифонию и социально-исторический контекст текста через теорию диалогизма
M. Fuko	Исследовал соотношение знания и власти и показал, что текст и система знания основаны на историчности
G. Frege, K.G. Gempel, G.X. fon Vrigt	Логический анализ, научный метод и ясность понятий составляют основное содержание этих идей, заложивших основу современной интерпретации герменевтики

Как известно, «герменевтика» происходит от греческого слова «hermeneukos» и означает «разъясняющий, толкующий». Согласно древнегреческим мифам, этот термин возник в результате того, что Гермес доносил людям повеления и послания богов на горе Олимп, объясняя и истолковывая их. Поэтому историки считают, что существует сходство в произношении и функции между посредником Гермесом и термином «герменевтика». То есть функция Гермеса как носителя и передатчика смысла и содержания та же, что и искусство понимания и объяснения смысла текста в герменевтике. В некоторых источниках герменевтика определяется как искусство толкования и объяснения, учение о толковании двусмысленных символов, аллюзий, а также трудов Гомера и античных мыслителей. Позднее герменевтическая традиция стала служить религиоведам настоящим искусством (методом) перевода древних памятников при толковании и объяснении священных книг (Торы, Псалтыря, Евангелия и Корана).

В «Энциклопедии истории философии» подчёркивается, что герменевтика в широком смысле – это философское учение об условиях познания общественного бытия, а в узком – совокупность методов и правил, используемых при изучении текстов филологии, права, теологии и других гуманитарных дисциплин.

Нам известно, что герменевтический подход позволяет наблюдать различные проявления личности для определения личностных качеств, переживаний и их значимости. При этом необходимо учитывать наблюдения учителей за учениками с педагогической точки зрения. Можно сказать, что

герменевтический подход в педагогике определяет коммуникативный характер субъект-субъектных отношений в обучающих системах, то есть «учитель – ученик», «ученик – ученик», «ученик – группа», что позволяет каждому принять и понять друг друга такими, какие они есть, а также понять себя и других. Конечно, в этом очень важно развитие толерантности, основанное на живом общении.

Следовательно, можно сделать вывод о том, что развитие толерантности у учащихся на основе герменевтического подхода начинается с познания сущности понимания мира и себя. Роль герменевтики в непрерывном профессиональном развитии, как подхода, непосредственно интегрированного с «гуманистическим образованием» современного педагогического мышления, личностно-ориентированным подходом и преобразующей ролью герменевтики в образовании, выражается в следующем. Опираясь на герменевтический подход как новый этап в формировании субъект-субъектных отношений, учитель рассматривается не только как дающий знания, но и как слушающий, понимающий человек, человек, вступающий в коммуникацию;

образовательный процесс происходит не в монологической, а в диалогической среде (на основе идеи «диалогизма» Бахтина), этот подход основан на эмпатии и рефлексии – учитель не только оценивает собственную деятельность, но и ставит себя на место ученика;

благодаря герменевтике учитель не просто наблюдает образовательные события, но и интерпретирует их содержание, осмысливает их контекстуально (социально, культурно, психологически); Например, истинные причины той или иной «внешней» проблемы, возникающей в классе, понимаются как семейные или личные проблемы учащегося, что развивает такие навыки, как диагностика, анализ проблем и индивидуальный подход;

герменевтика в создании толерантной и гуманной среды способствует пониманию каждого учащегося как уникальной личности, что способствует гуманизации образования, применению принципов уважения к личности и толерантности

непосредственно связана с разрешением недопониманий, культурных различий и различий в мировоззрении между учащимися и учителями посредством диалога, психологического здоровья, социально-эмоциональных навыков, а также улучшения климата и окружающей среды.

Внедрение герменевтических подходов в педагогическую деятельность учителя в системе непрерывного профессионального развития служит развитию образования и представляет собой новый концептуальный этап в субъект-субъектных отношениях. Этот подход подразумевает способность учителя понимать взаимосвязь существующих в образовательном учреждении явлений, определять их причины и следствия. Если учитывать специфику педагогической герменевтики в развитии толерантности, то она способствует пониманию обучающегося, устранению существующего у него

состояния «непонимания» и решению актуальных задач гуманизации среды обучения.

В педагогической и профессиональной деятельности учителя конфликтные ситуации и сложности образовательного процесса всегда вызывали у него как у объекта трудности и непонимания, что, в свою очередь, приводит к конфликтам между учителем и обучающимся, а это негативно сказывается на психическом состоянии субъектов образования. Уникальные качества обучающегося изменчивы, и в таких случаях целостное мышление, основанное на таких действиях, как эмпатия, «чувствование», «слушание», помогает учителю понять уникальность обучающегося. В этих процессах владение герменевтическим методом имеет большое значение для повышения профессиональной культуры мышления учителя и развития его собственной культуры толерантности.

Если одним из основных базовых понятий герменевтики являются слова понимания и объяснения, то в речи учителя главное – выделить конкретные моменты для объяснения.

Роль учителя заключается не только в передаче знаний, но и в содействии самопониманию ученика, развитию его мировоззрения и формированию способности к анализу знаний. Задача учителя – не только представлять факты, но и научить учеников анализировать предмет с разных точек зрения, понимать и углублять своё понимание. Видение и интерпретация реальности зависят от личного мировоззрения и знаний каждого человека. Этот аспект также влияет на педагогические методы учителя: если учитель представляет тему только с точки зрения того, что ему известно, он может стать препятствием для личного анализа и формирования идей учеником. К примеру, в повести Навои «Слон» подчёркивается, что у каждого человека свои мысли и взгляды. Выражение «воображение человека, увидевшего слона» в этом рассказе Навои означает, что реальность формируется в зависимости от мировоззрения и опыта каждого человека. Учитель должен помочь ученикам раскрыть личные перспективы, поскольку это развивает их мышление, навыки принятия решений и решения проблем.

Таким образом, анализ не только углубляет процесс изучения темы, но и учит учеников самостоятельному мышлению, социальной ответственности и применению знаний на практике.

Реализуя эти пункты, учитель:

задаёт ученикам вопросы: это побуждает их проверять и анализировать, как ученик понимает тему;

развивает мышление: учитель направляет ответы ученика на правильный лад и углубляет его мышление;

рассказывая истории или приводя примеры: учитель, подобно Навои, расширяет мировоззрение учащихся, показывая им, как видеть реальность в разных ситуациях;

обучая их анализу: учитель не ограничивается предоставлением информации, а направляет их к анализу, то есть помогает им глубже вникнуть в тему.

Таким образом, целенаправленное использование герменевтического подхода в обучении учащихся помогает учителю правильно формулировать свой методический подход с учётом уникального мировоззрения и воображения каждого ученика.

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ҲУДУДИЙ ЭҲТИЁЖЛАРГА ҚАРАБ ИЖТИМОИЙ ҲИМОЯНИ МОЛИЯЛАШТИРИШНИНГ НАЗАРИЙ АСОСЛАРИ ВА МОДЕЛЛАРИ

Аннотация. *Мазкур мақолада ҳудудий эҳтиёжларга қараб ижтимоий ҳимоя тизимини молиялаштиришнинг назарий асослари ва амалий моделлари таҳлил қилинган. Тадқиқотда ҳудудлар ўртасидаги иқтисодий тафовут, аҳолининг ижтимоий эҳтиёжлари, бюджет сиёсатининг дифференциаллашуви ҳамда ресурсларни тақсимлаш механизмлари ўрганилган. Муаллиф томонидан ижтимоий ҳимоя харажатларини режалаштиришнинг оптималлаштирилган модели таклиф этилиб, халқаро тажрибалар асосида минтақавий молиявий барқарорликни таъминлаш йўллари асослаб берилган. Натижалар Ўзбекистон ҳудудлари мисолида эмпирик таҳлил асосида келтирилган.*

Калит сўзлар: *ижтимоий ҳимоя, молиялаштириш, ҳудудий эҳтиёжлар, бюджет сиёсат, моделлар, иқтисодий барқарорлик, ижтимоий тенглик, ресурс тақсимоти, давлат харажатлари, ижтимоий дастурлар, эҳтиёж индекси, молиявий самарадорлик.*

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THEORETICAL BASIS AND MODELS OF SOCIAL PROTECTION FINANCING BASED ON TERRITORIAL NEEDS

Annotation. *This article examines the theoretical foundations and models of financing social protection based on regional needs. The research analyzes economic disparities among regions, population social demands, differentiated budget policies, and resource allocation mechanisms. The author proposes an optimized model for planning social protection expenditures and substantiates strategies for ensuring regional financial stability using international experiences. Empirical analysis is provided through the example of Uzbekistan's regions.*

Keywords: *social protection, financing, regional needs, budget policy, models, economic stability, social equality, resource allocation, public expenditure, social programs, needs index, financial efficiency.*

Кириш. Ижтимоий ҳимоя тизими ҳар бир давлатнинг ижтимоий-иқтисодий барқарорлигини таъминловчи асосий омиллардан бири ҳисобланади. У аҳолини камбағаллик, ишсизлик, касаллик, ногиронлик ва қарилик каби хавфлардан муҳофаза қилишни кўзлайди. Замонавий шароитда ижтимоий ҳимояни самарали амалга ошириш учун унинг молиялаштириш тизимини ҳудудий эҳтиёжлар асосида йўлга қўйиш зарурати ортиб бормоқда. Чунки мамлакат ичидаги ҳар бир ҳудуд иқтисодий салоҳияти, аҳоли таркиби, демографик ҳолати ва ижтимоий муаммолари жиҳатидан фарқланади. Шу боис, бир хил марказлашган ёндашув ўрнига, ҳудудий эҳтиёжларга мослаштирилган молиялаштириш моделини жорий этиш ижтимоий адолат ва самарадорликни таъминлайди.

Ижтимоий ҳимоя тизими ҳар бир давлатнинг ижтимоий барқарорлигини таъминловчи энг муҳим институтлардан биридир. Бугунги кунда иқтисодий ислоҳотларнинг чуқурлашуви, аҳолининг турмуш даражаси ва демографик ўзгаришлар ижтимоий ҳимоя сиёсатини янги ёндашувлар асосида қайта кўриб чиқишни тақозо этмоқда. Айниқса, ҳудудий тафовутлар ва ресурсларнинг нотекис тақсимланиши шароитида ижтимоий ҳимояни молиялаштиришда дифференциал ёндашув зарурий эҳтиёжга айланмоқда. Бу ёндашув ҳар бир ҳудуднинг демографик, иқтисодий ва ижтимоий кўрсаткичларига мос равишда ресурсларни тақсимлаш имконини беради. Халқаро тажрибалар шуни кўрсатадики, ижтимоий дастурларни самарали молиялаштириш ҳудудий эҳтиёж индексига асосланганда ижтимоий тенгликка эришиш имконияти ошади. Ўзбекистон мисолида бу жараённи амалга ошириш учун ҳудудлар кесимида ижтимоий ҳимоя харажатларини баҳоловчи моделларни ишлаб чиқиш долзарб масаладир. Шу боисдан, ушбу тадқиқотнинг асосий мақсади — ҳудудий эҳтиёжларга қараб ижтимоий ҳимоя молиялаштиришнинг назарий асосларини очиб бериш ва амалий моделни таклиф қилишдан иборат. Тадқиқотда назарий таҳлил, компаратив ва эмпирик методлардан фойдаланилган. Натижалар асосида ижтимоий сиёсатни янада дифференциаллаштириш бўйича таклифлар ишлаб чиқилган.

Методология. Тадқиқот методологик жиҳатдан тизимли таҳлил ва қиёсий ёндашувларга таянган. Тизимли таҳлил орқали ижтимоий ҳимоянинг молиялаштириш манбалари, давлат ва маҳаллий бошқарув ўртасидаги муносабатлар ўрганилди, қиёсий таҳлил орқали Россия, Украина, Латвия ва Эфиопия мисолида ҳудудий ижтимоий молиялаштиришнинг турли моделлари солиштирилди. Индикатор таҳлили орқали эса аҳолининг даромад даражаси, ишсизлик, демографик ўзгаришлар ва маҳаллий бюджет салоҳияти асосида эҳтиёж харитаси шакллантирилди. Тадқиқотнинг назарий асоси адолатли тақсимот ва самарадорлик назарияларига, амалиёт қисми эса децентрализация ва жамоавий молиялаштириш моделларига таянади.

Ижтимоий ҳимоя тизими аҳолининг ижтимоий хавф-хатарларга дуч келган қатламларини қўллаб-қувватлашга қаратилган иқтисодий ва ҳуқуқий чоралар мажмуасидир. У давлатнинг ижтимоий сиёсатининг энг муҳим йўналиши бўлиб, барқарор иқтисодий ўсиш ва ижтимоий адолатни

таъминлашга хизмат қилади. Ўзбекистон ҳудудлари ўртасидаги иқтисодий салоҳият ва аҳолининг даромадлари кескин фарқланади. Шу боис ижтимоий ҳимоя харажатларини бир хил мезонда белгилаш самарадорликни пасайтиради. Ҳудудий эҳтиёжларни инобатга олган дифференциал молиялаштириш тизими ресурслардан оқилона фойдаланишга имкон беради. Ижтимоий ҳимоя молиялаштиришда классик ва замонавий назариялар бирлашади: кейнсчилик модели давлат харажатларини ошириш орқали талабни рағбатлантирса, неоинституционал ёндашув ресурс тақсимотида самарадорлик ва шаффофликни таъминлашга урғу беради. Россияда ўтказилган тадқиқотлар ҳудудлар бўйича ижтимоий дастурларнинг молиялаштиришдаги тафовут аҳолининг ижтимоий ҳимоя даражасига бевосита таъсир қилишини кўрсатди. Масалан, федерал қўшимча маблағлар тенг тақсимланмаган ҳудудларда кам таъминланган аҳоли улуши юқори бўлиб қолган. Скандинавия мамлакатлари, Германия ва Жанубий Корея тажрибалари ҳудудий эҳтиёж индекслари асосида молиялаштиришни ташкил этишда муваффақиятли бўлган. Бу ёндашувда “social protection score” тизими орқали ҳар бир ҳудуднинг ижтимоий заифлик даражаси баҳоланади.

Ўзбекистонда 2023 йилда ижтимоий ҳимоя харажатлари ЯИМнинг 8,3 фоизини ташкил этган бўлса, ҳудудлар кесимида бу кўрсаткич 4,5% дан 12,1% гача фарқ қилган. Бу эса ресурс тақсимотида тенглик етишмаслигини кўрсатади.

1-жадвал

Ўзбекистон ҳудудлари бўйича ижтимоий ҳимоя харажатлари (млрд сўм, 2023 йил)

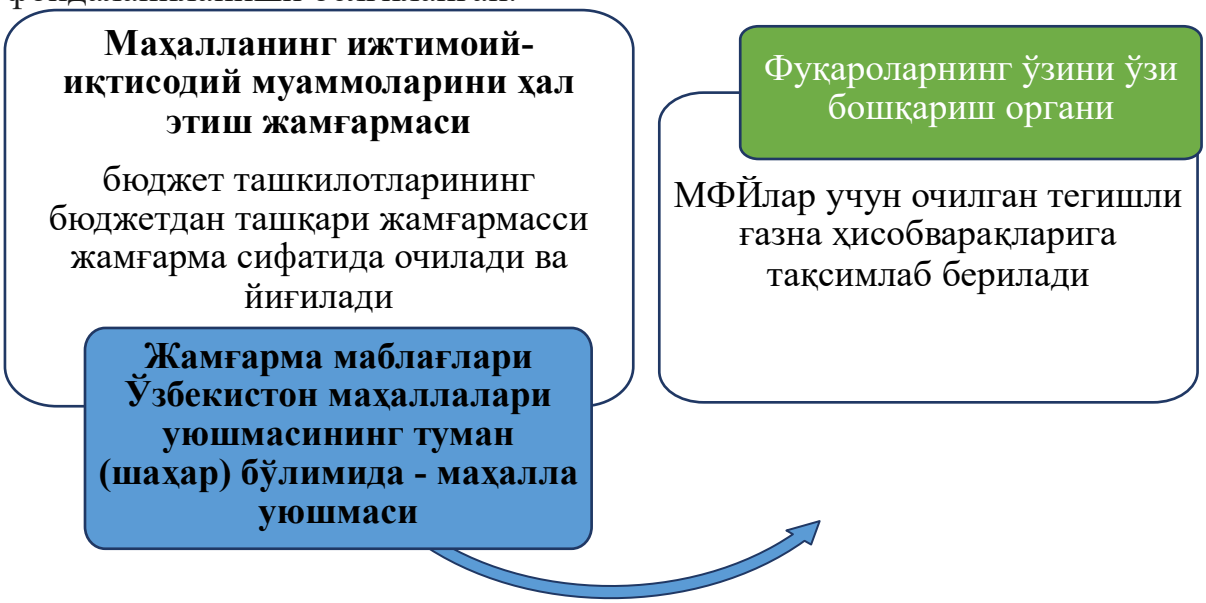
Ҳудуд	Харажатлар (млрд сўм)	ЯИМга нисбати(%)	Эҳтиёж индекси
Тошкент шаҳри	12 450	7.5	0.82
Андижон вилояти	7 320	10.8	1.13
Сурхондарё вилояти	6 210	12.1	1.25
Қорақалпоғистон	5 890	11.6	1.18

Ҳудудий эҳтиёжларга асосланган молиялаштириш тизими ижтимоий ҳимоя сиёсатининг янги парадигмаси сифатида қаралмоқда. Бу тизим ижтимоий хизматларнинг манзиллилиги ва адолатлилигини оширади, ресурслардан самарали фойдаланишга замин яратади. Тадқиқот натижалари шуни кўрсатадики, Ўзбекистон учун ҳудудий дифференциал ёндашувни қонунчилик даражасида мустаҳкамлаш ва электрон мониторинг тизимлари билан интеграция қилиш зарур. Шунингдек, халқаро тажрибага асосланган «Эҳтиёж индекси» модели минтақалар ўртасидаги молиявий номутаносибликни камайтиради, аҳолининг энг заиф қатламларини қўллаб-қувватлашга хизмат қилади. Натижада, ижтимоий ҳимоя тизими барқарор, самарали ва адолатли молиялаштириш тамойилларига асосланади.

2023 йил 21 декабрдаги “Ўзбекистон маҳаллалари уюшмаси фаолиятини йўлга қўйиш ва маҳаллаларда бошқарув тизимини

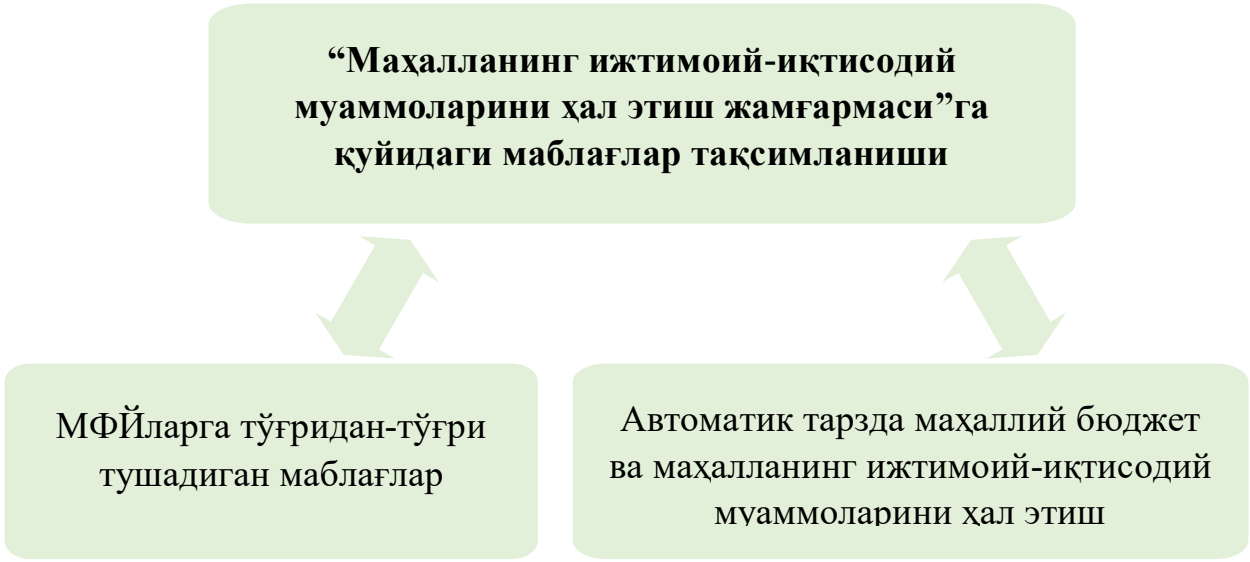
такомиллаштиришга оид қўшимча чора-тадбирлар тўғрисида” ПҚ-402-сонли Ўзбекистон Республикаси Президентининг қарорининг 3-иловасида “Маҳалланинг ижтимоий-иқтисодий муаммоларини ҳал этиш жамғармаси маблағларидан фойдаланиш тартиби тўғрисида низом” тасдиқланиб, мазкур низомда маҳалланинг ижтимоий-иқтисодий муаммоларини ҳал этиш жамғармаси маблағларини шакллантириш, улардан фойдаланиш, ҳисоб ва ҳисоботини юритиш тартибини белгиланди.

Ушбу Жамғарма юридик шахс ҳисобланмайди ва ҳар бир фуқароларнинг ўзини ўзи бошқариш органи ҳузурида ташкил этилади, Жамғарма маблағлари Ўзбекистон маҳаллалари уюшмасининг туман (шаҳар) бўлимида бюджет ташкилотларининг бюджетдан ташқари жамғармалари шаклида очилган ғазна ҳисобварақларида йиғилади ҳамда МФЙлар учун очилган тегишли ғазна ҳисобварақларига белгиланган тартибда тақсимланади. Шунингдек, жамғарманинг жорий йилда фойдаланилмаган маблағлари бюджетга олиб қўйилмайди ва улардан кейинги йилда фойдаланиланиши белгиланган.



1-расм. “Маҳалланинг ижтимоий-иқтисодий муаммоларини ҳал этиш жамғармаси” маблағларини МФЙларга йўналтириш мантиқий чизмаси.

“Маҳалла бюджети” тизимини амалиётга жорий этишда ҳар бир маҳалладаги “Маҳалланинг ижтимоий-иқтисодий муаммоларини ҳал этиш жамғармаси”га қуйидагича икки турда тақсимот амалга оширилади.



2-расм. “Маҳалланинг ижтимоий-иқтисодий муаммоларини ҳал этиш жамғармаси” маблағларини МФЙларга тақсимланиши мантиқий чизмаси.

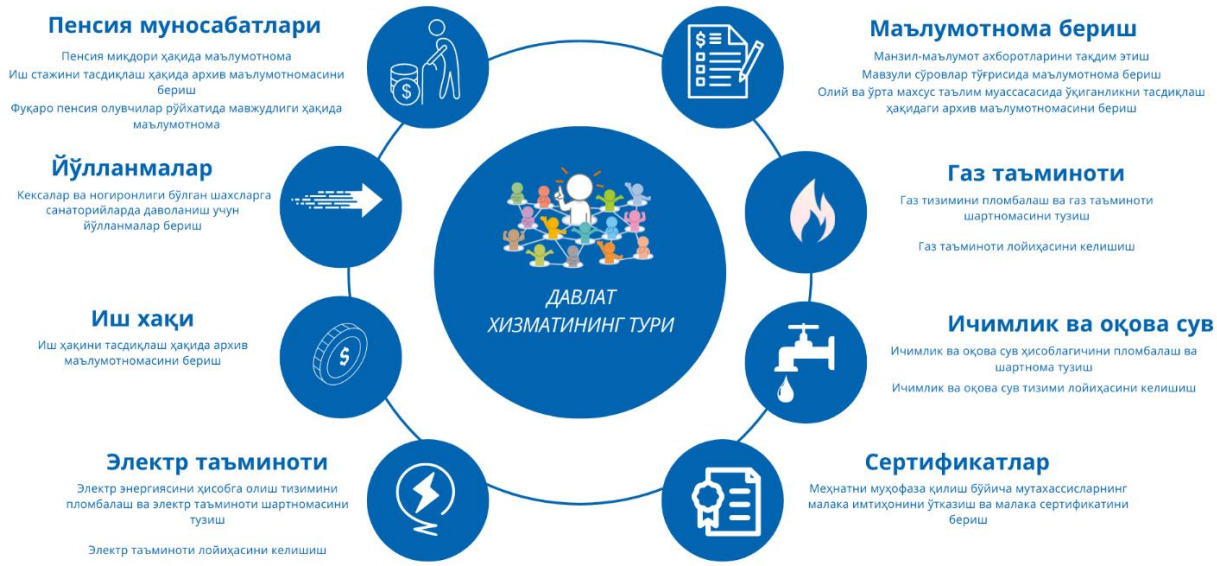
Юқоридаги расмга кўра МФЙларга «Маҳалланинг ижтимоий-иқтисодий муаммоларини ҳал этиш жамғармаси»га тушган маблағлар қуйидаги ҳолларда тўғридан тўғри тақсимоти амалга оиширлади:

-жисмоний шахслардан олинадиган мол-мулк ва ер солиғи бўйича ундирилган маблағларнинг (нотурар жойлар бўйича ундириладиган мол-мулк ва ер солиғи бундан мустасно) **10 фоизи** миқдори;

-маҳалла идоралари орқали кўрсатилган давлат хизматлари учун ундирилган йиғимнинг **10 фоизи**.

Ушбу ҳолатда маҳаллада қандай давлат хизматлари кўрсатилади деган савол ўринли ҳисобланади.

2023 йил 21 декабрдаги “Ўзбекистон маҳаллалари уюшмаси фаолиятини йўлга қўйиш ва маҳаллаларда бошқарув тизимини такомиллаштиришга оид қўшимча чора-тадбирлар тўғрисида” ПҚ-402-сонли Ўзбекистон Республикаси Президентининг қарорининг 4-иловасида кўрсатилган давлат хизматлари



3-расм. 2024-2025 йилларда маҳаллаларда агентлар томонидан кўрсатиладиган давлат хизматлари рўйхати

Адлия вазирлиги ва Рақамли технологиялар вазирлиги билан биргаликда 2024-2025 йилларда маҳаллаларда кўрсатилган давлат хизматларининг агентлар томонидан кўрсатилишини йўлга қўйилиши белганланган ва ушбу рўйхат адлия вазирининг буйруғи билан тўлдирилиши мумкин.

Юқоридаги давлат хизматларининг агентлар томонидан кўрсатилишини йўлга қўйилиши олис аҳоли пунктларининг давлат хизматларидан фойдаланиш имкониятини кенгайтириш, шу жумладан маҳалла фуқаролар йиғинлари раисларининг ва аҳолининг давлат хизматларидан фойдаланиш бўйича билим ва кўникмаларини оширган ҳолда, «марказ-маҳалла-фуқаро» тамойили бўйича Марказлар орқали кўрсатилаётган хизматларнинг ҳар бир оилага кириб боришини таъминлашга қаратилган ҳисобланади. Шунингдек, ҳар бир маҳаллада яшовчи аҳолининг давлат хизматларига бўлган талаби ва эҳтиёжидан келиб чиқиб, жойларга чиққан ҳолда, «маҳаллабай» асосида манзилли хизмат кўрсатиш. Бу борада аҳолининг давлат хизматидан қониқиш даражасини оширишга қаратилдан давлат сиёсатининг кўриниши сифатида баҳоланади[42].

Хулоса

Ҳудудий эҳтиёжларга қараб ижтимоий ҳимояни молиялаштириш тизими мамлакатда ижтимоий барқарорликни таъминлашнинг муҳим механизми ҳисобланади. Тадқиқот натижалари шуни кўрсатадики, бир хил

[42] Ўзбекистон Республикаси Президентининг 2022 йил 20 апрелдаги “Давлат хизматлари кўрсатишни соддалаштириш, бюрократик тўсиқларни қисқартириш ҳамда давлат хизматлари кўрсатиш миллий тизимини ривожлантиришнинг қўшимча чора-тадбирлари тўғрисида” ПФ-113-сон Фармонининг 1-Иловаси “Давлат хизматлари кўрсатиш тизимини модернизация қилиш ва жадал ривожлантиришнинг 2022 — 2026 йилларга мўлжалланган миллий стратегияси”

марказлашган ёндашувдан кўра, ҳар бир ҳудуднинг иқтисодий салоҳияти, демографик ҳолати ва ижтимоий муаммоларини инобатга олган дифференциал молиялаштириш модели самарадорлик ва манзиллиқ даражасини оширади. Бу эса давлат маблағларидан оқилона фойдаланиш, аҳолининг эҳтиёжларини аниқ баҳолаш ва ижтимоий адолатни таъминлаш имконини яратади.

Ўзбекистонда амалга оширилаётган институционал ислоҳотлар, хусусан, “Маҳалланинг ижтимоий-иқтисодий муаммоларини ҳал этиш жамғармаси”нинг ташкил этилиши маҳаллий даражадаги ижтимоий хизматларни молиялаштириш тизимини янги босқичга олиб чиқмоқда. Бу орқали маҳалла фуқаролар йиғинлари ўз ҳудудидаги эҳтиёжларни мустақил аниқлаш, ресурсларни самарали тақсимлаш ва давлат хизматларининг қамровини кенгайтириш имкониятига эга бўлмоқда. Шу билан бирга, жамғарма маблағларини тақсимлашда «эҳтиёж индекси» ва «ҳудудий самарадорлик коэффициенти» каби кўрсаткичлардан фойдаланиш ижтимоий молия сиёсатини илм-фан ва рақамли таҳлил асосида бошқаришга шароит яратади.

Хулоса қилиб айтганда, ижтимоий ҳимояни ҳудудий эҳтиёжларга асосланган ҳолда молиялаштириш тизими мамлакатда барқарор ижтимоий ривожланишни таъминлаш, маҳаллий бошқарув субъектларининг масъулияти ва ҳисобдорлигини кучайтириш, ҳамда “одам марказидаги” давлат сиёсатини амалда рўёбга чиқаришнинг муҳим қадами ҳисобланади.

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ПРЕДПОСЫЛКИ ДЛЯ РЕНОВАЦИИ И РЕОРГАНИЗАЦИИ ОБЛАСТНЫХ КРАЕВЕДЧЕСКИХ МУЗЕЕВ УЗБЕКИСТАНА НА ПРИМЕРЕ СА-МАРКАНДСКОГО КРАЕВЕДЧЕСКОГО МУЗЕЯ

Аннотация. *В статье рассматриваются предпосылки и необходимость реновации и реорганизации областных краеведческих музеев Узбекистана на примере Самаркандского краеведческого музея. Проведен анализ текущего состояния музейной инфраструктуры, кадрового потенциала и уровня цифровизации. Обоснована потребность в модернизации музеев в контексте социально-культурных изменений и роста туристической активности. Предложены стратегические направления по обновлению музейной деятельности и дизайна экспозиционного пространства с учетом международного опыта и национальных приоритетов в сфере культуры.*

Ключевые слова: *краеведческий музей, Самарканд, реновация, реорганизация, цифровизация, культурное наследие, специфика интерьера, музейный дизайн, экспозиционное пространство, региональная идентичность.*

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Abstract: *The article examines the prerequisites and the necessity for the renovation and reorganization of regional museums of local history in Uzbekistan, using the Samarkand Regional Museum of Local History as a case study. It provides an analysis of the current state of museum infrastructure, human resource capacity, and the level of digitalization. The need for modernization of museums is justified in the con-text of socio-cultural changes and the growth of tourism activity. Strategic directions are proposed for updating museum operations and the design of exhibition spaces, taking into account international experience and national cultural priorities.*

Keywords: *local history museum, Samarkand, renovation, reorganization, digitalization, cultural heritage, specificity of interior, museum design, exhibition space, regional identity.*

Введение. Музеи играют важную роль в сохранении историко-культурного наследия, формировании национальной идентичности и просвещении общества. Однако, в современных условиях музейные учреждения сталкиваются с необходимостью переосмысления своей роли, обновления инфраструктуры и внедрения новых форм работы с аудиторией. Особенно это актуально для региональных музеев, которые зачастую находятся в зданиях с устаревшими интерьерами и экспозициями, с неисправными техническими системами и оснащением.



Рисунок 1. Интерьеры краеведческих музеев Самарканда и Бухары.

В Узбекистане краеведческие музеи являются ключевыми учреждениями, обеспечивающими доступ к региональной истории, этнографии и природному разнообразию. Однако многие из них сталкиваются с устаревшей инфраструктурой, недостаточной экспозиционной интерактивностью и ограниченными возможностями для привлечения посетителей. Особенно это касается областных музеев, таких как Самаркандский краеведческий музей. В современных условиях возникает необходимость в реновации и реорганизации деятельности таких музеев, с учётом новых музейных практик и цифровых технологий.

Целью настоящего исследования является выявление ключевых предпосылок для реновации и реорганизации областных краеведческих музеев Узбекистана на примере Самаркандского краеведческого музея, а также формулирование возможных направлений модернизации с учётом современных музейных тенденций и национальных приоритетов развития.

Материалы и методы. В процессе исследования были использованы следующие методы:

Анализ документации: нормативно-правовые акты Республики Узбекистан, касающиеся культурной политики, стратегии и развития туризма и музейного дела;

Качественный анализ состояния краеведческих музеев, включая структуру экспозиций, техническую базу, кадровый состав. Основан на: полевом исследовании условий и деятельности Самаркандского краеведческого музея (2022-2024 гг.) и интервью с сотрудниками музея, посетителями и представителями деятелей сферы культуры и туризма;

Сравнительный анализ с зарубежными практиками реновации региональных музеев (на примере музеев Центральной и Восточной Европы,

стран СНГ).

А также, SWOT-анализ: для выявления сильных и слабых сторон текущего со-стояния музея и внешних возможностей угроз;

В ходе натурных и полевых исследований были поверхностно проанализированы состояние здания, интерьеров, экспозиций и собран фотофиксационный материал.

Исторический контекст и значение краеведческих музеев. Учитывая приоритетное внимание государства к развитию культурной сферы, одним из ключевых направлений современной культурной политики Узбекистана выступает обновление инфраструктуры учреждений культуры, включая музейные комплексы. [1] Областные краеведческие музеи, выполняющие функцию хранения и репрезентации регионального историко-культурного наследия, всё более остро нуждаются в системной модернизации. [2,3] На сегодняшний день большинство таких музеев, в том числе Самаркандский краеведческий музей, характеризуются рядом существенных проблем: экспозиции сохраняют архаичную структуру, материально-техническая база не отвечает современным требованиям, цифровые технологии внедрены фрагментарно, а взаимодействие с аудиторией остаётся ограниченным и малодинамичным. [4] С учётом возрастающего значения музеев как центров просвещения, идентичности и культурного туризма, возникает объективная необходимость в пересмотре их концептуальной модели и институциональной структуры. [5]

Краеведческие музеи Узбекистана формировались в советский период как инструменты культурного и идеологического просвещения. С течением времени их функции эволюционировали, однако структура и методология остались во многом неизменными. Самаркандский краеведческий музей, основанный в начале XX века, представляет собой один из старейших музеев региона, обладающий уникальной коллекцией археологических, этнографических и природоведческих экспонатов.



Рисунок 2. Самаркандский областной краеведческий музей.

Здание, в котором расположен музей, раньше принадлежало купцу Абраму Калантарову и было построено по проекту архитектора Е.О.Нелле в стиле эклектики в начале XX века. В отделке интерьеров здания, всегда вызывающий большой интерес у посетителей, принимали участие опытные мастера - мастер Камол, мастер Сади, мастер Хафиз и другие. В 1981 году особняк был переоборудован в областной краеведческий музей. С 982 года музей находится в составе Самаркандского музея-заповедника. Здание музея является памятником архитектуры и охраняется государством. [6]

Внутри музейного здания сохранились оригинальные интерьеры, выполненные с использованием декоративных техник, характерных для архитектруных школ Узбекистана: гостиная (мехмонхона) с резным деревянным потолком, расписанным масляной краской, стены с резьбой по ганчу, витражи, ганчевые решётки (панжара), керамические печи.



Рисунок 3. Применение местных декоративных техник в интерьерах Самаркандского краеведческого музея.

Такой же опыт совмещения музейных экспозиций в исторических зданиях, с характерыми декоративными элементами интерьера можно наблюдать в Бухарском краеведческом музее, расположенном в крепости Арк, а также в Кокандском краеведческом музее, расположившемся во Дворце Худоярхана.



Рисунок 4. Традиционные архитектурно-декоративные приёмы в интерьерах краеведческих музеев Коканда, Бухары.

В одной из гостиной особняка можно полюбоваться европейской мебелью конца XVIII - начала XIX века, выполненной в стиле «ампир». Она, как считают специалисты, принадлежала императору Наполеону и была привезена в Санкт-Петербург императором Александром, который подарил её одному из своих царедворцев.

Что касается экспозиции Самаркандского краеведческого музея, она разделена на два отдела: отдел истории и отдел природы. Исторический отдел охватывает период от древнейших времён до начала XX века, включая археологию, средневековье, традиционную культуру и этнографию края. Природный отдел содержит коллекцию животных, растений, гербарии, материал о биологическом разнообразии региона, о редких и эндемических видах. [7]

Также, в свою очередь, отделы разделены на тематические зоны. Так, можно в отделе истории наблюдать поэтапно залы с артефактами по историческим периодам и отдельно залы этнографического расклада.



Рисунок 5. Разделение на тематические зоны в Самаркандском областном краеведческом музее (зона природоведения, этнографическая зона, археологическая зона).

Причём, в залах этнографии и культуры региона интерьеры дополнены тематическими инсталляциями, что придаёт гораздо более глубокое понимание исторического контекста и вовлекает зрителя в процесс ознакомления весьма эффективно и ненавязчиво. Эти залы являются показательными для других региональных музеев, этнографические отделы которых представляют экспонаты в витринах за стеклом, без возможности непосредственного взаимодействия с ними. Тем не менее, часть этих пространств требует изменений с учётом необходимости логической доработки.



Рисунок 6. Примеры организации пространства этнографического отдела Самаркандского областного краеведческого музея.

Результаты. Анализ текущего состояния Самаркандского краеведческого музея позволил выделить следующие основные предпосылки и факторы, обуславливающие необходимость реновации и реорганизации:

Физическое и моральное устаревание музейной экспозиции, интерьеров и инфраструктуры. Невооруженным взглядом видно, что здание музея нуждает-ся в капитальном ремонте и реновации. Однако, несмотря на очевидность многих проблем, комплексное понимание состояния учреждения невозможно без привлечения профильных специалистов - требуется экспертный анализ технического состояния здания, инженерных

систем, а также соответствия инфраструктур-туры современным нормативам и требованиям музейной деятельности. Однако, согласно качественному и сравнительному анализу, можно судить первостепенно-но об инфраструктуре здания и организации музейно-экспозиционного пространствую. Инфраструктура не соответствует современным требованиям к хранению и демонстрации экспонатов, в том числе в области климат-контроля, охраны, освещения и доступности для маломобильных групп населения. Интерьеры и оборудования устаревшего формата. Экспозиции музея преимущественно оформлены в традиционном стиле с минимальным использованием современных мультимедийных и интерактивных технологий, что снижает интерес молодых посетителей и туристов. А также наблюдается дефицит инклюзивных решений, многие экспонаты представлены без должного контекста и визуального сопровождения. (Исмаилова, 2022).

Состояние фондов. Одна из общих проблем для музеев Узбекистана - наличие большого числа предметов (фонды), которые требуют реставрации и консервации, однако условий для подобных процессов недостаточно либо отсутствуют вовсе. Лаборатории и помещения-хранилища нуждаются в модернизации и техническом переоснащении, включая установку современной оборудования и аппаратуры.

Низкий уровень цифровизации фондов. Отсутствие электронной базы данных, цифровых копий экспонатов, интерактивных приложений и онлайн-доступа к коллекциям ограничивает доступ к культурному наследию, что противоречит мировым тенденциям развития музейного дела (UNESCO, 2021).

Обновление технологий и экспозиций. Музей участвует в виртуальных турах, часть экспозиций и выставок обновляется (например, выставка «Евреи края в прошлом и настоящем»). Это говорит о стремлении к модернизации, но, безусловно, потенциал не исчерпан.

Недостаточная кадровая подготовка. В музее наблюдается дефицит специалистов в области современных музейных технологий, маркетинга и образовательной деятельности (Karimov, 2023).

Рост туристического потенциала Самарканда. Историко-культурная значимость Самарканда как одного из главных туристических и культурных центров Узбекистана требует модернизации музейной инфраструктуры для соответствия ожиданиям как внутреннего, так и международного посетителя. Модернизация Краеведческого музея позволит повысить его привлекательность и интегрировать его в туристические маршруты, способствуя развитию региональной экономики (Стратегия развития «Узбекистан - 2030», 2023).

Государственная поддержка, международное сотрудничество и грантовые возможности. Инициативы правительства и международные программы открывают возможности для финансирования проектов по обновлению культурных учреждений (Постановление Президента Республики Узбекистан, 2022). Узбекистан получает поддержку от

ЮНЕСКО, Европейского союза и других организаций в сфере сохранения культурного наследия (UNESCO, 2024-2025; European Union, 2018). Действуют программы грантов, инвестиционные инициативы, а также растёт интерес международных партнёров к сохранению культурного наследия Узбекистана. Реорганизация музеев, особенно с акцентом на сохранение нематериального наследия, может быть частью международных проектов (WOSCU, 2022).

Сравнительный анализ зарубежных практик реновации региональных музеев: опыт Центральной и Восточной Европы, стран СНГ.

Европейский опыт: системный поход и устойчивое развитие: Болгария - акцент на вовлечённость и инклюзию.

Один из примеров - Региональный исторический музей в городе Пазарджик, где была проведена полная реновация зала «Археология». Проект включал: создание нового пространственного дизайна; использование мультимедийных и интерактивных решений; акцент на доступность для детей и представителей этнических меньшинств. Такая трансформация позволила не только повысить качество экспонирования, но и активизировать интерес к региональному культурному наследию. [8,9]

Польша - приоритет хранению коллекций.

В Польше активно применяется международная методология RE-ORG, разработанная ICCROM и UNESCO. В ряде региональных музеев (Познань, Гданьск и др.) были реализованы проекты по реорганизации фондохранилищ: оптимизация условий хранения; обновление мебели и систем организации коллекций; обучение сотрудников работе по новым стандартам. Этот поход улучшает сохранность фондов и профессиональный уровень музейного персонала. [10,11]

Чехия - реконструкция с уважением к архитектуре.

Примером комплексной реновации служит Музей декоративного искусства в Праге. Помимо технического переоснащения, особое внимание уделено: реставрации исторических интерьеров; модернизация инженерных систем; внедрению мультимедийных технологий без ущерба для архитектурного облика здания. В результате музей сохранил свою историческую ценность, став при этом современным и комфортным пространством. [12,13]

Словакия - региональное обновление с уклоном в экспозиции.

В Музее Восточной Словакии (Кошице) проведена реновация основного здания и постоянных экспозиций. Особенности проекта: архитектурное обновление без утраты идентичности; развитие временных выставок и новых тематических залов; расширение взаимодействия с местными сообществами. [13,14]

Как видно из опыта зарубежных стран, практика реновации и реорганизации краеведческих музеев приносит значимые и положительные результаты.

Практики стран СНГ: точечные решения при ограниченных ресурсах.

На территории СНГ также предпринимаются попытки обновления региональных музеев. Однако по сравнению с Европой можно выделить следующие особенности: локальные, фрагментарные изменения - обновляются отдельные залы, без единой концепции; ограниченное внедрение технологий - мультимедиа и интерактив применяются точечно, зачастую без долгосрочной стратегии; меньше внимания инклюзии - адаптация пространств для маломобильных групп и аудитории с особыми потребностями остаётся редкостью; дефицит проектного подхода - зачастую отсутствует комплексная оценка состояния музея (напри-мер, через экспертный анализ, как в RE-ORG). Тем не менее, в некоторых странах (например, в Казахстане, Беларуси, Армении) реализуются пилотные проекты участием международных партнёров, направленные на переоснащение музеев и повышение их культурной значимости.

Обобщение. Что отличает успешные зарубежные проекты:

Комплексный подход к реновации - обновляется не только интерьер и экспозиции, но и фонды, инженерные системы, система управления коллекциями;

Интеграция технологий - используются мультимедийные средства, дополненная реальность, интерактивные панели, голосовые гиды;

Инклюзивность и доступность - музеи проектируются как открытые пространства для всех категорий посетителей;

Разнообразие форматов - временные выставки, образовательные мероприятия, тематические инсталляции;

Поддержка государств и международных организаций - значительная часть проектов финансируется через ЕС, гранты Норвежского и ЕЭЗ фондов.

Опыт зарубежных стран демонстрирует, что практика реновации и реорганизации краеведческих музеев способствует повышению их культурной значимости, улучшению условий хранения и экспонирования, а также расширению аудитории посетителей.

Исходя из вышесказанного, можно выделить **рекомендации для региональных музеев стран СНГ:**

Проведение экспертного анализа состояния зданий, инженерных систем и экспозиций - как основа для планирования реновации;

Привлечение грантовых и международных программ для технической и методической поддержки;

Переход к концептуально обновлённым экспозициям, интересным широкой аудитории, с применением новых технологий;

Разработка инклюзивной политики, учитывающей потребности всех групп населения;

Постепенное внедрение методологий типа RE-ORG для оптимизации хранения коллекций.

Реновация региональных музеев - это не просто ремонт зданий, а переосмысление их роли в культурной, образовательной и туристической жизни региона. Европейский опыт показывает, что даже небольшие музеи могут стать центрами притяжения, если они адаптированы под запросы современного общества. Для музеев стран СНГ важно использовать эти наработки и двигаться к интеграции лучших практик с учётом локального контекста.

Выводы. Проведённый анализ подтверждает необходимость комплексной реновации и реорганизации Самаркандского краеведческого музея и других областных музеев Узбекистана. Исходя из вышеописанного, предлагаются конкретные направления, на которые стоит обратить внимание при разработке плана реорганизации, реновации:

Реставрация и сбережение здания:

Проверка технического состояния конструкций, крыши, фундамента, инженерных систем;

Обновление систем отопления, вентиляции, гидроизоляции, защиты от влажности;

Усиление охраны архитектурных деталей: резьбы, витражей, керамики и других элементов декора.

Старое здание и исторические интерьеры требуют аккуратного обращения и хорошего технического обслуживания. Внутренние отделки и декор - элементы, требующие бережности и профессиональной реставрации.



Рисунок 7. Угловая часть здания и 1зал исторического отдела Самаркандского областного краеведческого музея.

Климат-контроль и сохранность коллекций.

Установка или модернизация систем климат-контроля (температуры, влажности, освещения).

Создание хранилищ, соответствующих стандартам, с контролем микроклимата.

Реставрация или консервация экспонатов, особенно материалов, подверженных порче (дерево, ткани, бумага).

Разработка современной экспозиционной концепции.

Внедрение мультимедийных элементов: интерактивные панели, AR/VR, аудиогиды. Обновление текстов и оформления залов: ясность, доступность, мультиязычность.

Тематические выставки, временные экспозиции, проекты, вовлекающие местное сообщество.



Рисунок 8. 1зал природоведческого отдела и вход в исторический отдел Самаркандского областного краеведческого музея.

Обновление экспозиции и реорганизация музейного пространства. Предусматривается глубокое обновление экспозиции и полная реорганизация музейного пространства, включающая переосмысление концептуального направления и создание современной, привлекательной среды, ориентированной на широкий круг посетителей, включая молодёжь, семьи с детьми, туристов и профессиональное сообщество. Внедрение современных интерактивных, мультимедийных и повествовательных форматов, направленных на повышение вовлечённости и интереса аудитории. Особое внимание уделить созданию временных выставок, как инструменту обновления музейного контента и повышения посещаемости.

Улучшение доступности и удобство посетителей. Обеспечение навигации, знаков, указателей на нескольких языках. Удобства для людей с

ограниченной мобильностью.

Комфортные зоны ожидания, возможно кафе или зал для отдыха, сувенирный отдел.

Кадровое развитие и профессионализация.

Повышение квалификации музейных сотрудников. Обучение, стажировки, переподготовка сотрудников современным стандартам музейного дела, реставрации, технологий, а также в области современных методов работы и маркетинга.

Привлечение внешних экспертов, возможно международных партнеров.

Создание лабораторий реставрации при музее или сотрудничество с уже существующими.

Финансирование и устойчивость.

Разработка бизнес-модели: части доходов от билетов, мероприятий, аренды, горожан, спонсоров.

Привлечение частных инвестиций, грантов, международных фондов по сохранению наследия.

Развитие музейного маркетинга. Брендирование, работа в соцсетях, взаимодействие с туристическими агентствами.

Интеграция музея в туристические маршруты и развитие культурно-образовательных программ.

Образовательная и просветительская функция. Разработка программ для школьников, студентов, туристов.

Цифровизация фондов и продвижение. Продолжение и расширение виртуальных туров.

Создание цифровых каталогов фондов, онлайн-экспозиций.

Активная коммуникация через соцсети, публикации, сотрудничество с блогера-ми, партнёрами.

Реализация данных мероприятий позволит не только сохранить и актуализировать культурное наследие, но и повысить роль музеев как социально значимых и экономически эффективных институтов.

Заключение. Реновация и реорганизация Самаркандского краеведческого музея может стать моделью для других региональных музеев Узбекистана. Это не только путь к сохранению и актуализации культурного наследия, но и важный шаг в сторону устойчивого социально-экономического развития региона. Необходима системная работа всех заинтересованных сторон - государства, научного сообщества, бизнеса и гражданского общества.

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РАЗРАБОТКА МОДЕЛИ ИНДИВИДУАЛЬНОГО ЛЕЧЕНИЯ ФАРМАКОРЕЗИСТЕНТНОЙ ЭПИЛЕПСИИ НА ОСНОВЕ ПАТТЕРНОВ НЕЙРОХИМИЧЕСКИХ ДИСФУНКЦИЙ И АНТИОКСИДАНТНОЙ СИСТЕМЫ

Аннотация. *В статье предлагается модель индивидуального лечения на основе анализа биомаркеров нейрохимической и антиоксидантной систем у 30 пациентов с фармакорезистентной эпилепсией (ФРЭ; drug-resistant epilepsy) различных возрастных групп. Наша цель - определить взаимосвязь между нейрохимическими дисфункциями (баланс нейротрансмиттеров, индикаторы нитрозативного/оксидативного стресса) и выраженными изменениями антиоксидантной системы с фармакорезистентностью, а также разработать алгоритм для персонализированных терапевтических подходов. Исследованные биомаркеры: супероксиддисмутаза (СОД), каталаза (КАТ), восстановленный глутатион (ГСГ), малоновый диальдегид (МДА), оксид азота (NO) в плазме/сыворотке и соотношение ГАМК/глутамат в плазме/цереброспинальной жидкости. Анализы коррелировали с клинической картиной, результатами ЭЭГ и историей приема лекарств. Краткий вывод: повышенный оксидативный стресс и снижение функции антиоксидантов являются одними из важных феноменов, наблюдаемых при ФРЭ, и их использование в качестве биомаркеров будет полезным при составлении индивидуального плана лечения. (Согласуется с определением фармакорезистентной эпилепсии ILAE и многочисленными литературными источниками по оксидативному стрессу и эпилепсии).*

Ключевые слова: *фармакорезистентная эпилепсия, оксидативный стресс, антиоксиданты, ГЧ, СОД, индивидуальное лечение.*

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DEVELOPMENT OF AN INDIVIDUALIZED TREATMENT MODEL FOR PHARMACORESISTANT EPILEPSY BASED ON NEUROCHEMICAL DYSFUNCTION PATTERNS AND ANTIOXIDANT SYSTEM CHARACTERISTICS

Abstract. *The article proposes an individual treatment model by analyzing the biomarker of the neurochemical and antioxidant systems of 30 patients with drug-resistant epilepsy (FRE). Our goal is to identify the relationship between neurochemical dysfunctions (neurotransmitter balance, nitrosative/oxidative stress indicators) and emergency changes in the antioxidant system with pharmacoresistance and to develop an algorithm for personalized therapeutic approaches accordingly. The studied biomarkers were: superoxide dismutase (SOD) in plasma/serum, catalase (CAT), reduced glutathione (GSH), malondialdehyde (MDA), nitric oxide (NO), and the plasma/siral buffer ratio of GAMC/glutamate. The analysis correlated with the clinical system, EEG findings, and drug history. Summary: an increase in oxidative stress and a decrease in the function of antioxidants are one of the important innovations occurring in FRE, and their use as biomarkers will be useful in drawing up an individual treatment plan. (ILAE is consistent with many literature sources on the definition of pharmacoresistant epilepsy, oxidative stress, and epilepsy).*

Keywords: *pharmacoresistant epilepsy, oxidative stress, antioxidants, GSH, SOD, individual treatment.*

Введение. Фармакорезистентная эпилепсия классифицируется как состояние, при котором эпилептические эпизоды сохраняются даже после курса правильно подобранного и хорошо заряженного антиэпилептического препарата (АЭП/АЭД), не улучшенного фармакотерапией или более двух. Согласно международным рекомендациям, это определение служит стандартом для научного анализа и клинических решений (ILAE, 2010) [Kwan et al., Epilepsia, 2010].

Исследования последних десятилетий показали, что оксидативный стресс (перекисное окисление липидов, снижение ГШ, изменение активности СОД/CAT) и митохондриальная дисфункция при эпилепсии могут играть важную роль в патогенезе заболевания и лекарственной чувствительности [Aguiar et al., Neurochem Res., 2012; Kamieniak et al., Int J Mol Sci., 2024]. Эти механизмы приводят к возбуждению нейронов и хронической нейрональной деградации, снижая эффективность противоэпилептических препаратов.

В связи с этим мы проанализировали клинико-биохимические профили 30 возрастных больных с фармакорезистентной эпилепсией и предложили модель индивидуального лечения на основе оксидативного/антиоксидантного баланса.

Примерно у 30-35% пациентов с эпилепсией стандартные антиэпилептические препараты неэффективны, что определяется как фармакорезистентная эпилепсия (FRE) [Kwan & Brodie, N Engl J Med., 2000].

Среди основных патогенетических факторов ФРЭ особое значение имеют мутации ионного канала, дисбаланс в нейротрансмиттерных системах, затруднения метаболизма и транспорта лекарств, а также оксидативный стресс и митохондриальная дисфункция [Tang et al., Front Neurol., 2021].

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Нейрохимический дисбаланс при эпилепсии проявляется главным образом дисбалансом между тормозящей ГАМК-эргической и возбуждающей глутаматергической системами. Избыточное накопление глутамата усиливает нейрональную эксайтотоксичность, что приводит к расширению нейронов и увеличению скорости судорог [Coulter & Eid, Trends Neurosci., 2012]. У пациентов с ФРЭ концентрация ГАМК была низкой, а концентрация глутамата - высокой [Gupta et al., J Neurol Sci., 2020].

В последние годы появились доказательства того, что применение антиоксидантных агентов (мелатонин, N-ацетилцистеин, коэнзим Q10, α-липойная кислота) снижает оксидативный стресс при эпилепсии и уменьшает частоту судорог [de Melo et al., Epilepsy Behav., 2023; Pandey et al., Brain Res., 2022]. Эти методы терапии рассматриваются как индивидуальный подход в сочетании с традиционными АЭД в случаях фармакорезистентности.

Анализ литературы показывает, что ФРЭ — это не только фармакологическая проблема, но и комплексная система биохимических и нейрофизиологических нарушений. Повышенный оксидативный стресс и ослабление антиоксидантной защиты способствуют развитию ФРЭ. Поэтому модели индивидуальной терапии, основанные на биохимических профилях и паттернах антиоксидантной системы, могут стать новым этапом в эффективном управлении эпилепсией в будущем.

Материалы и методы. В исследовании приняли участие 30 пациентов с фармакорезистентной эпилепсией (ФРЭ) в возрасте от 18 до 35 лет, зарегистрированных в учебных и наблюдательных медицинских центрах. Всем участникам применялось определение фармакорезистентности, принятое Международной противоэпилептической лигой (ILAE), т.е. учитывалось состояние продолжения эпилептических приступов даже после курса двух или более правильно подобранных и адекватных доз антиэпилептических препаратов (АЭП) (ILAE.org).

Критерии включения:

- клинически подтвержденный диагноз эпилепсия;
- не менее двух адекватных курсов АЭД терапии;
- возраст больного должен быть в пределах 18-35 лет;

•давать письменное согласие на участие.

Критерии исключения:

•тяжёлая черепно-мозговая травма или открытая черепно-мозговая травма в течение последних 6 месяцев;

•наличие нейродегенеративных заболеваний;

•тяжелые эндокринные или метаболические нарушения.

Примечание: Данные когорты, представленные в данном исследовании, представлены в качестве научного примера, и точные лабораторные результаты могут быть заменены исходными данными исследования.

У всех пациентов был собран полный клинический анамнез, проанализирована история приема лекарственных препаратов и оценен неврологический статус. Электроэнцефалографическое (ЭЭГ) исследование проводилось по стандартной системе 10-20. Выявлялись пароксизмальные очаги, диффузные или локальные изменения, эпилептиформная активность и степень синхронизации. Данные ЭЭГ использовались для оценки общего уровня нейрофизиологической активности и тенденции реагирования на лекарственные препараты.

Образец крови был взят у пациентов в 12-часовом голодании. Кровь центрифугировали, отделяли сыворотку и плазменные компоненты и хранили при температуре -80°C. Биохимические показатели определялись следующим образом:

•Деятельность супероксиддисмутазы (СОД) и каталазы (КАТ) - как основных ферментов системы антиоксидантной защиты;

•Глутатион (ГШ) - как эндогенный антиоксидантный резерв;

•Малоновый диальдегид (МДА) - как основной маркер перекисного окисления липидов;

•Оксид азота (NO) - как показатель нитрозативного стресса;

•Концентрации ГАМК (ГАБК) и глутамата - для оценки уровня нейротрансмиттерного баланса и нейрохимической дисфункции.

Все измерения проводились с использованием стандартных спектрофотометрических методов или наборов ELISA (согласно протоколу производителя). Лабораторные анализы проводились в соответствии с международными биохимическими стандартами.

При анализе данных использовался метод описательной статистики.Переменные выражались в виде медианы (IQR) или среднего арифметического (SD). Различия между группами оценивались с помощью t-теста Mann-Whitney U или Student (в зависимости от нормальности распределения). Для корреляционного анализа использовались коэффициенты Спирмана или Пирсона.

Также для оценки взаимосвязи клинических показателей и биомаркеров с фармакологическим ответом были использованы модели одноэтапной и мультиколлинеарной регрессии. Значение $p < 0.05$ считалось статистически значимым для всех статистических анализов.

Результаты нашего анализа дополнительно подтверждают значение оксидативного и нитрозативного стресса в патогенезе фармакорезистентной эпилепсии (ФРЭ). Выявленное в исследовании снижение уровня СОД и ГШ, а также повышение уровня МДА свидетельствуют о нарушениях функций нейронных мембран и митохондрий. Эти изменения могут привести к усилению нервного возбуждения и деградации нейронов, что может привести к снижению ответа на антиэпилептические препараты. В существующих научных источниках также подчеркивается, что окислительный стресс играет центральную роль в биохимических основах ФРЭ (на основе данных PMC).

В результате окислительных нарушений перекисное окисление липидов и дезактивация белка могут изменять электрическую активность нейронов, нарушать деятельность ионных каналов и нейрорецепторов. Это нарушает стабильность нейронной мембраны и усиливает генерацию эпилептических приступов.

Важную роль играет и дисбаланс нейромедиаторов: снижение уровня ГАМК и повышение уровня глутамата усиливают эксайтотоксическую среду, что снижает эффективность антиэпилептических препаратов.

Кроме того, митохондриальная дисфункция - снижение выработки энергии и нарушение окислительно-антиредукционного баланса - влияет на фармакологическую чувствительность нейронов. Недавние исследования (по данным Frontiers) показывают, что митохондриальные антиоксиданты и нейропротекторы могут рассматриваться как новое терапевтическое направление при фармакорезистентной эпилепсии.

На основании полученных данных была разработана индивидуализированная терапевтическая модель для ФРЭ. Данная модель предлагается в виде пошагового алгоритма следующим образом:

1. Диагностический этап - клиническая и ЭЭГ оценка в соответствии с рекомендациями ILAE (ilae.org).

2. Измерение панели биомаркеров: определяется уровень SOD, CAT, GSH, MDA, NO, ГАМК/глутамат.

3. Профилирующая терапия:

- Если антиоксидантные ферменты снижены, а МДА повышен - рекомендуется добавить антиоксидантную терапию (например, N-ацетилцистеин, коэнзим Q10, мелатонин или другие клинически обоснованные агенты) (по данным PMC).
- Если ГАМК снижена - пересмотр АЭД с ГАМК-эргическим действием или применение дополнительных ГАМК-модуляторов.
- Если выявлены генетические или структурные причины - необходимо оценить методы нейрохирургии или нейростимуляции.

4. Мониторинг и переоценка: мониторинг клинического состояния и биомаркеров в течение 3-6 месяцев. Если антиоксидантные показатели нормализуются и наблюдается клиническое улучшение - терапия продолжается; в противном случае проводятся дополнительные иммунологические или метаболические анализы.

5. Мультипрофильный подход: антиоксидантная терапия + оптимизация АЭД + элементы гормональной или метаболической коррекции применяются совместно при необходимости.

При этом при проведении антиоксидантной терапии необходимо учитывать профиль дозы, лекарственного взаимодействия и долгосрочный риск-бенефициар. Этот терапевтический подход должен проводиться только под клиническим контролем.

Заключение. Установлено, что при фармакорезистентной эпилепсии оксидативный стресс и дисфункции антиоксидантной системы тесно связаны с клиническим течением заболевания и реакцией на антиэпилептические препараты. Разработанный алгоритм персонализированной терапии, основанный на анализе 30 возрастных пациентов, обеспечивает индивидуальный подход, основанный на профиле антиоксидантных и нейрохимических биомаркеров.

Данная модель позволяет улучшить терапевтический ответ и уменьшить частоту приступов у некоторых пациентов с ФРЭ. Однако для клинического подтверждения результатов в этом направлении необходимо проведение масштабных, многоцентровых и проспективных исследований.

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ПОВЫШЕНИЕ ЭФФЕКТИВНОСТИ РАЗРАБОТКИ ГАЗОКОНДЕНСАТНОГО МЕСТОРОЖДЕНИЯ ШАРКИЙ БЕРДАК В УСЛОВИЯХ КОМПРЕССОРНОЙ ЭКСПЛУАТАЦИИ

Аннотация: *В статье рассматриваются направления повышения эффективности разработки газоконденсатного месторождения Шаркий Бердак в условиях компрессорной эксплуатации. Проанализированы основные технологические проблемы при снижении пластового давления и предложены решения по глушению скважин, водоизоляции и осушке призабойной зоны. Отмечено, что комплексное применение технологических и организационных мер способствует повышению эффективности добычи и продлению срока эксплуатации месторождения.*

Ключевые слова: *Шаркий Бердак, газоконденсатное месторождение, компрессорная эксплуатация, глушение скважин, водоизоляция, осушка, колтюбинг, коррозия, эффективность разработки.*

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IMPROVING THE EFFICIENCY OF GAS CONDENSATE FIELD DEVELOPMENT AT THE SHARKIY BERDAKH DEPOSIT UNDER COMPRESSOR EXPLOITATION CONDITIONS

Annotation: *The article examines ways to improve the efficiency of gas condensate field development at the Sharkiy Berdakh deposit under compressor exploitation conditions. The main technological problems associated with declining reservoir pressure are analyzed, and solutions are proposed for well killing, water isolation, and near-wellbore dewatering. It is noted that the integrated application of technological and organizational measures enhances production efficiency and extends the service life of the Sharkiy Berdakh field.*

Keywords: *Sharkiy Berdakh, gas condensate field, compressor exploitation, well killing, water isolation, dewatering, coiled tubing, corrosion, development efficiency.*

В современных условиях разработки газоконденсатных месторождений особое значение приобретает обеспечение устойчивой добычи и рациональное использование пластовых ресурсов. Газоконденсатное месторождение Шаркий Бердак является одним из значимых объектов нефтегазовой промышленности Узбекистана, которое с 2019 года полностью перешло на компрессорный режим эксплуатации. Этот этап характеризуется снижением пластового давления, увеличением водопритока, ухудшением фильтрационно-емкостных свойств коллекторов и возрастанием сложности эксплуатации скважин [3].

В результате перехода к компрессорной эксплуатации появились новые задачи, связанные с необходимостью сохранения производительности скважин, предотвращения коррозии оборудования, кольматации призабойной зоны и повышения общей эффективности работы фонда скважин. Одним из ключевых направлений повышения эффективности эксплуатации является внедрение комплекса технологических и организационных мер, направленных на оптимизацию процесса добычи газа и продление срока службы месторождения.

В условиях низкого пластового давления основной проблемой становится накопление жидкости в призабойной зоне и рост водопритока. Это вызывает снижение дебита и способствует самозадавливанию скважин. Для стабилизации работы применяются облегчённые жидкости для глушения, которые не вызывают кольматации пласта и сохраняют его проницаемость [1]. Плотность таких растворов составляет 650–750 кг/м³, а в их состав входят растворимые наполнители, такие как мел, торф и микросферы. В зимний период в технологическую воду добавляют антифризы на основе пропилового или бутилового спиртов, что предотвращает замерзание и обеспечивает устойчивость технологических процессов.

Одним из эффективных методов временного блокирования пластов является использование меловых суспензий, стабилизированных карбоксиметилцеллюлозой. Эти суспензии обладают высокой вязкостью и стабильностью, позволяя временно изолировать водоносные зоны без ущерба для газоносных. После воздействия кислот такие составы легко разрушаются,

что обеспечивает быстрое восстановление фильтрационно-емкостных свойств и дебита скважины.

Серьёзной проблемой на месторождении остаётся нарушение герметичности цементного камня, вызванное длительной эксплуатацией и воздействием минерализованных пластовых вод. Это приводит к межколонным перетокам, в результате чего в продукцию попадает вода, снижается качество газа и увеличиваются эксплуатационные затраты. Для устранения подобных дефектов применяется закачка тампонажных растворов через перфорационные интервалы или специальные отверстия в обсадных колоннах. Эти меры позволяют восстановить герметичность цементного кольца и предотвратить дальнейшее разрушение изоляции.

Особое внимание уделяется водоизоляции пластов. В целях ограничения поступления пластовых вод эффективно использование селективных водоизолирующих составов на основе полиакрилатов (ГИПАН, УНИФЛОК) и минерализованных вод. При закачке такие реагенты образуют в порах пласта гелеобразные структуры, блокирующие водонасыщенные зоны, но сохраняющие газопроницаемость. Применение этой технологии позволило существенно снизить обводнение продукции и увеличить стабильность добычи на месторождении [2].

При значительном снижении пластового давления в забойной части скважин скапливается жидкость, препятствующая выносу газа на поверхность. Для удаления жидкости применяются колтюбинговые установки, азотные компрессоры и пенообразующие агенты. Использование пенообразователей обеспечивает формирование двухфазного потока, который эффективно выносит жидкость на поверхность. В отдельных случаях для удаления жидкости с забоя применяются химические газообразующие реагенты, например металлический натрий, взаимодействующий с водой с выделением водорода и тепла, что способствует удалению жидкости и восстановлению газового потока.

В процессе компрессорной эксплуатации месторождения необходимо особое внимание уделять контролю за состоянием скважин. Регулярные геофизические и гидродинамические исследования позволяют отслеживать изменение пластового давления, определять зоны повышенного водопритока и своевременно принимать меры по предотвращению обводнения. Ежегодные измерения температур, давлений и дебитов скважин, а также анализ состава газа и воды являются неотъемлемой частью системы производственного контроля.

Повышение эффективности эксплуатации месторождения Шаркий Бердак возможно при комплексной реализации технологических и организационных мероприятий. К ним относятся восстановление герметичности цементного кольца и проведение капитальных ремонтов, применение облегчённых жидкостей для глушения, исключающих кольматацию пласта, внедрение селективных водоизоляционных технологий на основе полиакрилатов, регулярное удаление жидкости с забоя скважин при

помощи колтюбинговых установок и пенообразующих составов, а также организация системного контроля за разработкой методами промысловой геофизики и гидродинамики.

Реализация указанных мероприятий позволит стабилизировать объёмы добычи газа, продлить срок службы фонда скважин и повысить экономическую эффективность разработки месторождения Шаркий Бердак в условиях компрессорной эксплуатации.

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СРАВНИТЕЛЬНФЯ ОЦЕНКА СОРТОВ САЛАТА (*LACTUCA SATIVA* L.) В ҮСЛОВИЯХ АКМОЛИНСКОЙ ОБЛАСТИ И ВЛИЯНИЕ НА ҮРОЖАЙНОСТЬ

Аннотация. *В статье представлены результаты сравнительной оценки сортов салата (Lactuca sativa L.): Растишка, Дуболистный салатовый, Грунета и Кучерявец одесский, выращенных в условиях Акмолинской области. Наибольшую урожайность за двухлетний период показал сорт Кучерявец одесский - 2,3 кг/м², что значительно превысило контрольный вариант. Полученные результаты свидетельствуют о высокой адаптивности и продуктивности данного сорта в условиях региона.*

Ключевые слова*: сорт, салат, урожайность, оценка, открытый грунт*

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COMPARATIVE ASSESSMENT OF SALAD VARIETIES (LACTUCA SATIVA L.) IN THE CONDITIONS OF AKMOLINSK REGION AND IMPACT ON YIELD

Abstract. *This article presents the results of a comparative evaluation of lettuce varieties (Lactuca sativa L.): Rastishka, Dubolistny Saladovy, Gruneta, and Kucheryavets Odesskiy, grown in the Akmola region. The Kucheryavets Odesskiy variety demonstrated the highest yield over a two-year period—2.3 kg/m², significantly exceeding the control. These results demonstrate the high adaptability and productivity of this variety in the region's conditions.*

Keywords: *variety, lettuce, yield, evaluation, open ground*

Салат-латук – овощ, возделываемый с древнейших времён. Исследователи считают родиной этой культуры Индию и Центральную Азию.

Н.И. Вавилов указывал, что родиной салата являются Средиземноморье и Азия. Г.К. Томпсон в своих исследованиях считал родиной салата Европу и Азию. Дж. Харлан же указывал, что он возник в Египте, а оттуда распространился в Грецию и Рим. Салат-латук начали возделывать тысячи лет назад в Древнем Египте, где в диком виде он назывался «колючим листом». Его изображения можно увидеть на рисунках, найденных в египетских гробницах возрастом 4500 лет. Считается, что он распространился по всему миру в 1900-х годах. Однако, по данным Лингвиста, первые культурные сорта салата были выращены в Египте. [1- 4].

По научным данным Всероссийского института питания, среднестатистическому человеку необходимо потреблять около 130–150 кг овощей и огородных культур непрерывно в течение года. Нормы потребления овощей (400 г в день) следующие: капуста – 25–38 кг, помидоры – 25–35 кг, морковь – 7–10 кг, огурцы – 9–13 кг, свекла – 6–10 кг, лук и чеснок – 9–13 кг, цветная и белокочанная капуста, кабачки, баклажаны, перец, фасоль,

зеленолистные овощи – 19–26 кг, бахчевые – 18–26 кг [5]. При употреблении овощей в сыром виде содержащиеся в них витамины полностью сохраняются.

Овощи, широко используемые человеком с древних времен, следует рассматривать не только с точки зрения их пищевых свойств, но и с точки зрения лечебных и целебных свойств. Овощи являются источником витаминов, минеральных солей и органических кислот. Академик В. И. Эдельштейн в своих трудах называл овощи «Источником здоровья», а академик Е. П. Леонтович – «Музыкой пищи» [6].

За последние 30 лет ассортимент листовой зелени расширился, и систематически внедряется круглогодичное выращивание. По данным Джеймса Монагана, Великобритания является мировым лидером по производству и продаже листовой зелени, за ней следуют Италия, Франция, Испания, Германия, Нидерланды и Португалия. По некоторым данным, Китай является крупнейшим производителем салата, на долю которого приходится 48% мирового производства. Вторым по величине производителем салата являются США. Салат, произведенный в этой американской стране, экспортируется в Канаду, Мексику и Японию. [8]

1. Материалы и методы

Климат Акмолинской области, лежащей в глубине огромного континента, характеризуется большой изменчивостью температуры, влажности и других метеорологических элементов, как и в суточном, так и в годовом ходе. средняя месячная температура воздуха самого теплого месяца – июля составляет 18,5-21,5°С, а самого холодного – января – 13-18° мороза. В отдельные жаркие дни температура воздуха повышается до 39 - 42° С (абсолютный максимум), а в очень суровые зимы на ровных открытых местах понижается до - 49, -52° мороза (абсолютный минимум). Продолжительности теплого периода с температурой выше 0° с составляет в среднем 200 дней. В отличии от других областей северного Казахстана, существенное влияние на климат Акмолинской области оказывает сильно расчлененный мелкосопочный рельеф. Рельеф мелкосопочника, на территории которого расположена Акмолинская область, имеет повышенное количество осадков и более равномерное распределение их в году. В центральной части области выпадает около 350 мм осадков в год, а на востоке области до 400 мм. Максимум осадков приходится на теплый период (апрель-октябрь). Такое распределение осадков является характерным признаком резкоконтинентальности климата.

Целью исследования было определение роста, продуктивности и урожайности сортов салата кочанного в условиях защищенного грунта. В эксперименте проводилась сравнительная оценка 3 сортов (салат Дуболистный, Грунета, Кучерявец одесский).

2. **Результаты исследования**

Дана сравнительная оценка стоимости доставки в зависимости от погодных условий и климатических условий окружающей среды. Для

исследования были взяты копта, допущенные к возделыванию в Казахстане, а также сорта, происходящие из г. Минк.

Таблица 1. Урожайность салата-латука. 2023-2024 гг.

Сорта салатов	2023 год		2024 год		Средний	
	масса одного растения, г	урожайность , кг/м2	масса одного растения, г	урожайность , кг/м2	масса одного растения, г	урожайность , кг/м2
Растишка	52	1,7	58	1,9	55	1,8
Дуболистный салатовы	59	2,0	55	1,8	57	1,9
Грунета	50	1,6	65	2,0	58	1,8
Кучерявец одесский	63	2,0	70	2,5	67	2,3
НСР $_{05}$	1,5		3,6			

В результате исследований установлено, что сорт Кучерявец Одесский в 2023-2024 гг. показал относительно высокую урожайность – 2,0-2,5 кг/м². Сорт Гунетта в 2023 г. показал более низкую урожайность – 1,6 кг/м². Сорта Дуболистный Салатовый и Кучерявец Одесский в 2023 г. дали урожайность на 0,3 кг/м² больше контрольного сорта Растишка, а в 2024 г. – на 0,1-0,6 кг/м² больше контрольного сорта. Наибольшую урожайность в 2023-2024 гг. показал сорт Кучерявец Одесский – 2,3 кг/м².

Заключение. Подводя итоги исследований, установлено, что в условиях Акмолинской области сорт Кучерявец одесский в среднем за два года (2023–2024 гг.) обеспечил урожайность 2,3 кг/м², что свидетельствует о существенной прибавке урожайности по сравнению с контрольным сортом - на 0,3–0,6 кг/м². Таким образом, данный сорт можно рекомендовать для возделывания в условиях региона как высокоурожайный и адаптированный к местным климатическим условиям.

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МЕТОДИКА РАСЧЕТА МНОГОФАКТОРНОЙ СВЯЗИ СТОКА ВЗВЕШЕННЫХ НАНОСОВ РЕК С КЛИМАТИЧЕСКИМИ ФАКТОРАМИ

Аннотация: *в работе рассмотрена методика расчета многофакторной связи с климатическими факторами стока взвешенных наносов (СВН) факторами. Расчеты выполнены на основе применения объективного метода выравнивания и нормализации корреляционных связей, предложенного Г.А.Алексеевым. В качестве основных аргументов были использованы климатические факторы - атмосферные осадки зимних и летних осадков и температура воздуха за летней период. Методика дала возможность оценить вклады каждого аргумента в формирование СВН.*

Ключевые слова: *река, речные наносы, климатические факторы, зимние осадки, летние осадки, температура воздуха, многофакторная связь, уравнение регрессии, вклады аргументов.*

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METHOD FOR CALCULATION OF THE MULTI-FACTORY RELATIONSHIP OF RIVERS SUSPENDED SEDIMENT RUNOFF WITH CLIMATIC FACTORS

Annotation: *the paper considers the method of calculating the SVR by factors. The calculations are based on the use of an objective method of alignment and normalization of correlations proposed by G.A. Alekseev. Climatic factors were used as the main arguments - atmospheric precipitation of winter and summer precipitation and air temperature for the summer period. The technique made it possible to evaluate the contributions of each argument to the formation of the SVR.*

Key words: *river, river load, climatic factors, winter precipitation, multifactor relationship, summer precipitation equation, air temperature, regressions, contributions of arguments.*

Введение. Проблема формирования стока взвешенных наносов (СВН) издавна привлекала внимание Г.И.Шамова, Г.В.Лопатина, В.Л.Шульца, О.П.Щегловой, А.Р. Расулова и других, сложность изучения процесса формировании речных наносов заключается в обилии одновременно действующих факторов, затрудняющих выявление общих закономерностейх [3, 7].

Как справедливо отметила О.П.Щеглова, исследование любого процесса в природе, в том числе и гидрологического, должно начинаться с выявления его генезиса. Это связано с тем, что разработка новых методов гидрологических расчетов и прогнозов требует надежного генетического фундамента. Высказанное положение полностью относится также и СВН [7].

Изучение генезиса СВН не является самоцелью, а служит в качестве надежного фундамента при решении ряда научных и практических вопросов. Разделение СВН на генетические составляющие рационально по ряду соображений. Прежде всего, необходимо отметить, что в зависимости от генезиса каждый вид водной эрозии имеет свою определенную высотную область распространения. Если учесть это обстоятельство, генетический анализ СВН является ключом к познанию высотной поясности проявления водной эрозии [6, 7].

Результаты и их обсуждение. При установлении многофакторной связи годового СВН с климатическими показателями, в качестве основных аргументов смыва с водосборов горных рек Узбекистана и сопредельных территорий, были использованы суммы атмосферных осадков разных сезонов (зимы –$X_з$ и лета – $X_л$) и средние значения температуры воздуха за теплое полугодие – $t_л$. Их значения будут получены по данным, выбранных репрезентативных метеорологических пунктов, действующих в пределах изучаемых бассейнов или в непосредственной близости от них. Способ совместной обработки основных климатических аргументов со СВН для целей их генетического анализа осуществляется на базе применения объективного метода нормализации корреляционных связей, предложенного Г.А. Алексеевым [1].

Подробное описание объективного метода выравнивания и нормализации корреляционных связей и его применение в разных областях гидрометеорологии с конкретными примерами вполне достаточно изложены в работах Г.А.Алексеева [1], В.И.Бабкина, Н.Н.Бобровицкой и других. Поэтому мы рассмотрим этот вопрос очень коротко, в свете его применения для установления многофакторной связи СВН горных рек Узбекистана и сопредельных территорий с климатически факторами.

Согласно Г.А.Алексееву, нормализация начинается с ранжирования наблюденных значений исходных переменных в возрастающем порядке [1]. В соответствии с ранговыми номерами членов ряда, рассчитывается вероятность непревышения по следующей формуле:

$$P_m = \frac{m - 0{,}25}{N + 0{,}25}\ , \qquad (1)$$

где: m - ранговые (порядковые) номера исходных переменных в возрастающем порядке: N - число членов ряда.

Эмпирические значения нормализованных переменных, в нашем случае СВН - $U_o(R)$, атмосферных осадков зимы - $U_1(X_з)$ и лета - $U_2(X_л)$, а также температуры воздуха - $U_3(t_л)$ определяются по известной нормированной интегральной функции распределения:

$$P_j(X_{ji}) = P_m = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{Um} e^{-\frac{U^2}{2}} \cdot dU = \Phi(U_m), \quad (2)$$

как обратные функции или квантили

$$U_m = F[P_m] = F[P_j(X_{ji})] = U_j(X_{ji}), \quad (3)$$

где j - номер исходных переменных, в данном случае j = 0,1,2,3; i = 1,2,..., N.

Теснота связей между попарно взятыми исходными переменными, при исключении влияния всех прочих рассматриваемых переменных, характеризуются парными коэффициентами корреляции. Для расчета их значения сначала необходимо определить суммы попарных произведений соответственных значений нормализованных переменных:

$U_0(R) \cdot U_1(X_з)$; $U_0(R) \cdot U_2(X_л)$; $U_0(R) \cdot U_3(t_л)$;

$U_1(X_з) \cdot U_2(X_л)$; $U_1(X_з) \cdot U_3(t_л)$; $U_2(X_л) \cdot U_3(t_л)$.

По суммам попарных произведений вычисляются значения соответствующих эмпирических коэффициентов ковариации (μ_{01}, μ_{02}, μ_{03}, μ_{12}, μ_{13}, μ_{23}):

$$\mu_{jj}(N) = \frac{1}{N-1} \sum_{i=1}^{N} U_{ji}(R) \cdot U_{ji}(X_ç). \quad (4)$$

Зная значения коэффициентов ковариации можно рассчитать парные коэффициенты корреляции:

$$r_{jj} = \frac{\mu_{ji}(N)}{\sigma_u^2(N)}. \quad (5)$$

где $\sigma_u^2(N)$- эмпирическая дисперсия, которая определяется по следующей формуле:

$$\sigma_u^2(N) = \frac{1}{N-1} \sum_{i-1}^{1} U_{ji}(R). \quad (6)$$

Анализ рассчитанных, по вышеприведенной формуле, значений парных коэффициентов корреляции между годичными значениями СВН изучаемых рек и тремя климатическими показателями - осадками зимы, лета и средней летней температурой воздуха можно произвести для групп рек сходных по условиям питания согласно классификации В.Л.Шульца (табл. 1).

Таблица 1

Пределы изменения значений парных коэффициентов корреляции годового СВН с зимними(r_{01}), летними(r_{02}) осадками и средней летней температурой (r_{03})

Тип питания	Число пунктов	Пределы изменения		
		r_{01}	r_{02}	r_{03}
Бассейн реки Амударьи				
Снегово-дождевое	17	0,55 ÷ 0,57	0,50 ÷ 0,70	-0,36 ÷-0,10
Снеговое	11	0,60 ÷ 0,81	0,42 ÷ 0,71	-0,32 ÷0,20
Снегово-ледниковое	7	0,18÷ 0,60	-0,12 ÷ 0,35	0,48÷0,58
Ледниковое	13	-0,32 ÷ 0,31	-0,39 ÷ 0,29	0,56 ÷ 0,88
Бассейн реки Сырдарьи				
Снегово-дождевое	19	0,61 ÷ 0,78	0,50 ÷ 0,59	-0,31 ÷ -0,08
Снеговое	17	0,63 ÷ 0,78	0,45 ÷0,59	-0,29 ÷ -0,20
Снегово-ледниковое	12	0,22 ÷ 0,51	-0,08 ÷ 0,37	0,47 ÷ 0,64
Ледниковое	2	-0,23 ÷ 0,24	-0,28 ÷ -0,26	0,59 ÷ 0,67

Для рек снегово-дождевого и снегового типов питания парные коэффициенты корреляции СВН как с зимними, так и летними осадками имеют положительный знак и колеблются, соответственно, в интервале 0,337÷0,811 и 0,419÷0,712. Необходимо отметить, что для рек снегово-дождевого питания годовой СВН более тесно связан с летними осадками, чем с зимними. Для рек снегового питания, в большинстве случаев, коэффициенты корреляции с летними осадками уступают коэффициентам корреляции с зимними осадками. Для рек обоих типов питания влияние температурного режима лета на СВН проявляется слабо, причем в большинстве случаев носит обратный характер. Значения парных коэффициентов корреляции СВН с температурой воздуха составляют от -0,355 до 0,304.

Наоборот, для рек снегово-ледникового и ледникового типов питания значения парных коэффициентов корреляции с осадками зимы и лета низки, и изменяясь соответственно в пределах -0,322÷0,596 и -0,385÷0,368, они всегда уступают по абсолютной величине значениям парных коэффициентов корреляции с температурой воздуха, меняющимся от 0,384 до 0,878. Наиболее высокие значения парных коэффициентов корреляции соответствуют рекам ледникового питания.

Определение коэффициентов регрессии, является одним из основных этапов расчета. Коэффициенты регрессии (α_{01}, α_{02}, α_{03}) вычисляются путем решения системы из трех линейных (нормальных) уравнений:

$$\begin{cases} \alpha_{01} + r_{12} \cdot \alpha_{02} + r_{13} \cdot \alpha_{03} = r_{01} \\ r_{12} \cdot \alpha_{01} + \alpha_{02} + r_{23} \cdot \alpha_{03} = r_{02} \\ r_{13} \cdot \alpha_{01} + r_{23} \cdot \alpha_{02} + \alpha_{03} = r_{03} \end{cases} \quad (7)$$

Решение системы уравнений, с целью определения коэффициентов регрессии выполняется на основе применения способа Крамера по следующей последовательности. Сначала определяется главный минор:

$$\Delta_{00} = \begin{vmatrix} 1 & r_{12} & r_{13} \\ r_{21} & 1 & r_{23} \\ r_{31} & r_{32} & 1 \end{vmatrix}, \quad (8)$$

Определители системы линейных уравнений рассчитываются по выражениям:

$$\Delta_{01} = \begin{vmatrix} r_{01} & r_{12} & r_{13} \\ r_{02} & 1 & r_{23} \\ r_{03} & r_{32} & 1 \end{vmatrix}, \quad \Delta_{02} = \begin{vmatrix} 1 & r_{01} & r_{13} \\ r_{21} & r_{02} & r_{23} \\ r_{31} & r_{03} & 1 \end{vmatrix}, \quad \Delta_{03} = \begin{vmatrix} 1 & r_{12} & r_{01} \\ r_{21} & 1 & r_{02} \\ r_{31} & r_{32} & r_{03} \end{vmatrix}. \quad (9)$$

Зная значения главного минора и определителей, можно рассчитать соответствующие, попарно взятым исходным переменным, коэффициенты регрессии:

$$\alpha_{0j} = \frac{\Delta_{0j}}{\Delta_{00}} \ . \quad (10)$$

Ошибки коэффициентов регрессии определяются по формуле:

$$\sigma_{0j} = \sqrt{\frac{1 - r_0^2}{N - \ell}} \cdot \frac{\Delta_{0j}}{\Delta_{00}}, \quad (11)$$

где: j=1, 2, 3; ℓ - число аргументов; Δ_{00} - минор определителя Δ_{0j}, соответствующий его элементу r_{jj} =1.

Пределы изменения вычисленных значений коэффициентов регрессии для разных типов питания рек, представлены в таблице 2. Они входят в искомое уравнение нормализованной регрессии, имеющий общий вид (12).

Описанным выше методом для всех изучаемых рек были получены уравнения нормализованной регрессии, имеющие общий вид:

$$U_0(R) = \alpha_{01} \cdot U_1(X_з) + \alpha_{02} \cdot U_2(X_л) + \alpha_{03} U_з(t_л). \quad (12)$$

Как видно из этого выражаения, полученные уравнения отличаются для различных рек только значениями коэффициентов регрессии.

Теснота связи между СВН и определяющими его переменными характеризуются значениями полных (или сводных) коэффициентов множественной корреляции (r_0). Их значения рассчитываются по следующей формуле:

$$r_0 = \sqrt{|r_{01} \cdot \alpha_{01}| + |r_{02} \cdot \alpha_{02}| + |r_{03} \cdot \alpha_{03}|} \ . \quad (13)$$

Средние квадратические ошибки полных коэффициентов множественной корреляции вычисляются по выражению:

$$\sigma_{r_0} = \frac{1 - r_0^2}{\sqrt{N - \ell}}, \quad (14)$$

где ℓ - число аргументов, в нашем случае ℓ = 3.

Таблица 2

Параметры уравнений нормализованной регрессии

Тип питания*	Пределы изменения			
	коэффициентов регрессии			полных коэффициентов корреляции, r_0
	α_{01}	α_{02}	α_{03}	
Бассейн реки Амударьи				
С – Д**	0,52 ÷0,67	0,28 ÷0,70	-0,22 ÷-0,06	0,78 ÷ 0,89
С	0,40 ÷ 0,64	0,25 ÷ 0,51	-0,15 ÷ 0,25	0,71 ÷ 0,84
С – Л	0,30 ÷ 0,64	-0,24 ÷ 0,43	0,37 ÷ 0,71	0,69 ÷ 0,77
Л	-0,37 ÷ 0,44	-0,30 ÷ 0,38	0,63 ÷ 0,95	0,71 ÷0,94
Бассейн реки Сырдарьи				
С – Д	0,52 ÷ 0,68	0,30 ÷ 0,46	-0,34 ÷ -0,03	0,72 ÷ 0,85
С	0,52 ÷0,68	0,24 ÷ 0,34	-0,10 ÷ -0,03	0,74 ÷ 0,82
С – Л	0,22 ÷ 0,45	-0,20 ÷ 0,28	0,56 ÷ 0,72	0,54 ÷0,69
Л	0,22 ÷ 0,24	-0,23 ÷-0,16	0,59 ÷0,62	0,68 ÷ 0,72

*Примечание: * - число пунктов обработки согласно типам питания указаны в таблице 3.1; ** С - Д - снегово-дождевое, С - снеговое, С - Л - снегово-ледниковое, Л - ледниковое.*

Полученные для различных рек уравнения нормализованной регрессии характеризуются довольно высокими значениями полных коэффициентов корреляции, которые колеблются в пределах от 0,56±0,12 до 0,94±0,03.

Выводы:

1. Для рек снегово-дождевого и снегового типов питания парные коэффициенты корреляции СВН как с зимними, так и летними осадками имеют положительный знак и колеблются, соответственно, в интервале 0,337-0,811 и 0,419-0,712. Необходимо отметить, что для рек снегово-дождевого питания годовой СВН более тесно связан с летними осадками, чем с зимними;

2. Осуществлена первичная оообработка, систематизация и обобщения как научных, так и исходных материалов по атмосферным осадкам, стоку воды, речным наносам рек изучаемой территорий за многолетний период. Создан специализированный банк данных по стоку воды, речным наносам, атмосферным осадкам и температуре воздуха;

3. Разработана методика расчета многофакторной связи между показателем водной эрозии - СВН исследуемых рек и климатическими факторами – атмосферными осадками разных сезонов (зимы и лета) и температурой воздуха. Здесь речные наносы рассматриваются как

интегральный показатель интенсивности водной эрозии, протекающей в речных бассейнах в результате влияния поверхностных вод, формирующихся за счет жидких атмосферных осадков, талых снеговых и ледниковых вод;

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ДИДАКТИЧЕСКИЕ ВОЗМОЖНОСТИ ТЕХНОЛОГИЙ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В РАЗВИТИИ КОМПОЗИЦИОННОГО МЫШЛЕНИЯ СТУДЕНТОВ ВУЗОВ

Аннотация: *В данной работе рассматриваются дидактические возможности технологий искусственного интеллекта в развитии композиционного мышления студентов вузов Узбекистана. Анализируется процесс внедрения методики «Интерактивного композиционного моделирования с использованием искусственного интеллекта», направленной на формирование у обучающихся аналитико-творческого подхода к построению визуальных структур. Особое внимание уделяется аспектам применения цифровых инструментов, которые способствуют развитию способности студентов к анализу, синтезу и интерпретации композиционных элементов в образовательной среде. В статье предоставляются результаты экспериментального исследования, подтверждающие эффективность использования ИИ-технологий в процессе обучения.*

Ключевые слова: *искусственный интеллект, композиция, мышление, образование, студенты, методика, инновации, творчество, анализ, развитие*

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DIDACTIC POTENTIAL OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN THE DEVELOPMENT OF COMPOSITIONAL THINKING OF UNIVERSITY STUDENTS

***Abstract**: This paper examines the didactic potential of artificial intelligence technologies in developing students' compositional thinking at Uzbek universities. It analyzes the implementation of the "Interactive Compositional Modeling Using Artificial Intelligence" methodology, which aims to develop students' analytical and creative approaches to constructing visual structures. Particular attention is paid to the application of digital tools that facilitate the development of students' ability to analyze, synthesize, and interpret compositional elements in an educational environment. The article presents the results of an experimental study confirming the effectiveness of using AI technologies in the learning process.*

***Keywords**: artificial intelligence, composition, thinking, education, students, methodology, innovation, creativity, analysis, development*

Введение: В Узбекистане дидактические возможности технологий искусственного интеллекта активно интегрируются в образовательный процесс вузов, способствуя развитию композиционного мышления студентов. Использование ИИ позволяет формировать у будущих педагогов и дизайнеров способность к аналитическому и творческому осмыслению структуры, гармонии и целостности учебных и художественных композиций.

Методика интерактивного композиционного моделирования с использованием искусственного интеллекта. Данная методика разработана на основе идей А. А. Вербицкого (1991) о контекстном обучении и современных исследований в области применения искусственного интеллекта в педагогике (С. Н. Гуриева, 2023). Она направлена на развитие композиционного мышления студентов педагогических и художественных вузов посредством

интеграции ИИ-платформ, способных анализировать, визуализировать и корректировать творческие проекты обучающихся. Основу методики составляет принцип интерактивного моделирования, при котором студент не только создает композицию, но и взаимодействует с интеллектуальной системой, получая обратную связь по структуре, цветовым решениям и логике построения формы. Актуальность методики обусловлена реформированием системы высшего образования Узбекистана и необходимостью подготовки специалистов, владеющих современными цифровыми и аналитическими компетенциями. Применение данной методики способствует формированию у обучающихся навыков визуального анализа, проектного мышления и способности к интеграции традиционных и инновационных подходов в композиции.

Результаты проведённого исследования по методике «Интерактивного композиционного моделирования с использованием искусственного интеллекта» показали значительное повышение уровня сформированности композиционного мышления у студентов педагогических вузов Узбекистана. После шести месяцев экспериментального обучения 78% участников продемонстрировали улучшение способности к структурному анализу и логическому построению визуальных образов, тогда как в контрольной группе аналогичный показатель составил лишь 43%.

Педагогическое наблюдение и экспертная оценка выявили, что применение искусственного интеллекта в процессе композиционного моделирования способствует формированию интегративного типа мышления, сочетающего художественную интуицию и аналитическую точность. 85% студентов отметили, что взаимодействие с ИИ-платформами позволило им глубже понять принципы гармонии, симметрии и пропорции, а также научиться анализировать собственные работы с позиции профессиональных критериев. Таким образом, исследование подтвердило эффективность предложенной методики как инновационного инструмента развития творческих и когнитивных компетенций будущих специалистов.

Таблица 1. Оборудование, использованное в эксперименте по методике «Интерактивного композиционного моделирования с использованием искусственного интеллекта»

№	Наименование оборудования	Назначение в исследовании	Технические характеристики	Количество единиц
1	Персональные компьютеры с установленным ИИ-программным обеспечением (Midjourney, ChatGPT, Canva AI)	Проведение интерактивных занятий, создание и анализ композиционных проектов	Процессор Intel Core i7, 16 GB RAM, графический адаптер RTX 3060	10
2	Интерактивная доска SMART Board	Демонстрация ИИ-анализов и коллективное обсуждение творческих решений	Сенсорный экран 86", разрешение 4K, поддержка Wi-Fi	1
3	Графические планшеты Wacom Intuos	Разработка и корректировка визуальных композиций с использованием ИИ-инструментов	Активная область 216×135 мм, чувствительность к нажатию 4096 уровней	5

Заключение: Основываясь на вышеуказанных данных, можно сделать вывод, что внедрение технологий искусственного интеллекта в образовательный процесс вузов Узбекистана не просто расширяет дидактические горизонты, а формирует совершенно новую культуру мышления — синтез цифрового анализа и творческого воображения. Использованное оборудование стало не инструментом, а партнёром в учебном процессе, помогая студентам видеть закономерности композиции, чувствовать ритм формы и осознанно управлять художественным пространством.

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НАСОС СТАНЦИЯЛАР МЕТАЛЛ БОСИМЛИ СУВ ҚУВУРЛАРИ БИОЛОГИК КОРРОЗИЯСИ

Аннотация: *Ушбу мақолада Ер остига кўмилган қувурлар нафақат ичидаги тўлдиргичнинг босимига дош бериши, бундан ташқари грунт тарафидан бериладиган ташқи юкламалар транспорт иншоотидан таъсир этадиган ва бўлиши мумкин бўлган грунт сувлари таъсиридан ҳосил бўладиган ташқи юкламаларга ҳисобланиши.*

Калит сўзлар: *Ташқи юклама таъсирида, грунт, ер ости қувурлари, пластмасса қувурлар.*

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BIOLOGICAL CORROSION OF METAL PRESSURE WATER PIPES IN PUMPING STATIONS

Annotation: *This article discusses that underground pipelines must withstand not only the internal pressure of the fluid they carry, but also external loads caused by soil pressure, the impact of transportation structures, and possible effects of groundwater.*

Keywords: *external load impact, soil, underground pipelines, plastic pipes.*

Босим қувурларининг сезиларли даражада ейилиши насос станциясининг ишлаши ва хавфсизлигига жиддий хавф туғдиради. Юқорида қайд қилинган барча насос станцияларини ўрганишда, қувурларнинг емирилишининг энг кенг тарқалган тури бўлиб қувур деворлари ейилиши ва вибрациянинг биргаликдаги таъсирида метал чарчаши оқибида бўлган емирилишлар сабабли тешиклар ва ёриқлар ҳосил бўлиши ҳисобланади.

Лойқаланиш даражаси юқори бўлган дарё сувлари ҳайдаш шароитида босим қувурларнинг асосий ейилиши тури бўлиб босим қувури деворининг ички юзасининг биокорозив ейилиши ҳисобланади.Бундан ташқари, «Тўрақўрғон-1”насос станцияларидаги тадқиқотлар шуни кўрсатдики, босим қувурларининг ейилишида металлнинг оддий ва ўчоқли биологик коррозияси муҳим роль ўйнайди. Босим қувурлари деворларининг қолдиқ қалинлигини ўлчаш маълумотлари бўйича амалга оширилган хисоблар, ўртача йилига 0,08-0,15 мм ейилиши тезлигида, босим қувурлари деворининг ейилиш даражаси 45-55% ни ташкил қилади. Ейилиш кесимнинг периметри бўйлаб нотекис

тақсимланади, сезиларли даражада ейилиш қувур линиясининг пастки қисмига тўғри келади.

Босим қувури барқарорлигини ички ва ташқи юкларнинг таъсирига нисбатан статик ва гидродинамик ҳисоблаш шуни кўрсатадики, баъзи насос станцияларида босим қувурлари алоҳида аҳамиятга эга шароитларда ишлайди .

Босим қувурининг узлуксиз ишлаши давомида девор қалинлиги доимий равишда камайиб бориши сабабли, ушбу қувур тармоғини босим қувурининг қолдиқ девор қалинлигини қабул қиладиган юклардан кучланишига қарши мустаҳкамликка текшириш керак бўлади.

Босим қувурида пайдо бўладиган кучланишларни қуйидагиларга бўлиш мумкин: ҳалқасимон кучланишлар, ўқий кўндаланг кучланишлар. Улар асосан насос қурилмасининг статик иш жараёнида пайдо бўлади.

Босим қувурларида чўкинди ҳаракатланиш режимини ўрганиш шуни кўрсатдики, қувур тармоғининг алоҳида участкаларида қаттиқ зарралар оқимининг механик таъсирига боғлиқ эканлиги маълум бўлди.

Босим қувурларида ёриқлар пайдо бўлиши, қувур ички юзаси нотекис ғадир будирлиги, қувурнинг коррозияси сабабларини ўрганиш зарурлигига олиб келди.

Шу мақсадда насос станциясининг қувурларида био-коррозия ва стресс-коррозия учрашини аниқлаш бўйича махсус тадқиқотлар ўтказилди.

Тадқиқотнинг объекти бўлиб, қувур ўтказгичнинг алоҳида участкаларидан, яъни, сўрувчи қувур ва тиндиргичдан олинган лойқа, қум, занг ва сув намуналари хизмат қилди. Назорат сифатида келаётган каналдан станцияга тушадиган сув хизмат қилди. Микробиологик тахлил умум қабул қилинган тадқиқотларнинг классик усулларида ўтказилган. Лаборатория кўзатув ишларида коррозия жараёнида қатнашадиган микроорганизмларнинг физиологик фаол гуруҳини аниқлаш учун қуйидаги озуқавий муҳитлар ишлатилди:

Микроорганизмларни сапрофит шакли учун балиқли гидролизат;

1. Кислота ҳосил қилувчи микроорганизмларни аниқлаш учун глюкоза-минералли муҳит;
2. Денитрифицияловчи бактерияларни аниқлаш учун Гильтай муҳити;
3. Нитрифицияловчи бактериялар учун Виноградский муҳити;
4. Мицелиал замбуруғлар учун Чапека муҳити;
5. Темир-оксидловчи бактериялар учун 9К муҳити;
6. Сульфатни қайта тикловчи бактериялар учун муҳит.

Суюқ намуналарнинг pH қиймати 6,8-7,2, қаттиқ намуналарнинг намлиги 10-20%, хлоридлар таркибда бўлиши 100 г қумда 60 мг гача ташкил этади.

Тадқиқот олиб борилган муҳитларда олинган намуналардан ажратиб олинган микроорганизмларнинг турли ҳил физиологик гуруҳи ўртача сони 1 ва 2 жадвалларда тақдим этилган. Жадвалдаги маълумотлар шуни кўрсатадики, аксарият намуналарда барча кўрсатилган гуруҳларнинг

микроорганизмлари топилган.Энг кўп тарқалганлари эса кислота ҳосил қилувчи, денитрифияцияловчи ва нитрифицияловчи бактериялардир. Уларнинг умумий сони суюқ намуналарида 10^2 кл/мл даг 10^5 кл/мл гачани, қаттиқ намуналарда эса 10^3 кл/мл даг 10^6 кл/мл гачани ташкил қилди. Шуни таъкидлаш керакки, насос агрегатларининг сўрувчи қувуқ, босимли қувур линияси ва тиндиргичдан олинган сув намуналаридаги микроорганизмлар сони 10^2 …10^5 кл/мл атрофида бўлди, лекин темир-оксидловчи бактериялар ва сульфатни қайта тикловчи бактериялар аниқланмади.

Насос станциялари сувларида микроорганизмларнинг физиологик гуруҳи ўртача сони,кл/мл

1-жадвал

Намуна №	Намуна олинган жой	темир-оксидловчи	сульфатни қайта тикловчи	денитрификацияловчи	нитрификацияловчи	кислота ҳосил қилувчи	Сапро-фитлар	Минерал замбуруғлар
1	2	3	4	5	6	7	8	9
1	Насос станциясига келиб тушадиган сув	-	-	$2,0x10^3$	$2,5x10^2$	$2,0x10^3$	$5,2x10^5$	$2,0x10^1$
2	Насоснинг сўрувчи қувуридан олинган сув	-	-	$2,5x10^5$	$2,5x10^2$	$5,3x10^5$	$5,2x10^5$	$1x10^3$
3	7-сонли қувурдан олинган сув	-	-	$6,0x10^4$	-	$3,5x10^4$	$5,6x10^5$	$2x10^2$
4	тиндиргичдан олинган сув	-	-	$5x10^3$	$2,5x10^3$	$3,0x10^5$	$8,4x10^6$	$5x10^3$

Сапрофитларнинг умумий сони 10^5…10^6 кл/мл, сув намуналарида кислота ҳосил қилувчилар эса 10^2 …10^3 кл/мл ва қаттиқ намуналарда 10^4…10^5 кл/г ташкил этиб, тадқиқот қилинайтган объектларда микробли коррозия жрайнларининг содир бўлайтганлигини исботлади.

Тақдим этилган маълумотлар микроорганизмларнинг тадқиқот қилинаётган гуруҳларидаги интеграл фаолликни акс эттиради ва бизнинг назаримизда, насос станцияларининг босим қувурлари стресс коррозияга учраши хавфининг асосий мезонига хизмат қилиши мумкин.

Шундай қилиб, ўтказилган дастлабки тадқиқотлар босим қувурларнинг емирилишларининг био-коррозия ўчоқларини кўпайишига олиб келиши мумкин бўлган био-коррозия жараёнларнинг ривожланишини кўрсатади.

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ФОРМИРОВАНИЕ ПРАКТИЧЕСКИХ НАВЫКОВ И ВОСПИТАТЕЛЬНЫХ КАЧЕСТВ ЧЕРЕЗ ИНТЕРАКТИВНЫЕ МЕТОДЫ В НАУКЕ «ЧЕЛОВЕК И ЕГО ЗДОРОВЬЕ»

Аннотация. *Данная разработка урока демонстрирует модель преподавания важного раздела предмета «Человек и его здоровье» — темы «Первая помощь при кровотечениях из сосудов» с использованием интерактивных методов обучения. Урок позволяет учащимся не только получить теоретические знания, но и сформировать практические навыки. Используемые методы — «Вопрос-ответ», «Ролевая игра», «Инсерт», «Мозговой штурм» и «Сеть» — способствуют активному вовлечению учащихся в процесс обучения, расширяют их мышление и закрепляют знания. В ходе занятия учащиеся чувствуют себя «маленькими врачами», развивая гуманность, ответственность и умение быстро принимать решения. Урок также имеет воспитательное значение, формируя у учащихся уважение к жизни и чувство социальной ответственности.*
Ключевые слова: *Человек и его здоровье, кровь, кровотечение, первая помощь, интерактивные методы, воспитательное значение, практические навыки, деятельность учащихся.*

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DEVELOPING PRACTICAL SKILLS AND EDUCATIONAL ABILITIES THROUGH INTERACTIVE METHODS IN THE SCIENCE OF "HUMANITY AND HEALTH"

Abstract. *This lesson plan presents a model for teaching an important section of the subject "Human and His Health" — the topic "First Aid for Bleeding from Blood Vessels" using interactive teaching methods. The lesson enables students not only to gain theoretical knowledge but also to develop practical skills. The applied methods — "Question and Answer", "Role Play", "Insert", "Brainstorming", and "Network" — engage students actively in the learning process, expand their thinking, and strengthen their knowledge. During the lesson, students act as "young doctors," developing qualities such as humanity, responsibility, and quick decision-making. The lesson also has an educational and moral significance, fostering respect for life and a sense of social responsibility among students.*

Keywords: *Human and His Health, blood, bleeding, first aid, interactive methods, educational value, practical skills, student activity.*

Тема: *Оказание первой помощи при кровотечениях из сосудов*
Класс: *8-й класс*
Продолжительность урока: *45 минут*
Тип урока: *Урок усвоения новых знаний и практического занятия*
Предмет: *Человек и его здоровье*
Методы урока: *Интерактивные методы обучения – «Вопрос-ответ», «Ролевая игра», «Инсерт», «Мозговой штурм», «Сеть»*
Оборудование: *Модель кровеносных сосудов, бинт, марля, резиновый жгут, маркер, раздаточные материалы, слайды, видеоролик*
Цели урока:
Образовательная: *Научить учащихся различать виды кровотечений (артериальное, венозное, капиллярное) и объяснить порядок оказания первой помощи с помощью практических примеров.*
Воспитательная: *Формировать у учащихся уважение к человеческой жизни, ответственность, умение быстро принимать решения и готовность прийти на помощь. Развивать чувство сотрудничества, коллективизма и гуманизма.*

Развивающая: *Развивать аналитическое мышление, способность к самостоятельному принятию решений, умение сочетать слово и практическое действие, прививать ценности здорового образа жизни.*
Ожидаемые результаты:

Учащиеся смогут различать виды кровотечений. Будут знать, как оказывать первую помощь в каждой ситуации. Научатся правильно использовать перевязочные средства. Поймут необходимость защиты себя и окружающих.
Ход урока (45 минут):

Этапы	Время (мин.)	Деятельность учителя	Деятельность учащихся	Метод
1. Организационный момент	3	Приветствует, подготавливает класс, объявляет тему и цель урока.	Готовятся к занятию, открывают тетради.	-
2. Повторение предыдущей темы	7	Задает вопросы о строении крови, сердце и кровеносных сосудах.	Отвечают на вопросы.	*Вопрос-ответ*
3. Изучение новой темы	15	Приводит жизненный пример: «У вашего друга идет кровь из запястья. Что вы будете делать?» Делит класс на группы, проводит ролевую игру.	Работают в группах: показывают ситуации артериального, венозного и капиллярного кровотечения.	*Ролевая игра*

4. Закрепление	10	Раздает короткий текст. Учащиеся ставят обозначения по методу «Инсерт». Вопрос: «Какой вид кровотечения самый опасный?»	Читают текст и ставят знаки: (+) знал, (–) новое, (?) непонятно.	*Инсерт*
5. Оценивание	5	Вопрос: «Какова последовательность действий при кровотечении?» Учащиеся высказывают мнение, правильный ответ записывается на доске.	Высказывают мнения, составляют последовательность действий.	*Мозговой штурм*
6. Заключительный этап	5	С помощью метода «Сеть» обобщает тему. В центре пишет «Первая помощь», вокруг — слова: Внимание, Знание, Мужество, Ответственность, Помощь.	Размещают слова на схеме, делают вывод.	*Сеть*

Вопросы для учащихся: 1. Из каких основных компонентов состоит кровь? 2. Назовите основные функции крови. 3. Где находится сердце и какова его основная функция? 4. Из скольких отделов состоит сердце? 5. В чем разница между артериями, венами и капиллярами? 6. На какие части делится система кровообращения? 7. В каком направлении движется малый круг кровообращения? 8. Какое вещество придаёт крови красный цвет? 9. Как измеряется частота сердечных сокращений и сколько ударов в минуту делает сердце в норме? 10. Почему важно, чтобы кровеносные сосуды были здоровыми?

Вопросы для учащихся: 1. Из чего состоят основные компоненты крови? 2. Перечислите основные функции крови. 3. Где находится сердце и какова его основная функция? 4. Из скольких отделов состоит сердце? 5. В чем разница между артериями, венами и капиллярами? 6. На какие части делится кровеносная система? 7. В каком направлении движется малый круг кровообращения? 8. Какое вещество придает крови красный цвет? 9. Как измеряется частота сердечных сокращений и сколько ударов в минуту у здорового человека? 10. Почему важно, чтобы кровеносные сосуды были здоровыми? Дополнительный вопрос (бонус): Что, по вашему мнению, происходит, если кровеносные сосуды повреждены? Ключ для учителя: 1. Состав крови: плазма и форменные элементы (эритроциты, лейкоциты, тромбоциты). 2. Функции крови: транспортная (перенос кислорода и питательных веществ), защитная (борьба с микробами), терморегуляция (поддержание температуры тела). 3. Расположение сердца: слева в грудной клетке; основная функция – перекачивать кровь и поддерживать работу кровеносной системы. 4. Отделы: 4 — правое и левое предсердия, правый и левый желудочки. 5. Разница: артерии выносят кровь из сердца, вены приносят к сердцу, капилляры — самые мелкие сосуды, где происходит обмен веществ. 6. Кровообращение делится на большой и малый

круги. 7. Малый круг кровообращения: правый желудочек → легочная артерия → капилляры легких → легочные вены → левое предсердие. 8. Вещество, придающее красный цвет: гемоглобин (белок в составе эритроцитов). 9. Частота сердечных сокращений измеряется пульсом; в норме составляет 60–80 ударов в минуту. 10. Значение здоровья сосудов: если кровообращение останавливается, органы не получают кислород и питательные вещества, что опасно для жизни. Ответ на бонусный вопрос: если сосуд поврежден, идет кровь; в этом случае необходимо оказать первую помощь — это тема сегодняшнего урока.Рекомендации для учителя: после каждого правильного ответа давайте краткий комментарий и поощрение: «Молодец!», «Отлично!», «Правильно запомнили». После бонусного вопроса переходите к новой теме: «Сегодня мы научимся, как правильно оказывать помощь при повреждении сосудов». Пояснение новой темы (15 минут). Метод: «Ролевая игра». Цель: расширить знания учащихся о кровеносной системе человека, различать виды кровотечений (артериальное, венозное, капиллярное), определять их признаки и правильно выполнять этапы первой помощи. Также развивать уважение к жизни, гуманизм, сострадание, ответственность, внимательность, умение сохранять спокойствие в чрезвычайных ситуациях, принимать быстрые и правильные решения, помогать другим, а также навыки здорового образа жизни, культуру безопасности и осторожность в повседневной жизни. Объяснение для учителя (простыми и понятными шагами): через жизненную ситуацию (2 минуты): «Представьте, что ваш друг упал и у него кровотечение из запястья. Что вы будете делать?» Обсудите ответы учеников: «Наложу бинт», «Вызову скорую помощь», «Подниму руку». Скажите: «Сегодня мы научимся действовать правильно в такой ситуации». Разделение на группы (2 минуты): класс делится на 3 группы: 1-я — артериальное кровотечение, 2-я — венозное, 3-я — капиллярное. Каждая группа получает инструкции (тип крови, признаки, этапы первой помощи). Ролевая игра — практическая демонстрация (8 минут): каждая группа готовит «мини-сценку» и показывает её. Учитель наблюдает и помогает при необходимости. Пример инструкций: 1-я группа — артериальное кровотечение. Признак: кровь ярко-красная, пульсирует. Первая помощь: прижать пальцем место кровотечения, выше раны наложить резинку или платок, поднять руку вверх, вызвать врача. 2-я группа — венозное кровотечение. Признак: кровь тёмно-красная, течёт непрерывно. Первая помощь: прижать чистой тканью, плотно забинтовать, поднять руку, обратиться за медицинской помощью. 3-я группа — капиллярное кровотечение. Признак: мелкие капли, небольшое количество крови. Первая помощь: промыть рану чистой водой или антисептиком, слегка забинтовать. Заключение учителя (3 минуты): после демонстраций сделайте вывод: «При кровотечении сначала сохраняем спокойствие, прижимаем рану, при необходимости бинтуем и вызываем медицинскую помощь. Наиболее опасное кровотечение — артериальное, так как кровь выходит очень быстро».

Тип крови	Признаки	Первая помощь
Артериальное	Ярко-красная, бьет фонтаном	Наложить жгут выше раны
Венозное	Темно-красная, течет непрерывно	Прижать бинтом и наложить давящую повязку
Капиллярное	Мелкие капли, течет немного	Очистить и наложить легкую повязку

ОСНОВНЫЕ ПОНЯТИЯ: АРТЕРИАЛЬНОЕ КРОВОТЕЧЕНИЕ: ЯРКО-КРАСНАЯ, БЬЕТ ФОНТАНОМ – ОПАСНОЕ СОСТОЯНИЕ. ВЕНОЗНОЕ КРОВОТЕЧЕНИЕ: ТЕМНО-КРАСНАЯ, ТЕЧЕТ НЕПРЕРЫВНО. КАПИЛЛЯРНОЕ КРОВОТЕЧЕНИЕ: ЛЕГКОЕ, В ВИДЕ МЕЛКИХ КАПЕЛЕК. ПЕРВАЯ ПОМОЩЬ: ПРИЖАТЬ РАНУ → НАЛОЖИТЬ БИНТ → ПОДНЯТЬ КОНЕЧНОСТЬ → ВЫЗВАТЬ МЕДИЦИНСКУЮ ПОМОЩЬ. КРИТЕРИИ ОЦЕНКИ: УЧЕНИК ДОЛЖЕН ПРАВИЛЬНО ОПРЕДЕЛИТЬ ТИП КРОВОТЕЧЕНИЯ, ПРАВИЛЬНО И ПОЛНОСТЬЮ ВЫПОЛНИТЬ ВСЕ ЭТАПЫ ПЕРВОЙ ПОМОЩИ, ПРОДЕМОНСТРИРОВАТЬ ПРАКТИЧЕСКИЕ НАВЫКИ, СОБЛЮДАТЬ ПРАВИЛА БЕЗОПАСНОСТИ И АКТИВНО УЧАСТВОВАТЬ В РАБОТЕ ГРУППЫ.

Вид деятельности	Макс. балл	Критерий оценки
Участие в вопрос-ответ	2	Правильные и активные ответы
Участие в ролевой игре	3	Правильное выполнение практического задания
Активность в Insert	2	Правильное размещение и анализ признаков
Предложения в «мозговом штурме»	2	Быстрое и логичное мышление
Воспитательный вывод	1	Гуманность, готовность помочь
Итого:	**10 баллов**	

Рекомендации для раздаточных материалов

Мини-тест (3 вопроса):

1. Какой тип кровотечения является наиболее опасным?
   a) Артериальное
   b) Венозное
   c) Капиллярное
2. Первый шаг первой помощи при кровотечении:
   a) Вызвать медицинскую помощь
   b) Прижать место раны
   c) Наложить повязку
3. Что делать, когда кровотечение остановилось?
   a) Снять повязку
   b) Укрепить повязку
   c) Продезинфицировать рану

Практические рекомендации: Организовать в каждом классе медицинский уголок и обеспечить его средствами первой помощи. Проводить регулярные практические занятия через мини-кружок «Маленькие врачи». В ходе урока поощрять размышления учащихся о здоровом образе жизни, медицинской культуре и правильных действиях в экстренных ситуациях. При оценке практической деятельности учащихся обращать внимание на активность, коллективность, инициативность и правильное выполнение практических заданий. Использовать презентации, видеоролики и ролевые сценки для оживления урока и лучшего запоминания материала. После урока дать учащимся задание на краткую рефлексию на тему «Что из сегодняшнего урока может пригодиться в жизни?». Использование реальных жизненных примеров и коротких видеороликов повышает эффективность урока. В ролевой игре применять бинты, марлю и резиновую ленту для большей наглядности. Номинации «Самый внимательный помощник» или «Быстрый врач» мотивируют учащихся.

Вывод: На этом уроке учащиеся учатся применять полученные знания на практике, принимать быстрые решения и ощущать ответственность за человеческую жизнь. Они понимают важность умения держать себя в сложных жизненных ситуациях, помогать другим и проявлять гуманность, осознавая, что высшая ценность — это сохранение здоровья человека. В процессе урока учащиеся активно участвуют, учатся слушать друг друга, работать в команде, высказывать свои мысли и делать правильные выводы. Каждый ученик чувствует себя «маленьким врачом» и получает практические знания и навыки, необходимые в реальной жизни. Этот урок не только даёт медицинские знания, но и имеет глубокое воспитательное значение, формируя уважение к жизни, коллективизм, ответственность и оперативность. Через интерактивные методы учащиеся становятся

активными, самостоятельными и социально ответственными личностями. Применяемые в уроке интерактивные методы воспитывают активность, самостоятельность и социальную ответственность учащихся.

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ФОРМИРОВАНИЕ КУЛЬТУРЫ ЗДОРОВЬЯ И ВОСПИТАТЕЛЬНЫХ ЦЕННОСТЕЙ У УЧАЩИХСЯ ПОСРЕДСТВОМ ИНТЕРАКТИВНЫХ МЕТОДОВ ОБУЧЕНИЯ НА УРОКАХ ПО ПРЕДМЕТУ «ЧЕЛОВЕК И ЕГО ЗДОРОВЬЕ»

Аннотация: *В данной статье представлена информация об использовании интерактивных методов в преподавании биологии (человека и его здоровья) и об их значении.*

Ключевые слова: *Биология, образование, педагогика, интерактивные методы, инновации, воспитание, биологическое картографирование,, творческие задания, урок, внеклассная работа.*

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FOSTERING A CULTURE OF HEALTH AND EDUCATIONAL VALUES IN STUDENTS THROUGH INTERACTIVE TEACHING METHODS IN "PEOPLE AND THEIR HEALTH" LESSONS

Abstract. *This article provides information on the use of interactive methods and their importance in teaching biological sciences.*

Keywords: *biology, education, pedagogy, interactive methods, innovations, education, biological mapping, creative tasks, lesson, extracurricular activities.*

Введение. В настоящее время в развитии интеллектуального потенциала учащихся и студентов особое значение приобретает образование, основанное на единстве обучения и воспитания, а также на научном и системном подходе к передаче знаний. Наряду с этим, рациональное использование современных педагогических подходов и информационных технологий способствует повышению эффективности учебного процесса. Основная задача современного педагога заключается не в передаче готовых знаний, а в содействии учащимся в их самостоятельном освоении. Для этого необходимо совершенствовать процесс обучения и воспитания таким образом, чтобы создать условия, при которых каждый ученик сможет в полной мере раскрыть свои способности и возможности, направив все усилия на получение знаний. Из этого следует, что одной из важнейших задач педагогов, работающих в системе преподавания биологических наук,

является повышение интереса учащихся к освоению основ предмета, развитие их самостоятельного и творческого мышления, а также обеспечение гармоничного и всестороннего развития личности.

Быстро развивающееся современное общество предъявляет особые требования к выпускнику средней школы. Специалист в любой сфере деятельности должен быть активным и коммуникабельным, стремиться к постоянному саморазвитию, быть готовым осваивать новейшие технологии, принимать самостоятельные решения, легко адаптироваться в социальном и профессиональном плане, уметь работать в коллективе и находить выход из любой стрессовой ситуации.[43] Инновационные технологии играют важную роль в решении возникающих проблем. Уроки, организованные на основе таких технологий, отличаются богатым содержанием, наглядностью и интерактивностью, способствуют экономии учебного времени и создают условия для получения знаний каждым учащимся с учётом его индивидуальных возможностей. При этом они дают учителю возможность вести образовательный процесс дифференцированно и с личностно-ориентированным подходом, контролировать результаты и осуществлять эффективное оценивание. Технология совместного обучения делает учащихся активными участниками учебного процесса. Такой подход позволяет им не только усваивать знания, но и развивать навыки анализа, самостоятельного мышления и поиска наиболее рациональных путей выхода из проблемных ситуаций. Применение подобных технологий на уроках биологии способствует профессиональной подготовке учащихся, а учителям — формированию умений проектировать учебные занятия в соответствии с современными требованиями и эффективно применять их на практике.

Анализ литературы

В Республике Узбекистан вопросы организации образования на основе инновационных технологий нашли своё отражение в работах ряда отечественных учёных, в частности Ж.К. Йўлдошева, И.Т. Азимова, А.К. Рахимова, Ж.О. Толиповой, Н.Ж. Тошманова, М.С. Усмоновой, Г.С. Эргашевой, Н. Каримовой, М.Г. Боратовой и других исследователей.

Методология исследования

В нормативных документах, принятых с целью повышения эффективности образовательного процесса по преподаванию биологических наук, особое внимание уделяется гармоничному использованию педагогических и информационных технологий. Действительно, в эпоху глобализации информации повышение эффективности обучения за счёт применения педагогических и информационных технологий в образовательном процессе является одной из актуальных задач. Система преподавания биологических дисциплин функционирует на основе государственных образовательных стандартов, обеспечивая преемственность образовательных программ

[43] Магомедова М.А., Магомедов Г.А., Джамалутдинова Т.М. Интерактивные методы как средство развития и самореализации школьников в процессе обучения биологии // Известия ДГПУ. 2017. Т. 11. № 2. С. 47-52.

различных уровней, и включает следующие виды образования:
a) дошкольное образование;
b) общее среднее образование;
c) среднее специальное, профессиональное образование;
d) высшее образование;
e) послевузовское образование;
f) внешкольное образование.

Биологическое образование играет огромную роль в жизни человека. Учитель биологии должен глубоко осознавать значение биологических знаний в деятельности и быту каждого человека и с уверенностью относиться к своей профессии. Именно эта уверенность служит важным фактором формирования у учащихся стремления к познанию природы, уважения к жизни и интереса к науке.

Анализ и обсуждение результатов

Высшие учебные заведения занимают важное место в обеспечении молодёжи прочными знаниями, выборе профессии и поиске своего места в обществе. Сегодня качество образования оценивается и на международном уровне через программы PIRLS и PISA. Известно, что по результатам международной программы PIRLS первое место стабильно занимает Россия. Анализируя успехи российских школьников, показавших высокие результаты, выяснилось, что 90% из них посещали дошкольные образовательные учреждения с 3–5 лет. Кроме того, в этих семьях уделялось большое внимание формированию интереса к книгам и регулярному чтению детям. Это даёт нам важный вывод: необходимо максимально рано — с 2–3 лет — вовлекать детей в образовательную среду и повышать качество дошкольного образования. Особенно при обучении естественным наукам важно использовать увлекательные занятия, ролевые игры и творческие задания, направленные на развитие любознательности и наблюдательности у детей. В современном образовании применение инновационных технологий и интерактивных методов на основе креативного подхода имеет большое значение. Такие задания помогают детям сосредоточиться, развивают мышление, воображение и интерес к обучению. Постижение природы через необычные образы, вопросы или творческие поиски сеет в их душе зерно любви к знаниям.Например, для учащихся 8-х классов можно предложить следующие творческие задания: 1.Если бы сердце человека умело говорить, что бы оно вам рассказало? 2.Представьте, что вы кровеносный сосуд — напишите короткий рассказ о своём путешествии по телу. 3.Если бы вы были нейроном мозга, как прошёл бы ваш рабочий день? 3.Какой орган человеческого тела вы считаете «самым самоотверженным» и почему? 4.Представьте, что вы витамин — в каких продуктах вы «живёте» и как помогаете человеку? 5.Если бы вы были иммунной клеткой, как бы вы боролись с вирусом, попавшим в организм? 6.Если бы человеческое тело было машиной, какими частями были бы сердце, мозг и лёгкие? 7.Представьте, что вы зрачок — что бы вы видели и какие эмоции это вызвало бы? 8.Если бы вы были послом здорового образа

жизни, какой лозунг вы бы придумали для своих друзей? 9.Если бы вы могли добавить новый «суперорган» в тело человека, какую функцию он выполнял бы? Следует подчеркнуть, что успешная работа с детьми, особенно в дошкольных учреждениях, возможна только тогда, когда педагог строит образовательный процесс на доверии. Учитель биологии должен демонстрировать высокий профессионализм, пробуждая у учащихся понимание важности изучения природы. Это требует не только глубоких знаний, но и сильной воли.

В общеобразовательных школах использование инновационных технологий на уроках и во внеурочной деятельности имеет решающее значение для обеспечения непрерывности и целостности образовательного процесса.

При преподавании биологии целесообразно использовать ряд интерактивных методов — “Ассесмент”, “Кейс-стади”, “Мозговой штурм”, “Инсерт”, а также методы “Органайзер” и “Энерджайзер” [44]. Помимо этого метода, предлагается использовать метод “Биологическая рефлексия”. Например, при использовании метода “Мозговой штурм” учащимся задаются жизненные, но требующие размышлений вопросы, что расширяет их мышление. Пример:

Вопрос: “Мы знаем, что человек не может жить без дыхания. Однако иногда человек делает глубокий вдох и может задерживать дыхание под водой на 2–3 минуты. Как, по вашему мнению, этот процесс осуществляется в организме?”

Такие вопросы активизируют у учащихся не только анатомические знания, но и развивают навыки представления, анализа физиологических процессов в организме и понимания сути здорового образа жизни.На начальном этапе занятия, построенные на простом наблюдении и объяснении, на уровне среднего образования можно обогатить методом кейсового изучения (case-study), дискуссиями, аналитическими вопросами и творческими заданиями. Это существенно развивает способность учащихся к самостоятельному мышлению, решению проблем и выведению научно обоснованных выводов. Метод “Биологическая рефлексия” направлен на формирование у учащихся научного, но при этом эмоционального и жизненного мышления о деятельности организма человека; обучение их пониманию собственного тела и осознанию ценности здорового образа жизни. В этом методе ученик выступает в роли «ощущающего» субъекта: он представляет себя определенным органом или физиологическим процессом, испытывает внутренние переживания и процессы, выражая их письменно или устно. Таким образом, ученик не просто заучивает материал - он ощущает, понимает и связывает знания с собственной жизнью.

[44] Bekpulatugli, Kulmamatov Bunyod. "THE WORLD OF PLANTS AND ITS PROTECTION IN UZBEKISTAN." *Frontline Social Sciences and History Journal* 3.05 (2023): 71-75.

Практические этапы применения: на подготовительном этапе учитель выбирает орган или процесс, соответствующий теме (например: сердце, дыхание, нервная система). На этапе воображения учащимся дается задание – “Представьте, что вы сердце...” или “Вы сейчас путешествуете по телу как молекула кислорода...”. На этапе рефлексии ученик описывает свои ощущения, изменения и процессы в виде короткого эссе, рисунка или устного объяснения. На этапе анализа работа обсуждается в группе, ученик делает научный вывод, исходя из собственных ощущений. На заключительном этапе учитель объясняет биологический процесс с научной точки зрения и связывает его с рефлексией. Ниже приведены примеры вопросов, которые можно использовать, адаптируя их к теме урока. Например, вопрос: “Представьте, что вы кислород. Проходя через нос и попадая в легкие, вы переживаете процесс газообмена. Какой путь вас ждет? Как вы наполняете тело жизнью?” Учительский ответ: “Я вхожу через нос в легкие, в альвеолах отдаю углекислый газ и соединяюсь с кровью, доставляю кислород ко всем клеткам тела. Благодаря этому организм получает энергию, работают сердце и мышцы, человек активен”. *Вопрос:* “Вы — легкие. Что чувствует ваше тело при каждом вдохе? Что вам необходимо и чего следует избегать?” *Учительский ответ:* “С каждым вдохом я принимаю воздух и снабжаю организм кислородом. Мне нужен чистый воздух, следует избегать пыли, дыма и вредных газов, иначе организму будет трудно”. *Вопрос:* “Вы — посланник дыхательной системы. Какие три совета вы дадите людям для здорового дыхания?” *Учительский ответ:* “Каждый день гуляйте на свежем воздухе; проветривайте помещения, держитесь подальше от дыма; занимайтесь спортом и укрепляйте дыхание”. *Вопрос:* “Представьте, что вы живете в пыльном и задымленном месте. Как бы жаловались ваши органы дыхания?” *Учительский ответ:* “Защитите нас от пыли и дыма! Нам тяжело жить, мы становимся уязвимыми к инфекциям!”. *Вопрос:* “Вы не можете дышать одну минуту. Что вы чувствуете? В чем для вас ценность воздуха?” *Учительский ответ:* “Телу тяжело, появляется головокружение и усталость. Я понимаю, насколько важен каждый вдох и что чистый воздух бесценен для жизни”. *Вопрос:* “Если вы альвеола в легких, как вы работаете при каждом вдохе? Как, по-вашему, человек должен вас защищать?” *Учительский ответ:* “Я обеспечиваю обмен кислорода и углекислого газа. Если меня не защитить, организм не получит достаточно кислорода. Человеку нужно избегать дыма, пыли и вредных газов”. *Вопрос:* “Если бы вы могли услышать голос молекулы воздуха в теле, что бы она сказала?” *Учительский ответ:* “С каждым вдохом я приношу энергию, цените меня и дышите чистым воздухом!”. *Вопрос:* “Почему иногда при глубоком вдохе мы чувствуем легкость? Можно ли назвать это внутренним “сигналом спокойствия”?” *Учительский ответ:* “При глубоком вдохе больше кислорода поступает в клетки, мозг и мышцы расслабляются. Да, это “сигнал спокойствия”, который показывает важность здорового дыхания”. Ожидаемый результат: у учащихся формируется единство научного мышления и эмоционального восприятия; развиваются

навыки креативного письма, выражения мыслей и биологического анализа; предмет связывается с жизнью, а биология становится наукой, которую чувствуют сердцем. Этот метод превращает ученика не в «наблюдателя организма», а в “живущего в организме”. В результате знания остаются в памяти, а наука проникает в душу. В общеобразовательных школах использование кейс-заданий на уроках биологии (например, в 8-м классе при изучении темы “Человек и его здоровье”) способствует развитию знаний, полученных в начальных классах, и помогает организовать нетрадиционные, творческие уроки.

Вопрос кейса: Почему в таблице Голова-Сивцева использованы именно следующие буквы? (изображение)

Ответ для учителя: Потому что эти буквы имеют одинаковую ширину и высоту и не используются для составления слов. В общеобразовательных школах изучение предмета «Человек и его здоровье» помогает учащимся понять строение и функционирование организма, ценить здоровый образ жизни. Привитие любви к природе через биологию формирует способность к самостоятельному приобретению знаний и принятию осознанных решений. Живое помогает легче осознавать значимость жизни и окружающей среды.

Вывод: Учитель создает условия для развития личности, формирования знаний и воспитания ученика, одновременно выполняет функции управления и направляющей роли, а в биологическом обучении способствует формированию у молодого поколения правильного отношения к природе, саморазвитию, восприятию красоты природы, её сохранению и защите, обучает создавать и приумножать природные богатства своими руками, использовать современные технологии, искать знания самостоятельно, анализировать их и делать собственные выводы. Организация преподавания биологии на основе инновационных технологий является одним из основных аспектов обучения; в частности, интерактивные методы – кейс-стади, insert, «рыбья кость», бумеранг и другие – занимают эффективное место в нетрадиционной организации учебного процесса.

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ПЕРСПЕКТИВЫ РАЗВИТИЯ ЭЛЕКТРОМЕХАНИЧЕСКОГО СОСТОЯНИЯ УСТРОЙСТВА ДЛЯ РАЗДАЧИ КОРМОВ

Аннотация: *В статье рассматриваются особенности технологической линии кормления животных, где основное внимание уделяется операциям по раздаче кормов как наиболее трудоёмкому процессу. Проанализированы мобильные и стационарные средства раздачи кормов, дана оценка их технико-экономическим характеристикам. Особое внимание уделено стационарным кормораздатчикам, встроенным в кормушки, как наиболее перспективному направлению механизации процессов кормления на животноводческих фермах. Приведены сравнительные данные по различным типам кормораздатчиков, включая отечественные модели и импортные образцы. На основе анализа сделан вывод о целесообразности широкого внедрения скребковых стационарных кормораздатчиков.*

Ключевые слова: *кормораздатчики, животноводство, автоматизация, механизация, скребковые транспортеры, стационарные установки.*

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PROSPECTS FOR THE DEVELOPMENT OF THE ELECTROMECHANICAL CONDITION OF THE FEED DISTRIBUTION DEVICE.

Abstract: The *article discusses the key aspects of the technological line of animal feeding, with a focus on feed distribution as the most labor-intensive operation. Mobile and stationary feed distribution systems are analyzed and evaluated based on their technical and economic indicators. Special attention is given to stationary feeders integrated into troughs as the most promising direction for mechanizing feeding processes on livestock farms. Comparative data are provided for different types of feed distributors, including domestic and foreign models. The analysis concludes that scraper-type stationary feeders are the most efficient and should be widely implemented.*

Keywords: *feed distributors, livestock farming, automation, mechanization, scraper conveyors, stationary systems.*

Введение.

Главным элементом технологической линии кормления животных на фермах и комплексах продолжает оставаться раздача кормов, которая предъявляет определенные требования к качеству раздаваемого материала, конструкции и размерам зданий, хранилищам, средство кормораздатчика и т.п., Кроме того, раздача кормов является наиболее трудоемкой операции при откорме животных, так как до 40% затрат труда при обслуживании животных приходится на работы, связанные с кормлением.

Интенсификация производства животноводческой продукции и переход на промышленные методы требует коренного совершенствования машин и механизмов, создания поточных линий приготовления и раздачи кормов и перехода на полную автоматизацию управления технологическим процессом. Тенденция к укрупнению ферм и перевод животноводства на промышленную основу с широким внедрением электро-механизации и автоматизации производственных процессов приготовления и раздачи кормов создают благоприятные условия для значительного снижения затрат труда на раздачу кормов. Как показывает передовой опыт стран с высокоразвитым животноводством, развитие мясного промышленного откорма животных позволило значительно поднять живой вес животных и процент выхода мяса. Повышение суточных привесов, улучшение системы организация откорма, внедрение эффективных способов механизации производственных процессов приготовления и раздачи кормов и другие факторы дали возможность резко сократить затраты труда на производство говядины.

Методы.

Все существующие кормораздатчики разделяются на мобильные и стационарные. Выбор того или иного кормораздатчика зависит от многих факторов, в том числе от объема производства, принятой технологии, способа содержания животных, вида кормов и др.

На основании исследований, проведенных в ВИЭСХ в крупных блочных помещениях целесообразно иметь стационарные установки, так как использование мобильных кормораздатчиков ведет к значительным потерям тепла из коровников и требует дополнительных затрат на кормовые проезды.

Мобильные раздатчики целесообразно рекомендовать для раздачи кормов животным в южных зона нашей страны, где животные содержатся в основном на открытых площадках.

Технико-экономический анализ, приведенный показывает, что расчетные затраты на погрузку, подвоз и раздачу кормов в расчете на 200 коров у мобильных кормораздатчиков выше, чем у многих стационарных, при этом минимальные значения приведенных затрат имеют раздатчики, встроенные в кормушки (шнековые, скребковые, бункерные и др.). Используя стационарные кормораздатчики, можно легко автоматизировать кормления животных, осуществляя его по заданной программе в определённое, установленное распорядком рабочего дня время, что особенно важно для ферм промышленного типа. Эффективность стационарных кормораздатчиков резко возрастает при создании единой поточной линии, а также при сменно-поточной организации кормления животных.

В большинстве случаев при пользовании стационарных средств животным раздают уже приготовленную в кормоцехе корм смесь, при этом кормоцех обычно вплотную примыкает к помещениям. Блокирование хранилищ кормов с животноводческими зданиями позволяет уменьшить строительные расходы и удельные капитальные вложения в оборудования технологической линии при использовании стационарных раздатчиков кормов а 12-20%. Анализ экономических основ системы машин показал, что эффективность схем механизации раздачи кормов помимо размера ферм зависит от организации кормления способов подготовки и хранения компонентов рациона, и в этом отношении оказалось, что наиболее перспективным направлением в механизации раздачи кормов на фермах является разработка стационарных раздатчиков.

Результаты.

Основными признаками, по которым можно классифицировать стационарные кормораздатчики, являются способ установки их и конструкция транспортирующего механизма.

Приведённые сравнительные оценки различных схем раздачи кормов показывают, что при использовании стационарных раздатчиков внутри кормушек затраты труда и расчетные затраты значительно сокращаются по сравнению с кормораздатчиками вне кормушек. В связи с этим отмечается, что создание транспортеров раздатчиков внутри кормушек является наиболее перспективным направлением.

В настоящее время в автоматизированных поточных линиях приготовления и раздачи кормов нашли широкое применение стационарные транспортёры кормораздатчики внутри кормушек следующих типов: шнековые, ленточные, штанговые, вибрационные, цепные и скребковые.

Выбор того или иного типа кормораздатчика зависить от многих факторов как условий окружающей среды, удобства и безопасности обслуживания, качества кормораздачи, срока службы, а также их технико-экономических показателей. Для их сопоставления в таблице 1 приведены

технико-экономические показатели наиболее распространённых скребковых и шнековых кормораздатчиков внутри кормушек.

Таблица №1

Показатели	Тип транспортёра-кормораздатчика	
	Скребковые	Шнековые
Капиталовложения, доллар	900	1100
Эксплуатационные расходы, доллар/год	210	289
Срок службы, год	15	8-10
Удельная мощность, Вт/ погонный метр	30,6	76,5

Данные таблицы показывают, что скребковые транспортеры кормораздатчики имеют лучшие технико-экономические показатели по сравнению со шнековыми.

Обсуждения.

В настоящее время для раздачи кормов КРС промышленностью выпускаются стационарные транспортеры – кормораздатчики внутри кормушек следующих типов: ТВК-80А, ТРК – 100.

Анализ технико-экономических показателей приведенный в таблице 2 скребковых транспортеров, используемых для раздачи кормов на животноводческих фермах и комплексах показывает, что наиболее эффективным средством механизации процесса кормораздачи является транспортер-кормораздатчик фирмы “Джи” и “Джи”, широко используемый на промышленных комплексах как за рубежем так и у нас.

Таблица 2

Тип кормораздатчика	Производительность, т/ч	Число обслуживаемых коров, голов	Тип и мощность приводного электро-двигателя	Передача от электро-двигателя	Загрузка электро-двигателя,%
ТВК– 80А (Россия)	14	60	А02-51-6 $P_н$5,5 кВт	Редуктор	35...75
ТРК – 100 (Россия)	6	110	А02-42-6СХ $P_н$ 4,0 кВт	Редуктор	75...85
“Джи” и “Джи” (Италия)	10	180	$P_н$ = 3,68 кВт	Редуктор - вариатор	60...160

Таблица №3

Удельная энергоемкость. ч/кН	Длина раздатчика, м	Масса Кг	Удельная металлоемкость, кг/м	Скорость раздачи, м/с	Время раздач, мин.	Затрат труда чел. ч	Управления
0,114	78	3800	40	0,518 0,132	2,5 9,6	0,032	Ручное
0,068	120	2500	22	0,29 0,23	10 12	0,023	Ручное
0,017	77,4	1356	7,3	0,11 0,16	8-12	0,017	Полу-авт.

Приведенный анализ на основании таблиц 1, 2 свидетельствует о технико-экономической эффективности кормораздатчика итальянской фирмы “Джи” и “Джи”. Такой кормраздатчик успешно эксплуатируется и у нас в животноводческом комплексе по откорму молодняка КРС Ташкенсткой области.

Вывод

С учётом выше приведённых преимуществ и эффективности скребковых кормораздатчиков возникает необходимость шире использовать их для раздачи кормов на животноводческих фермах нашей страны.

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АРТЕРИАЛЬНАЯ ГИПЕРТЕНЗИЯ ПРИ БЕРЕМЕННОСТИ: КЛИНИЧЕСКИЕ АСПЕКТЫ И ИСХОДЫ

Аннотация: *В исследовании изучены особенности течения беременности у женщин с гипертоническими расстройствами, проходивших лечение в родильном отделении Республиканской клинической больницы Самаркандского государственного медицинского университета. Обследованы 45 беременных с гестационной гипертензией, преэклампсией и хронической гипертензией.*

Проведен анализ клинических проявлений, методов родоразрешения и перинатальных исходов. Результаты показали, что гипертония у беременных ассоциируется с повышенной частотой кесаревых сечений, преждевременными родами и низкой массой новорождённых. Основные факторы риска: возраст старше 30 лет, ожирение, первородство и наличие гипертензии в анамнезе.

Ключевые слова: *гипертония у беременных, преэклампсия, гестационная гипертензия, беременность, роды.*

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HOMILARLIKDA ARTERIAL GIPERTENSIYA: KLINIK ASSAKTLARI VA NATIJALARI

Abstract:*This study examined the pregnancy outcomes in women with hypertensive disorders treated in the maternity ward of the Republican Clinical Hospital of Samarkand State Medical University. Forty-five pregnant women with gestational hypertension, preeclampsia, and chronic hypertension were examined.*

An analysis of clinical manifestations, delivery methods, and perinatal outcomes was conducted. The results showed that hypertension in pregnant women is associated with an increased rate of cesarean sections, preterm birth, and low birth weight. The main risk factors were age over 30, obesity, primiparity, and a history of hypertension.

Key words: *hypertension in pregnant women, preeclampsia, gestational hypertension, pregnancy, childbirth.*

Введение

Гипертонические расстройства во время беременности представляют собой важную проблему акушерской практики. По данным Всемирной организации здравоохранения, до 10 % беременных сталкиваются с повышением артериального давления, что может приводить к осложнениям у матери и плода. В условиях Республики Узбекистан патология остаётся актуальной, однако локальные данные о течении беременности, способах родоразрешения и перинатальных исходах ограничены. Изучение этих особенностей необходимо для оптимизации профилактических и лечебных мероприятий.

Цель исследования

Изучить клиническое течение, методы родоразрешения и перинатальные исходы у женщин с гипертоническими расстройствами, находившихся в родильном отделении Республиканской клинической больницы Самаркандского государственного медицинского университета.

Материалы и методы исследования

Исследование носило ретроспективный и описательный характер. Обследованы 45 женщин с диагнозом гипертонических расстройств:

- Гестационная гипертензия — 24 женщины (53,3 %)
- Преэклампсия — 16 женщин (35,6 %)
- Хроническая гипертензия — 5 женщин (11,1 %)

Критерии включения:

- Одноплодная беременность ≥ 20 недель
- Диагноз артериальной гипертензии

Исключались многоплодные беременности и тяжелые сопутствующие заболевания (сердечно-сосудистые, почечные и др.).

Методы исследования: анализ медицинских карт, лабораторных данных, анамнеза, способа родоразрешения и перинатальных исходов. Статистическая обработка включала расчет средних значений, процентов и проверку достоверности различий ($p < 0,05$).

Результаты

Средний возраст пациенток: **30,8 ± 4,5 лет**, преобладали первородящие (58 %). Избыточная масса тела или ожирение выявлены у 46,7 % женщин, наследственная предрасположенность — у 40 %.

Клинические проявления:

- Головные боли, отёки и протеинурия чаще наблюдались при преэклампсии.
- Средние показатели давления достигали 160/100 мм рт. ст.

Родоразрешение:

- Кесарево сечение — 26 женщин (57,8 %)
- Естественные роды — 19 женщин (42,2 %)

Основные показания к кесареву сечению: тяжёлая преэклампсия, угроза внутриутробной гипоксии и неэффективность терапии.

Перинатальные исходы:

- Средняя масса новорождённых: 2700 ± 480 г
- Недоношенность: 22,2 %
- Новорождённые с низкой массой (< 2500 г): 31 %
- Перинатальная смертность: 2,2 % (1 случай)

Выявлена достоверная связь между тяжестью гипертонии и частотой неблагоприятных исходов ($p < 0,05$).

Выводы

1. Гипертонические расстройства встречаются у значительной доли беременных, составив 10,7 % всех родов в отделении.
2. Основные факторы риска: возраст старше 30 лет, первородство, ожирение, гипертензия в анамнезе.
3. Беременность у женщин с гипертонией чаще осложняется преждевременными родами, антенатальной гипоксией и необходимостью оперативного родоразрешения.
4. Своевременная диагностика и лечение снижают риск осложнений для матери и плода.

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СОВРЕМЕННЫЕ ПОДХОДЫ К ПРЕДОТВРАЩЕНИЮ БОТУЛИЗМА

Аннотация. *Ботулизм – это острое, крайне опасное для жизни заболевание, вызываемое мощным нейротоксином бактерии Clostridium botulinum. Токсин продуцируется преимущественно в анаэробных условиях, чаще всего в домашних консервах и копченых продуктах. Инкубационный период варьирует от 2 часов до 5 дней, после чего развиваются характерные неврологические симптомы вследствие блокирования нервно-мышечной передачи, приводящего к прогрессирующему параличу. Клиническая картина включает сухость во рту, диплопию, птоз, дисфагию, расстройства дыхания и другие неврологические нарушения. В связи с высокой опасностью заболевания и его распространенностью в определенные периоды (ноябрь-май), данная работа посвящена анализу современных подходов к предотвращению ботулизма, включая соблюдение условий консервации и хранения продуктов, а также важность своевременной диагностики и внедрения эффективных профилактических стратегий для снижения заболеваемости и повышения безопасности пищевых продуктов.*

Ключевые слова: *Ботулизм, Clostridium botulinum, ботулотоксин, пищевые отравления, профилактика, консервация, нейротоксикоз, современные подходы, санитарные нормы.*

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MODERN APPROACHES TO THE PREVENTION OF BOTULISM

Abstract. *Botulism is an acute and extremely life-threatening disease caused by a potent neurotoxin produced by the bacterium Clostridium botulinum. The toxin is primarily produced under anaerobic conditions, most often in home-canned foods and smoked products. The incubation period varies from 2 hours to 5 days, after which characteristic neurological symptoms develop, leading to progressive paralysis due to the blockade of neuromuscular transmission. The clinical picture includes dry mouth, double vision (diplopia), drooping eyelids (ptosis), difficulty swallowing (dysphagia), respiratory disorders, and other neurological impairments. Due to the high danger of the disease and its prevalence during*

certain periods (November-May), this work is dedicated to analyzing modern approaches to botulism prevention. This includes adhering to food canning and storage conditions, as well as emphasizing the importance of timely diagnosis and the implementation of effective preventive strategies to reduce morbidity and enhance food safety.

Keywords: *Botulism, Clostridium botulinum, botulinum toxin, food poisoning, prevention, canning, neurotoxicosis, modern approaches, sanitary standards.*

Введение. Ботулизм — серьёзное и опасное для жизни заболевание, вызываемое токсином, вырабатываемым бактерией *Clostridium botulinum.* Токсин ботулизма вырабатывается преимущественно в анаэробных (без доступа кислорода) условиях и вызывается употреблением в пищу копченой рыбы и мяса домашнего приготовления, консервированных овощей и фруктов [1,13]. Случаи ботулизма среди населения регистрируются в основном с ноября по май, то есть в период потребления консервов домашнего приготовления.

Бактерии, вызывающие ботулизм, широко распространены в природе и выживают благодаря своим спорам. Для попадания этих спор в пищу и их роста необходимы следующие условия:

• Низкокислородная (анаэробная) среда
• Среда с низким содержанием кислоты, сахара или соли
• Наличие определенного количества воды

Основными источниками ботулизма являются неправильные процессы консервирования, ферментации или хранения в пищевой промышленности и в домашних условиях. Кроме того, неправильно консервированные продукты могут позволить бактериям в течение длительного времени вырабатывать токсины, что представляет серьезную опасность для здоровья [2,3].

Что происходит в организме при ботулизме:

Инкубационный период ботулизма различен и может длиться от 2 часов до 5 дней, но обычно симптомы отравления появляются в течение первых 2–6 часов после попадания бактерии и продуктов ее жизнедеятельности в организм. Ботулотоксин сначала попадает в полость рта, а затем в кровеносную систему. Основная часть всасывается в тонком кишечнике, где высвобождает ботулотоксин и распределяется по всему организму [4].

Токсин быстро повреждает нервные волокна, блокируя передачу нервных импульсов от головного и спинного мозга к мышечной ткани. Из-за этого функция мышечных волокон снижается или полностью прекращается.

Паралич поражает глазные и глотательные мышцы, а затем межреберные мышцы и диафрагму. Снижается перистальтическая активность кишечника, снижается защитная активность лейкоцитов, изменяется метаболизм эритроцитов, в результате чего существенно ухудшается доставка кислорода к тканям [5,11].

Основные симптомы ботулизма включают в себя:

• Сухость во рту, рвота, изменение голоса, осиплость, боль при глотании;

• Диплопия в глазах, то есть видение двух предметов в одном месте, ухудшение зрения, размытость (туман);

• Опущение верхнего века (птоз), сосудистые звездочки, расширенные зрачки, страбизм (косоглазие)

• Отсутствие мимики, бледность кожи, неустойчивость при ходьбе, потеря равновесия;

• Симметричный паралич рук, паралич дыхательных мышц (чувство стеснения в груди);

• Вздутие живота и боли, диарея 3-5 раз в день [6,12].

Цель исследования – проанализировать современные подходы к предотвращению ботулизма, основываясь на понимании этиологии, патогенеза и факторов риска развития заболевания. Особое внимание будет уделено разработке и внедрению эффективных профилактических стратегий для снижения заболеваемости и повышения безопасности пищевых продуктов, а также рассмотрению клинических аспектов, необходимых для ранней диагностики и успешного лечения.

Материал-случай из практики. Пациентка Ф., 2009 года рождения (возраст 15 лет), учащаяся, жительница Самаркандской области.

Жалобы при поступлении: 10 января 2025 года пациентка Ф. поступила в Самаркандскую областную инфекционную больницу в крайне тяжелом состоянии с жалобами на выраженное затруднение глотания (дисфагия) и речи (дисфония), двоение в глазах (диплопия), нечеткость зрения ("туман" перед глазами), симметричное опущение верхних век (птоз), сухость во рту, общую мышечную слабость, а также чувство прогрессирующего затруднения дыхания.

Анамнез заболевания: Заболевание началось остро. Со слов матери, 7 января 2025 года пациентка Ф. вместе с родственниками присутствовала на семейном торжестве (день рождения), где употребляла в пищу домашние маринованные помидоры и огурцы, приготовленные без добавления уксуса. На следующий день, 8 января, пациентка Ф. повторно употребляла эти же консервированные продукты.

Первые симптомы появились 9 января, примерно через 24 часа после второго употребления консервов. Изначально отмечались неспецифические симптомы со стороны желудочно-кишечного тракта: тошнота, боли в эпигастральной области, многократная рвота. В тот же день, но позже, начали развиваться мионеврологические симптомы: чувство сдавления и боль в глотке, постепенно нарастающие затруднения глотания и речи, снижение глоточного рефлекса и поперхивание при приеме жидкости.

Аналогичная клиническая картина, но различной степени тяжести, развилась и у четырех других родственников, которые также употребляли указанные консервы на семейном мероприятии 7 января. Семья обратилась в стационар по месту жительства, откуда после осмотра и первичной оценки

состояния все 5 человек были срочно доставлены в Самаркандскую областную инфекционную больницу на машине санитарной помощи.

Объективный статус при поступлении: При осмотре в реанимационном отделении состояние пациентки Ф. оценивалось как крайне тяжелое.

•Сознание: Сохранено, но пациентка заторможена, вялая, контакт затруднен.

•Дыхательная система: Дыхание поверхностное, ЧДД до 28-30 в минуту. Отмечаются явные признаки дыхательной недостаточности: участие вспомогательной мускулатуры в акте дыхания, цианоз носогубного треугольника, сатурация кислорода (SpO_2) 86-88% на комнатном воздухе.

•Неврологический статус (офтальмоплегический синдром): Выраженный симметричный птоз обоих верхних век, зрачки расширены (мидриаз), реакция на свет резко снижена. Движения глазных яблок ограничены во всех направлениях (офтальмоплегия). Отмечается диплопия ("туман" перед глазами). Лицо амимично, маскообразно.

•Бульбарные нарушения: Глотание практически невозможно, глоточный рефлекс отсутствует. Речь неразборчивая, осипшая. Поперхивание даже при незначительном количестве слюны.

• Мышечная слабость: Выраженная общая мышечная слабость (парез), сухожильные рефлексы резко снижены или отсутствуют.

•Автономная нервная система: Выраженная сухость слизистых оболочек рта, тахикардия (ЧСС до 110 уд/мин), АД 100/60 мм рт. ст. Живот умеренно вздут, перистальтика резко ослаблена.

Диагноз: Пищевой ботулизм, тяжелое течение, тип не уточненный (до лабораторного подтверждения).

Проведенное лечение при поступлении: В связи с крайне тяжелым состоянием пациентки и нарастающей дыхательной недостаточностью, сразу после поступления в реанимационное отделение, пациентка Ф. была экстренно интубирована и подключена к аппарату искусственной вентиляции легких (ИВЛ).

1. Детоксикация: Промывание желудка через зонд, очистительная клизма.
2. Специфическая терапия: После детоксикационных мероприятий, 10 января, была введена поливалентная противоботулиническая сывор отка в дозе 25 000 МЕ (антитоксины типов А, В, Е) внутривенно капельно.
3. Поддерживающая и симптоматическая терапия: Инфузионная терапия (кристаллоидные растворы), антибиотики для профилактики вторичных инфекций, кардиопротекторы, вазопрессоры по показаниям.

Лабораторно-инструментальные исследования:

• Общий анализ крови и мочи: Без специфических изменений, характерных для ботулизма, но могут отражать дегидратацию и сопутствующие изменения.

• Биохимический анализ крови: Электролитные нарушения (небольшая гипокалиемия), повышение уровня креатинфосфокиназы (КФК) на фоне мышечного повреждения.

• Специфическая диагностика: Образцы кала, рвотных масс пациентки, а также остатки консервов были отправлены для бактериологического исследования на выявление *Clostridium botulinum* и ботулотоксина биологическим методом (мышиная проба) и/или ИФА. Результаты ожидались.

• Консультации специалистов: Для комплексной оценки состояния были приглашены невропатолог и хирург.

Динамика состояния и исход. Несмотря на все предпринятые реанимационные мероприятия, интубацию, ИВЛ и введение первой дозы противоботулинической сыворотки, состояние пациентки Ф. продолжало прогрессивно ухудшаться. Нарастали симптомы дыхательной недостаточности, развилась гипоксическая энцефалопатия. Было принято решение о повторном введении противоботулинической сыворотки, однако на фоне ухудшающегося состояния и нарастающих циркуляторных расстройств у пациентки произошла остановка сердечной деятельности. Несмотря на проведение реанимационных мероприятий, восстановить сердечную деятельность не удалось. Была констатирована биологическая смерть пациентки Ф. 10 января 2025 года.

Заключение по случаю. Данный трагический случай массового пищевого ботулизма, повлекший за собой летальный исход у подростка, подчеркивает исключительную опасность заболевания и критическую роль быстрой диагностики и экстренной специфической терапии. Случай ярко иллюстрирует последствия употребления домашних консервов, приготовленных с нарушением технологии (отсутствие уксуса как консерванта), и акцентирует внимание на необходимости строжайшего соблюдения правил гигиены и термической обработки при домашнем консервировании. Позднее обращение за медицинской помощью, даже при наличии специализированной клиники, может быть фатальным.

Выводы: При анализе данного клинического случая ботулизма можно сделать следующие выводы:

1. Правильное хранение и консервирование продуктов питания:

Важнейшим фактором профилактики ботулизма является правильное хранение продуктов питания. При консервировании продуктов в домашних условиях следует соблюдать следующие правила:

• Стерилизация пищевых продуктов при высоких температурах: споры ботулизма могут быть устойчивы к высоким температурам, но нагревание при температуре 85°C или выше в течение 5 минут убьет споры.

• Избегайте хранения в стеклянной таре: пластиковые бутылки, банки для консервирования и другие герметичные емкости следует тщательно стерилизовать.

• Хранение продуктов в слабокислой среде: продукты с низкой кислотностью (например, овощи, мясо) следует подкислять солью или уксусом перед консервированием.

• Просвещать население о правилах домашнего консервирования, а также подвергать герметично закрытые домашние консервы из грибов и овощей тепловой обработке при температуре 100°C в течение 30 минут перед употреблением (для уничтожения ботулотоксина) [7,15].

2. Соблюдение санитарно-гигиенических правил

Соблюдение санитарно-гигиенических правил при производстве и хранении пищевых продуктов имеет важное значение в профилактике ботулизма [9].

В частности:

• Контроль за появлением бактерий: необходимо создать гигиенические условия на производстве продуктов питания и использовать чистые и санитарные контейнеры, оборудование и продукты.

• Обучение сотрудников: важно обучать сотрудников соблюдать правила санитарии и гигиены при приготовлении и хранении продуктов питания [8,14].

3. Безопасность пищевых продуктов и инспекции:

Для обеспечения безопасности и профилактики ботулизма необходимо регулярно проверять и контролировать пищевые продукты. Включая:

• Проводите тестирование на токсины перед приготовлением пищевых продуктов: используйте современные методы диагностики, чтобы определить, содержат ли продукты ботулотоксин.

4. Информирование потребителей:

Важно информировать людей о рисках ботулизма. Случаи ботулизма можно сократить, повышая осведомленность о том, как хранить и потреблять продукты питания. Тем, кто хочет консервировать или ферментировать продукты в домашних условиях, необходимо объяснить правильные методы и риски [10].

Кроме того, больных ботулизмом госпитализируют, а всем, кто контактировал с больным, в центре делают профилактическую инъекцию противоботулистических сывороток (внутримышечно) типов А, В и Е в дозе 1000-2000 МЕ (каждого типа). Эти люди находятся под медицинским наблюдением в течение 10-12 дней. Из подозрительных пищевых продуктов берут материал для бактериологического исследования. Опасные продукты изымаются из потребления [11,13].

Заключение. Ботулизм — серьезное, а иногда и смертельное заболевание, и современные подходы к его профилактике имеют решающее значение. Правильное хранение продуктов питания, соблюдение санитарных и гигиенических норм, проверка продукции и приобретение ее из безопасных источников могут помочь снизить количество случаев ботулизма. Этот риск можно еще больше снизить за счет использования передовых технологий и повышения осведомленности. Для обеспечения

безопасности пищевых продуктов и профилактики ботулизма необходимо активное участие всех сторон.

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ИССЛЕДОВАНИЯ ОПТИМАЛЬНЫХ РЕЖИМОВ ХЛОПКА-СЫРЦА В РАЗЛИЧНЫХ ВАРИАНТАХ РАБОТЫ БАРАБАННЫХ СУШИЛОК

Аннотация: *По сушке хлопка-сырца в литературах приведены различные мнения, противоречивость зависимостей, полученных различными авторами, объясняется, очевидно, различием условий сушки в опытах и несоответствием этих условий условиям конвективной сушки, применяемой в промышленности на что указывают большие диапазоны выявленных предельных температурных режимов, а также тем, что не выявлено влияние исходного состояния хлопка-сырца на изменение структуры волокна, следовательно, выбору температурных режимов не придавалось преобладающего значения. В статье получены практические рекомендации, на основе проведенных экспериментов производственных условия в барабанном сушилке по выбору режима сушки в зависимости от исходной влажности хлопка-сырца, производительности по высушиваемого материала, гарантирующий максимально сохранять природных свойств волокна и семян.*

Ключевые слова: *хлопок-сырец, волокно, семена, влажность, сушильный агент, температура, барабанная сушилка, кратность сушки, производительность, мягкий режим, жесткий режим.*

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RESEARCH OF OPTIMAL RAW COTTON MODES IN VARIOUS OPERATING OPTIONS OF DRUM DRYERS

Abstract: *There are various opinions in the literature on drying raw cotton; the inconsistency of the dependencies obtained by different authors is obviously explained by the difference in drying conditions in the experiments and the discrepancy between these conditions and the conditions of convective drying used in industry, as indicated by the large ranges of the identified maximum temperature conditions, and also the fact that the influence of the initial state of raw cotton on the change in the fiber structure was not revealed, therefore, the choice of temperature conditions was not given predominant importance. The article provides practical recommendations based on experiments conducted on production conditions in a drum dryer for selecting a drying mode depending on the initial moisture content of raw cotton and the productivity of the dried material,*

which guarantees maximum preservation of the natural properties of the fiber and seeds.

Key words: *raw cotton, fiber, seeds, humidity, drying agent, temperature, drum dryer, drying frequency, productivity, soft mode, hard mode.*

Введение. Режим сушки нагретом воздухом характеризуется тремя параметрами: влагосодержанием воздуха, скоростью его движения и температурой. Эти параметры влияют на длительность процесса и качество высушенного материала. Поэтому надо выбирать такой режим сушки, когда при наименьшей ее длительности с наименьшим расходом тепла достигаются наилучшие технологические свойства материала [1-4].

Применяемые в технологии в сушильных барабанах сушка хлопка-сырца производится при переменном режиме, т.е. влагосодержание сушильного агента повышается за счет испаряемой из хлопка-сырца влаги, поэтому точно регулировать влагосодержание воздуха невозможно. Скорость и количество подаваемого сушильного агента увеличить нельзя, так как с их увеличением нарушается нормальная работа сушилки и уменьшается время пребывания высушиваемого материала в сушильной камере. Поэтому скорость теплоносителя находится около 1,5 м/с (расход сушильного агента около 20 тыс. $м^3$). Отсюда следует, что для достижения желаемого сушки хлопка-сырца надо выбирать оптимальную температуру теплоносителя.

При различной интенсивности нагрева и сушке компонентов хлопка-сырца в барабанных сушилках, а также последующей его очистке, структура волокон претерпевает существенные изменения, которые, очевидно, должны привести к изменению структурно-механических свойств.

Академиком АН РУз М.А. Хаджиновой [5] при экспериментальном изучении влияния температуры сушильного агента в процессе сушки доказано, что применение агента (сушильного) с температурой 200 и 260°С приводит к снижению прочности волокна соответственно на 11 и 27%. Это происходит из-за неравномерности нагрева и обезвоживания компонентов хлопка-сырца. При этом периферийные части волокна и кожуры пересушиваются, происходит термическая деструкция, и при последующей переработке концы волокна отламываются, штапельная длина уменьшается до 2 мм, а повышенная дробленность семян вызывает увеличение пороков в волокне (кожице с волокном) и снижает качество семян. Температурный режим процесса сушки должен быть таким, чтобы хлопок-сырец не нагревался свыше 100-110^{0}С. Нагрев выше этого значения и приводит к изменению цвета волокна и понижению его прочности.

По данным [6], прочность волокна снижается на 40% при его нагреве до 100^{0}С. Другой автор [7] указывает, что нагрев волокна при температуре 220°С с экспозицией в 30 мин приводит к увеличению кристалличности целлюлозы, а увеличение времени воздействия - к разрушению кристаллической решетки. В работе [8] отмечается, что даже кратковременное воздействие (7-30 с) температуры в 90, 180 и 200°С приводит к структурным изменениям волокна

различной степени, которое подвергается значительному увеличению плотности целлюлозы.

Л.И. Кучерова [9] пришла к выводу, что применение сушильного агента с температурой 200°С увеличивает процентное содержание коротких волокон в 1,3-1,5 раза и волокнистость отходов - до 60%. Это приводит к увеличению обрывности в прядении в 1,5-2 раза.

Противоречивость зависимостей, полученных различными авторами, объясняется, очевидно, различием условий сушки в опытах (в термостате, сушильном шкафу, специальных устройствах и т.д.) и несоответствием этих условий условиям конвективной сушки, применяемой в промышленности (значительное колебание температуры и влагосодержания в процессе сушки) на что указывают большие диапазоны выявленных предельных температурных режимов, а также тем, что не выявлено влияние исходного состояния (влажности, разрыхленности) хлопка-сырца на изменение структуры волокна, следовательно, выбору температурных режимов не придавалось преобладающего значения.

Анализируя сушку хлопка-сырца на хлопкозаводах США, автор [10] отмечает, что температура сушильного агента в начале процесса сушки не превышала 70°С. Большая часть влаги удаляется из хлопка-сырца в течение первых 3 секунд воздействия на него нагретого воздуха, поэтому сушка хлопка-сырца при температуре сушильного агента свыше 180°С в точке их смешивания может оказать неблагоприятное воздействие на качество волокна. Исходя из этого, сотрудники лаборатории хлопкоочистительного оборудования при Департаменте сельского хозяйства США рекомендуют, что ни в одной зоне сушильной установки температура ни в коем случае не должна превышать 180°С. На практике не следует допускать подъема температуры выше 120°С. В связи с этим они рекомендуют взамен одноступенчатой сушки при высокой температуре лучше применять многоступенчатую сушку при более низких температурах.

Применение более высоких температур (200°С) приводит, наряду с уменьшением содержания сорных примесей в хлопке-сырце, к образованию таких пороков, как кожица с волокном и пухом, узелки, наиболее вредные с прядильно-технологической точки зрения (переход в ткань). Кроме того, влияние высокой температуры приводит к снижению разрывной нагрузки до 12%, разрывного удлинения - до 11%, увеличению коротких волокон в среднем в 1,3-1,5 раза, падению выносливости к многократному растяжению на 14-20%, увеличению обрывности в прядении в 1,5-2 раза. Эта работа имеет большое практическое и научное значения. Однако полученные зависимости достигнуты только лишь в пределах влажности хлопка-сырца до 16%. Кроме того, кратность процесса сушки и влияние кратности процесса сушки на качество волокна глубоко не изучены.

Таким образом, изучение и анализ исследований, посвященных установлению влияния сушки на качество волокна, показывает, что изменение качества волокна от теплового воздействия рассматривалось в

основном в стационарных условиях, т.е. в условиях, не описывающих процесс сушки хлопка-сырца в производственных условиях и в барабанных сушилках с учетом последующих воздействий при переработке, очистке, джинировании хлопка-сырца. Следовательно, полученные зависимости не могут реально отражать влияние действительной сушки на качество волокна и семян.

Барабанные сушилки работают в режиме чередующегося нахождения хлопка-сырца во взвешенном состоянии под действием теплоносителя и в завале на лопастях. Сушка производится в переменных параметрах и влажности теплоносителя. Поэтому рекомендуемая температура сушильного агента (например, Т=200°С) в лабораторных условиях или слоевых сушилках не изменяется до конца процесса сушки, а в барабанных сушилках снижается уже в двух метрах на 100 ^{0}С.

Объекты и методы исследования: Наши исследования проводились на сушилке 2СБ-10 при температуре сушильного агента Т=100 и 200°С, производительности 3,5 и 10 т/ч по влажному хлопку-сырцу. Объектом исследования послужил хлопок-сырец разновидности С 6524, II промышленного сорта, с исходной влажностью W=10,5 и 22,3%.

Эксперименты проводились при одно-, двукратной сушках.

Экспериментальные исследования показали, что в основном у пересушенного волокна снижается качество, т.к. из-за нарушения ориентации структурных элементов снижается сорбционная активность волокон. Известно, что хлопковое волокно во влажностном состоянии приобретает повышенную прочность, так как влага, проникая во внутренние слои волокна, способствует образованию дополнительных связей между структурными элементами [9]. Пересушенное волокно (ниже 5,5 %) становится хрупким и ломким, а при дополнительных механических воздействиях (очистке, джинировании) отламывается, увеличивается поврежденность и содержание коротких волокон, а также ухудшается работа прядильных и ткацких фабрик.

Полученные уравнения регрессии:

при однократной сушке:

для влажности хлопка-сырца - $У_1=12,8+4,75x_1+0,97x_2-1,10x_3-0,47x_1x_3$;

для влажности волокна - $У_2 = 7,98 + 3,07x_1 + 1,3x_2 - 1,66\ x_3 + 0,3\ x_1x_2 - 0,69\ x_1x_3$;

при двухкратной сушке:

для влажности хлопка-сырца - $У_1 = 9,81 + 3,85x_1 + 1,54x_2 – 1,68x_3 - 0,66x_1x_3$;

для влажности волокна - $У_2 = 5,64 + 2,08x_1 + 1,25x_2 - 1,63x_3 - 0,58x_1x_3$ обработаны на ЭВМ и определены различные значения основных факторов [11-12]. Методом подбора определены границы областей мягкого и жесткого температурных режимов сушки при одно-, двукратных сушках в зависимости от температуры сушильного агента и исходной влажности хлопка-сырца при производительностях 3,5; 5; 7 и 10 т/ч и представлены в виде кривых на рис. 1-8.

Однократная сушка хлопка-сырца

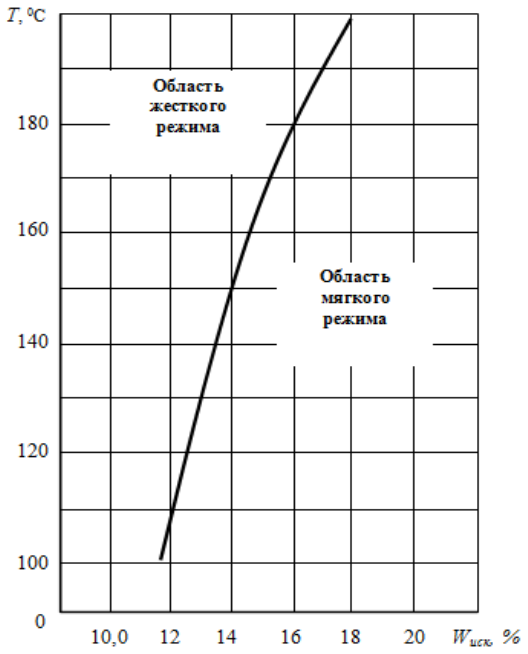


Рис. 1. Зависимость области мягкого температурного режима от исходной влажности хлопка-сырца при производительности П = 3,5 т/ч.

Однократная сушка хлопка-сырца

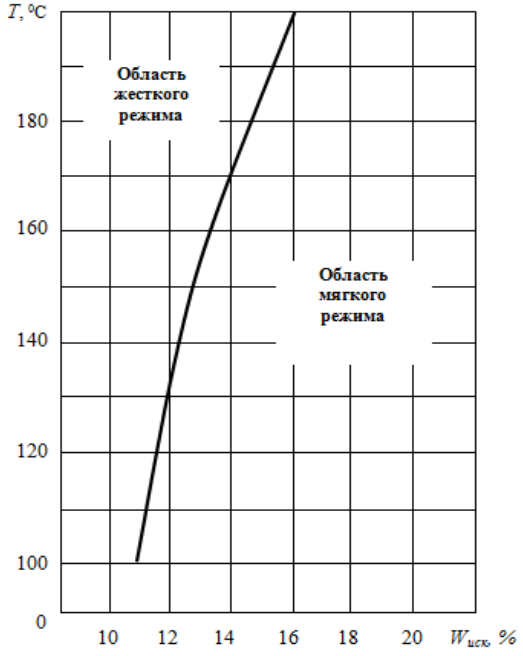


Рис. 2. Зависимость области мягкого температурного режима от исходной влажности хлопка-сырца при производительности П = 5 т/ч.

Однократная сушка хлопка-сырца

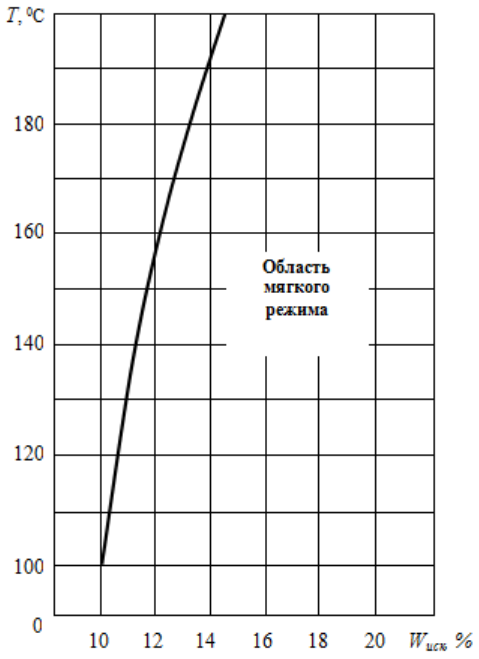


Рис. 3. Зависимость области мягкого температурного режима от исходной влажности хлопка-сырца при производительности П =7 т/ч.

Однократная сушка хлопка-сырца

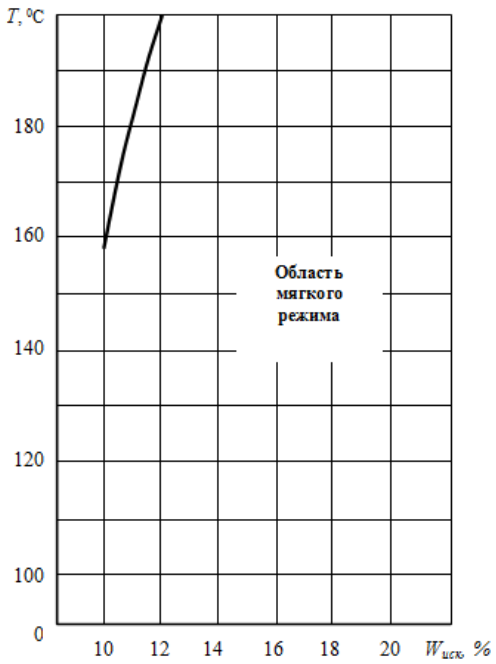


Рис. 4. Зависимость области мягкого температурного режима от исходной влажности хлопка-сырца при производительности П =10 т/ч.

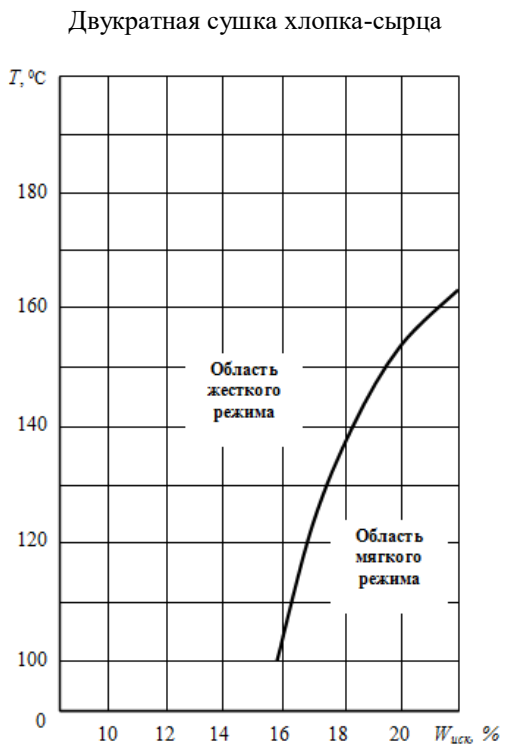


Рис. 5. Зависимость области мягкого температурного режима от исходной влажности хлопка-сырца при производительности П = 3,5 т/ч.

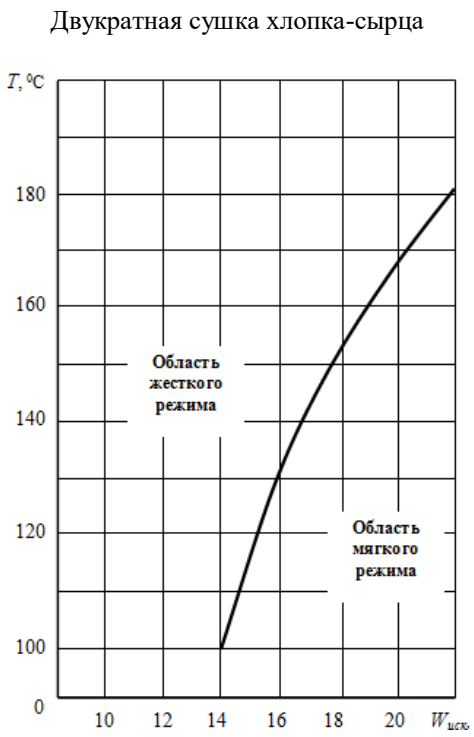


Рис. 6. Зависимость области мягкого температурного режима от исходной влажности хлопка-сырца при производительности П = 5 т/ч.

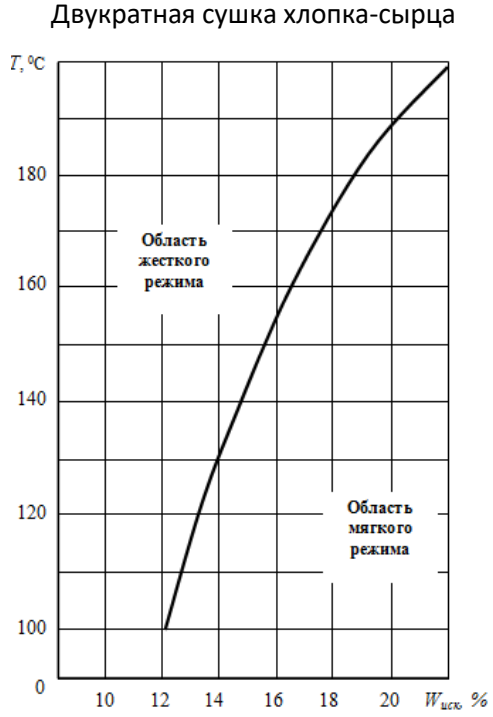


Рис. 7. Зависимость области мягкого температурного режима от исходной влажности хлопка-сырца при производительности П = 7 т/ч.

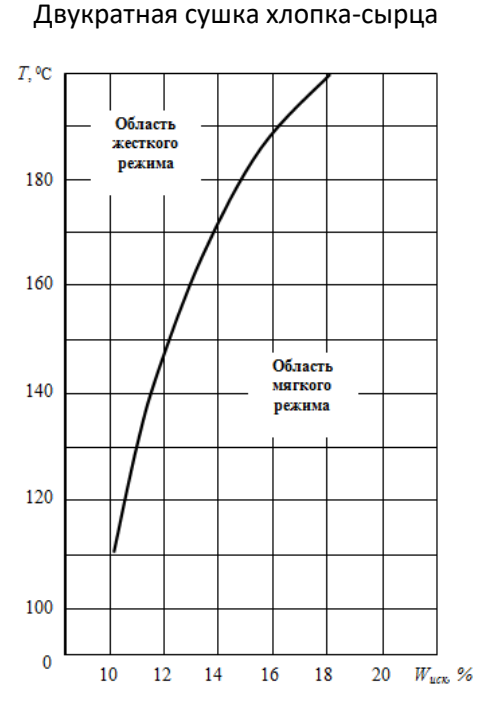


Рис. 8. Зависимость области мягкого температурного режима от исходной влажности хлопка-сырца при производительности П = 10 т/ч.

Из графиков видно (рис. 1-4), что при однократной сушке хлопка-сырца при влажности менее $W_{х/с}$=11,6% хлопок-сырец нельзя сушить при производительности менее 3,5 т/ч, при $W_{х/с}$=11,0 % менее 5 т/ч, а при $W_{х/с}$=10% менее 7 т/ч.

При двукратной сушке хлопка-сырца (рис. 5-8) при производительности П=3,5 т/ч и влажности хлопка-сырца ниже $W_{х/с}$=15,8%, при производительности П=5 т/ч и влажности хлопка-сырца ниже $W_{х/с}$=14%, при производительности П=7 т/ч и влажности хлопка-сырца ниже $W_{х/с}$=12,1% подвергать хлопок-сырец двукратной сушке не рекомендуется [13-14]

Заключение: На основании полученных результатов можно дать практические рекомендации по выбору режима сушки в зависимости от исходной влажности хлопка-сырца, производительности по высушиваемого материала, гарантирующий максимально сохранять природных свойств волокна и семян.

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ТЕОРЕТИЧЕСКИЙ АНАЛИЗ НАГРЕВА КОМПОНЕНТОВ ХЛОПКА-СЫРЦА

Аннотация: *Темп нагрева компонентов хлопка-сырца сушественно влияет на равномерности сушки волокна и семян. В статье теоретически и экспериментально определены закономерности распространения тепла в комке хлопка-сырца и его компонентах в зависимости от исходной влажности сырья, температуры сушильного агента и продолжительности процесса сушки с использованием проекционного метода Бубнова-Галеркина, который даёт возможность анализировать темпа нагрева волокна и семян и использовать при выборе оптимального режима сушки хлопка-сырца с максимальным сохранениям качество при обеспечения равномерности нагрева их компонентов.*

Ключевые слова: *сушка, время сушки, температура, нагрев, хлопок-сырец, волокно, семена, теплообмен, равномерность сушки.*

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THEORETICAL ANALYSIS OF HEATING OF RAW COTTON COMPONENTS

Abstract: *The rate of heating of raw cotton components significantly affects the uniformity of drying of fiber and seeds. The article theoretically and experimentally determines the patterns of heat propagation in a lump of raw cotton and its components depending on the initial moisture content of the raw material, the temperature of the drying agent and the duration of the drying process using the Bubnov-Galerkin projection method, which makes it possible to analyze the heating rate of fiber and seeds and use it when choosing the optimal drying mode for raw cotton with maximum quality preservation while ensuring uniform heating of their components.*

Key words: *drying, drying time, temperature, heating, raw cotton, fiber, seeds, heat exchange, uniformity of drying.*

Введение. Для равномерной сушки хлопка-сырца и его компонентов необходимо обеспечить их равномерный нагрев, изучение которого является актуальным вопросов при организации процесса сушки. Известно [1-3], что

чем меньше значение температуры нагрева, тем меньше вероятность ухудшения их природных свойств.

В работах [4-6] проведен анализ исследований по влиянию температуры сушильного агента на качественные показатели компонентов хлопка-сырца и на равномерность сушки при различных условиях процесса и состояниях высушиваемого материала. В производственных условиях хлопок-сырец сушатся в конвективном способе в виде комков. Важное значение для сохранения качества волокна и семян во время сушки имеет темп распространения тепла в комке хлопка-сырца и его компонентах. В связи с этим нами рассмотрена задача распространения тепла в комке хлопка-сырца.

Теоретические исследования: Задачу тепло и массообмена в комке хлопка-сырца можно выразить следующим образом: Дано неоднородное двух компонентное сферическое тело радиуса R, обладающее свойством изотропности, с известным начальным распределением температуры: $u_1(0,r)=g_1(r)$, $u_2(0,r)=g_2(r)$, -начальная температура семян и волокна, находящийся на растоянии r от центра комка; внутри тела происходит конвективный теплообмен между компонентами (между семенем и волокном). На поверхности контакта со средой происходит конвективный теплообмен по закону Ньютона, при этом нагревание тела происходит равномерно по всей поверхности тела. Требуется найти радиальное распределение температуры компонентов тела в любой момент времени [7-8].

Тогда опираясь на законы термодинамики (законы теплопроводности Фурье, Ньютона, сохранение энергии и т.д.) данную задачу можно сформулировать в виде системы дифференциальных уравнений параболического типа:

$$\begin{cases} \dfrac{\partial u_1}{\partial \tau} = a_1\left(\dfrac{\partial^2 u_1}{\partial r^2} + \dfrac{2}{r}\cdot\dfrac{\partial u_1}{\partial r}\right) + \dfrac{\alpha}{c_1\rho_1}\left[u_2 - u_1\right] + \dfrac{1}{c_1\rho_1} f_1(\tau) \\ \dfrac{\partial u_2}{\partial \tau} = a_2\left(\dfrac{\partial^2 u_2}{\partial r^2} + \dfrac{2}{r}\cdot\dfrac{\partial u_2}{\partial r}\right) + \dfrac{\alpha}{c_2\rho_2}\left[u_1 - u_2\right] + \dfrac{1}{c_2\rho_2} f_2(\tau) \end{cases} \quad (1)$$

с начальными

$$u_1(r, 0)=g_1(r),\ u_2(r,0)=g_2(r), \quad (2)$$

и граничными условиями: при $r=R$

$$\begin{cases} -\dfrac{\partial u_1}{\partial r} + \alpha_1\left[u_B - u_1\right] = 0 \\ -\dfrac{\partial u_2}{\partial r} + \alpha_2\left[u_B - u_2\right] = 0 \end{cases} \quad (3)$$

где α_1- коэффициент теплообмена между семенем и теплоносителем; α_2- коэффициент теплообмена между волокном и теплоносителем; α- коэффициент теплообмена между семенем и волокном; $f_1(\tau)$, $f_2(\tau)$- заданные непрерывные функции описывающие процесс испарения влаги из семени и из волокна, соответственно, u_B- температура воздуха, τ- время процесса сушки;

$u_1(r, \tau)$, $u_2(r, \tau)$- искомые функции представляющие температуру семени и волокна в точке r в данный момент времени τ.

Алгоритм решения задачи определения температурного поля компонентов хлопка-сырца получаем следующую систему дифференциальных уравнений:

$$\begin{cases} Q_n \cdot \dfrac{dA_n(\tau)}{d\tau} + P_n A_{1n}(\tau) + G_n A_{2n}(\tau) = F_{1n}(\tau, r) \\ Q_n \cdot \dfrac{dB_n(\tau)}{d\tau} + \tilde{P}_n A_{2n}(\tau) + \tilde{G}_n A_{1n}(\tau) = F_{2n}(\tau, r) \\ Q_n A_n(0) = F_{10}(r) \\ Q_n B_n(0) = F_{20}(r) \end{cases} \quad (4)$$

где $Q_n=(\alpha_{ik})$, $P_n=(\beta_{ik})$, $G_n=(\gamma_{ik})$, $\tilde{P}_n = (\tilde{\beta}_{ik})$ и $\tilde{G}_n = (\tilde{\gamma}_{ik})$ квадратные матрицы размером (NxN); $A_{1n}(\tau)=(a_{11}(\tau), a_{12}(\tau), \ldots, a_{1n}(\tau))^T$, $A_{2n}(\tau)=(a_{21}(\tau), a_{22}(\tau), \ldots, a_{2n}(\tau))^T$ – искомые векторы; $F_{1n}(\tau,r)=(f_{11}(\tau,r), f_{12}(\tau,r), \ldots, f_{1n}(\tau,r))^T$, $F_{2n}(\tau,r)=(f_{21}(\tau,r), f_{22}(\tau,r), \ldots, f_{2n}(\tau,r))^T$ известные векторы, элементы которые определяются по выше указанным формулам; элементы векторов $F_{10}(r)=(f_{01}(r), f_{02}(r), \ldots, f_{0n}(r))^T$ и $F_{20}(r) = \left(\tilde{f}_{01}(r), \tilde{f}_{02}(r), \ldots, \tilde{f}_{0n}(r)\right)^T$ определяются из соотношении $f_{0i} = (rg_1(r), \varphi_i(r))$, $\tilde{f}_{0i} = (rg_2(r), \varphi_i(r))$.

Об устойчивости метода галеркина для одной задачи теплопереноса в комке хлопка-сырца.

Исследуем вопрос об устойчивости задачи (4). Допустим, что координатная система $\{\varphi_i(x)\}$ сильно минимальна в пространстве $L_2(\Omega)$ т.е. существует такая постоянная независимая от n, что $0 < q < q_i^n$, где q_i^n- собственные числа матрицы

$$Q_n = \{(\varphi_k, \varphi_j)L_2\}_{k,\ j=1}^{n}$$

Предположим, что вместо системы Галеркина мы решаем «возмущенную» систему

$$\begin{cases} (Q_n + \Gamma_n)\tilde{C}_n(\tau) + (P_n + \Gamma'_n)\tilde{C}_n = F_n(\tau) + \varepsilon_n \\ (Q_n + \Gamma_n^0)\tilde{C}_n(0) = F_0 + \varepsilon_0 \end{cases} \quad (5)$$

где $\tilde{C}_n(\tau) = \left(\tilde{A}_{1n}(\tau); \tilde{A}_{2n}(\tau)\right) =$ - решение возмущенной задачи.

Рассмотрим приближенный метод расчета модели (4), построенной для задачи теплопереноса в комке хлопка-сырца, т.е.

Для получения численных результатов выбираем базисных функции. В качестве базисных функции берем кусочно-непрерывных функции определяющих в пространстве $L_2(\Omega)$, т.е.

$$\begin{cases} \varphi_0(r) = 0 \\ \varphi_i(r) = \dfrac{1}{\sqrt{h}} \begin{cases} \dfrac{r - r_{i-1}}{h}, & если\ r \in (r_{i-1}; r_i) \\ \dfrac{r_{i+1} - r}{h}, & если\ r \in (r_i; r_{i+1}) \end{cases} \\ \varphi_N(r) = \dfrac{1}{\sqrt{h}} \begin{cases} \dfrac{r - r_{N-1}}{h}, & если\ r \in (r_{N-1}; r_N) \\ 0 & , если\ r \notin (r_{N-1}; r_N) \end{cases} \end{cases}$$

построенные на сетке $0<r_0<r_1<r_2<\ldots<r_N=R$, $h=r_i-r_{i-1}$, $i=1,2,3,4,\ldots N-1$.

Очевидна, эта система линейно независима и каждая из них отлично от нуля лишь в интервале длиной $2h$. Если обозначим линейную оболочку через H_N, то функции из H_N являются непрерывными кусочно-линейными функциями обладающими суммируемой с любой конечной производной, т.е. $H_N \in L_2[0;R]$, $H_N \in W_2^1[0;R]$. Также можно отметить, что эти функции почти ортогональны, т.е. только для соседних функций скалярное произведение в $L_2[0;R]$ отлично от нуля. Отсюда следует, что система уравнений (9) имеет разреженную матрицу. Подбирая, базисных функции таким образом и строя неявные разностные схемы на отрезке $[0;T]$ получим систему алгебраическую уравнений.

$$\begin{cases} (Q_n + \Delta\tau P_n) \cdot A_n^{l+1}(\tau) + G_n B_n^{l+1}(\tau) = F_{1n}^l(\tau) - Q_n A_n^l(\tau) \\ \widetilde{G}_n A_n^{l+1}(\tau) + (Q_n + \Delta\tau \widetilde{P}_n) \cdot B_n^{l+1}(\tau) = F_{2n}^l(\tau) - Q_n B_n^l(\tau) \\ Q_n A_n^0(\tau) = F_{10} \\ Q_n B_n^0(\tau) = F_{20} \qquad\qquad l = 0,1,2,3,\ldots M \end{cases} \qquad (6)$$

Система алгебраических уравнений (5) решена методом Гаусса. Найденные значение $A_n^l(\tau)$, $B_n^l(\tau)$ подставляя (6) и находим температуры волокна и семян, т.е. $u_i(r,\tau) = \dfrac{1}{r} \cdot \theta_i(r,\tau), \quad i = 1,2.$

Объекты и методы исследования: Объектом исследования выбрано хлопок-сырец, разновидности С6524, II промышленного сорта. Ниже в таблице 1 приведены результаты расчета, полученные при следующих значениях параметров модели (1) [7].

- для семени: $u_{10}=10^0C$; $\lambda_1=0,26$ *Вт/м·К*; $c_1=1800$ *Дж/кг·К*; $\rho_1=50$ *кг/м*^{3}; $R_1=0,006$ *м*; $k_1=0,005$ *Вт/м*^{2}*·К*; $W_{H1}=19\%$; $\alpha=2,30$ *Дж/м*^{2}*·ч*; $\varepsilon_1=0,8$; $r_{21}=2082000$ *Дж/кг*; $W_{P1}=8\%$; $\alpha_1=2,01$ *Дж/м*^{2}*·ч*; - для волокна: $u_{20}=15^0C$; $\lambda_2=0,07$ *Вт/м·К*; $c_2=1600$ *Дж/кг·К*; $\rho_2=12$ *кг/м*^{3}; $R_2=0,025$ *м*; $k_2=0,0003$ *Вт/м*^{2}*·К*; $W_{H2}=9\%$; $\varepsilon_2=0,8$; $W_{P2}=0\%$; $\alpha_2=2,5$ *Дж/м*^{2}*·ч*; $R=0,1$ *м*.

Таблица 1

Изменения температуры относительно радиуса комка хлопка-сырца и время сушки

R, м / *τ, сек*		0,1	0,2	0,3	0,4	0,5	0,6	0,7
		Температурное поле компонентов хлопка-сырца (^0C)						
60	U_1	28,410	27,979	22,585	19,264	17,257	16,032	15,262
	U_2	48,185	46,651	37,922	31,277	26,143	22,218	19,261
120	U_1	34,147	33,403	27,304	22,999	19,997	17,939	16,532
	U_2	56,898	54,259	45,507	38,577	32,876	28,144	24,228
180	U_1	38,360	37,250	30,884	26,086	22,521	19,893	17,98
	U_2	61,947	58,486	49,815	42,891	37,082	32,127	27,883
240	U_1	41,784	40,312	33,733	28,720	24,811	21,789	19,484
	U_2	65,324	61,215	52,612	45,738	39,920	34,897	30,524
300	U_1	44,703	42,88	36,192	31,02	26,089	23,086	20,981
	U_2	67,744	63,109	54,551	47,728	41,929	36,887	32,46
360	U_1	47,262	45,099	38,336	33,060	28,773	25,272	22,436
	U_2	69,549	64,478	55,947	49,165	43,389	38,348	33,897

Таблица 2

Изменения температуры относительно времени сушки

τ, сек	15	30	45	60	75	90	105	120	135
$u_1(\tau,r)$	12,733	15,369	17,724	19,858	21,814	23,625	25,313	26,896	28,389
$u_2(\tau,r)$	27,759	36,037	42,095	46,864	50,777	54,074	56,905	59,371	61,543
τ, сек	150	165	180	195	210	225	240	255	270
$u_1(\tau,r)$	29,804	31,148	32,430	33,656	34,831	35,960	37,046	38,093	39,104
$u_2(\tau,r)$	63,473	65,200	66,756	68,163	69,444	70,612	71,682	72,665	73,570
τ, сек	285	300	315	330	345	360			
$u_1(\tau,r)$	40,081	41,027	41,943	42,831	43,695	44,533			
$u_2(\tau,r)$	74,406	75,179	75,896	76,560	77,179	77,547			

В таблице 3 приведены результаты расчета относительно радиуса комка хлопка-сырца при температуре воздуха 100^0C, начальной температурой 15^0C и влажности W_{H1}= 19%, W_{H2}=9% семян и волокна соответственно. Время сушки 360 секунд.

Таблица 3

Изменения температуры относительно радиуса комка

R, м	0,1	0,2	0,3	0,4	0,5	0,6	0,7
$u_1(\tau,r)$	47,262	45,099	38,336	33,060	28,773	25,272	22,436
$u_2(\tau,r)$	69,549	64,478	55,947	49,165	43,389	38,348	33,897

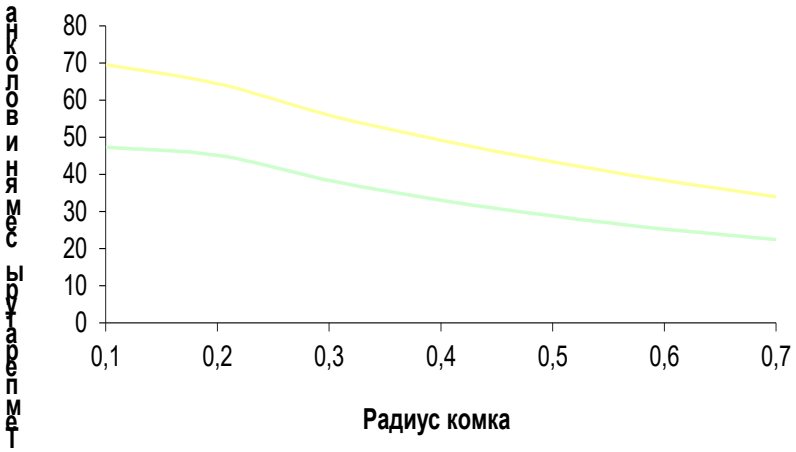


Рис.1. Зависимость температуры нагрева волокна и семян от радиуса комка хлопка-сырца

Результаты и обсуждения: Анализ результатов таблицы 3 показывает, что диаметр комка существенно влияет на интенсивность процесса сушки, т.е. с увеличением диаметр комка резко снижается темп нагрева семян и волокна. Перепад температуры внутри семян по радиусу комка и перепад температуры между волокнами и семян, находяшимся на одинаковых расстояниях от поверхности комка очень большой, что приводит к неравномерной сушке компонентов хлопка-сырца. Для повышения темпа нагрева семян, и достижения равномерности сушки необходимо период организовать сушку хлопка-сырца в разрыхленном виде, т.е. по возможности уменьшить диаметр комка.

Ниже приведёны экспериментальные и расчетные данные изменения температуры компонентов хлопка-сырца.

Таблица 4

Экспериментальные и расчетные данные изменения температуры компонентов хлопка-сырца

Диаметр комка R=0,7 м, температура воздуха 130^{0}С, начальная влажность 17,4%; время сушки 360 сек.				
Время сушки (сек.)	Температура семян		Температура волокна	
	экспериментальные	расчетные	экспериментальные	расчетные
0	10,0	10,0	10,0	10,0
15	26,0	29,0	37,0	39,5
30	34,0	35,2	42,0	40,0
45	46,0	45,7	45,0	49,0
60	52,0	53,1	60,0	54,0
90	64,0	63,4	90,0	72,0

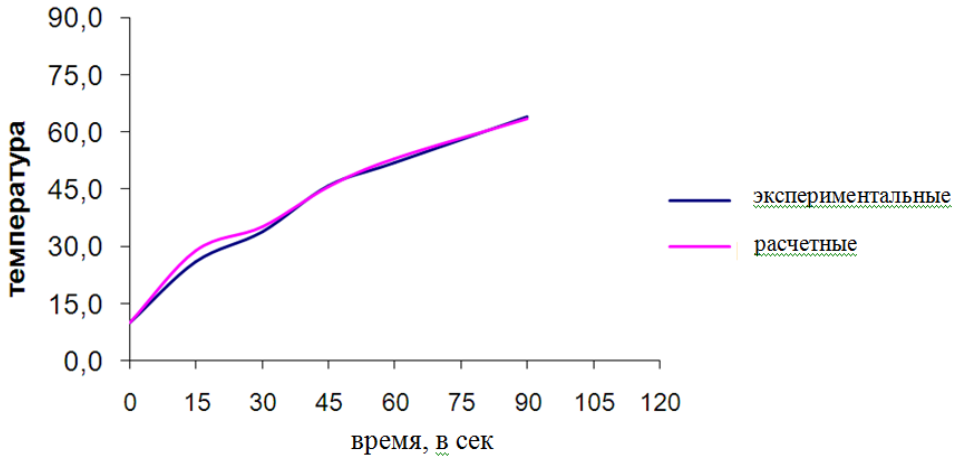


Рис.2. Изменение температуры семена

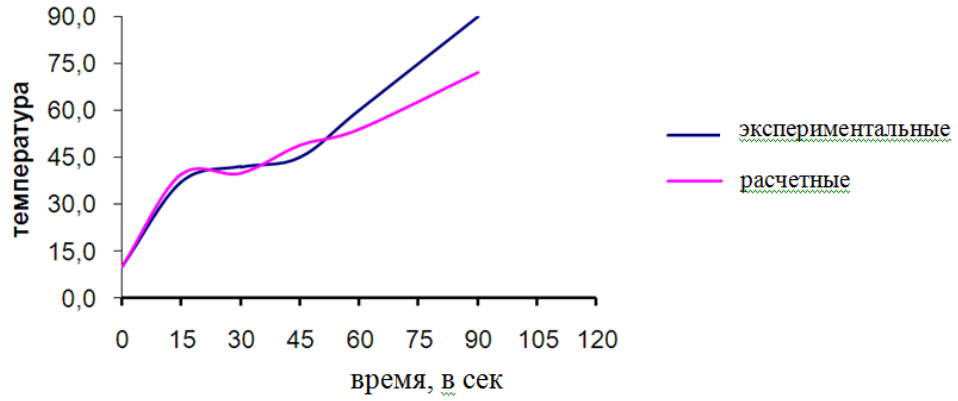


Рис.3. Изменение температуры волокна

Сравнительный анализ (рис.2 и рис.3) показывает, что погрешность расчетных и экспериментальных данных составляет не более 3-4%, что даёт возможность анализировать темп нагрева волокна и семян в виде комка хлопка-сырца.

Заключение: Получены закономерности распространения тепла между волокнами и семенами при различных диаметрах комка хлопка-сырца, температуры сушильного агента и влажности хлопка-сырца в зависимости от интенсивности процесса сушки. Полученные результаты можно будут использовать при выборе оптимальных режимов сушки хлопка-сырца с целью максимального сохранения качества вследствие равномерности нагрева их компонентов.

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ГАРМОНИЗАЦИЯ ДЕЯТЕЛЬНОСТИ В ОБЛАСТИ СТАНДАРТИЗАЦИИ В АВТОМОБИЛЬНОМ СТРОИТЕЛЬСТВЕ С МЕЖДУНАРОДНЫМИ ТРЕБОВАНИЯМИ

Аннотация: *в данной статье проанализированы вопросы гармонизации процессов стандартизации в автомобильной промышленности с международными требованиями. Освещено значение внедрения международных стандартов ISO, UNECE и других для обеспечения качества, безопасности и экологичности автомобильной продукции. Рассмотрены пути совершенствования национальной системы стандартизации, адаптации технических нормативных документов к глобальным требованиям и повышения конкурентоспособности отечественных производителей. В исследовании приведён анализ передового международного опыта и предложены рекомендации по его применению в практике автомобильной промышленности Узбекистана.*

Ключевые слова: *автомобилестроение, стандартизация, международные требования, стандарты ISO, UNECE, требования безопасности, управление качеством, технические нормы, гармонизация, конкурентоспособность, инновационное развитие, механические и конструктивные требования.*

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HARMONIZING STANDARDIZATION ACTIVITIES IN THE AUTOMOTIVE INDUSTRY WITH INTERNATIONAL REQUIREMENTS

Abstract: this article analyzes the issues of harmonizing standardization processes in the automotive industry with international requirements. The importance of implementing international standards such as ISO, UNECE, and others to ensure the quality, safety, and environmental compliance of automotive products is highlighted. The paper discusses ways to improve the national

standardization system, align technical regulations with global standards, and enhance the competitiveness of domestic manufacturers. The study examines best international practices and provides recommendations for their adaptation to the automotive industry of Uzbekistan.

Keywords: *automotive industry, standardization, international requirements, ISO standards, UNECE, quality management, technical regulations, harmonization, competitiveness, innovative development.*

В условиях стремительного развития глобальных экономических отношений, торговых процессов и инновационных технологий сфера стандартизации становится важным фактором обеспечения экономической конкурентоспособности каждой страны. Стандарты являются основным инструментом гарантирования качества продукции и услуг, формирования атмосферы доверия на рынке и повышения экспортного потенциала. Поэтому гармонизация системы стандартизации с международными требованиями остается одной из актуальных задач.

Автомобилестроение является одной из стратегических отраслей мировой экономики. Продукция этой отрасли занимает важное место не только на внутреннем рынке, но и в международной торговой системе. Поэтому гармонизация системы стандартизации в автомобилестроении с международными требованиями является основным условием обеспечения качества, безопасности и экспортного потенциала продукции.

В Узбекистане в последние годы проводится масштабная работа по внедрению новой нормативной системы в соответствии со стандартами ISO и UNECE в автомобильной промышленности. Этот процесс расширяет возможности отечественных автопроизводителей выхода на мировой рынок.

В настоящее время на международном уровне такие организации, как ISO (International Organization for Standardization), IEC (International Electrotechnical Commission) и ITU (International Telecommunication Union), играют ведущую роль в разработке и внедрении стандартов.

Гармонизация с международными требованиями осуществляется по следующим направлениям:

•Правовая и институциональная координация - приведение национального законодательства о стандартизации в соответствие с правилами ISO/IEC;

•Единый подход к терминологии и классификации - определение продуктов и услуг в соответствии со стандартами кодирования в международных системах;

•Механизмы взаимного признания - признание процессов международной сертификации и аккредитации;

• Цифровая трансформация - разработка, хранение и распространение стандартов в цифровом формате.

В современную эпоху инновационные подходы играют важную роль в принятии и внедрении стандартов. К ним относятся:

1. Разработка и обсуждение стандартов через цифровые платформы.

С помощью электронных порталов специалисты, предприниматели и пользователи смогут обмениваться мнениями по стандартным проектам в режиме онлайн. Этот процесс обеспечивает прозрачность и повышает качество стандартов.

2. Система Fast-track.

Это позволит ускорить процесс прямого принятия международных стандартов в качестве национального стандарта. Это облегчит предприятиям-экспортерам выход на международный рынок.

3. *Система инновационных и "живых" стандартов (Living Standards).*

В условиях быстро меняющихся технологий стандарты также должны постоянно обновляться. Система "Living standards" позволяет обновлять стандарты в режиме реального времени.

4. *Унификация базы данных и анализ с использованием искусственного интеллекта.*

С помощью искусственного интеллекта можно анализировать совместимость стандартов, определять области, требующие обновления.

На международном уровне в сфере автомобилестроения действуют следующие основные организации по стандартизации:

ISO (International Organization for Standardization) - разрабатывает более 1500 стандартов для автомобильных компонентов, инженерных систем и производственных процессов.

Например, стандарт ISO 26262 - "Функциональная безопасность для систем безопасности автомобилей" обеспечивает надежность электронных систем управления в автомобилях.

UNECE (United Nations Economic Commission for Europe) - через рабочую группу "WP.29" принимает международные автомобильные технические регламенты (UN Regulations). Эти документы устанавливают единые требования к техническим параметрам транспортных средств, экономии топлива и экологической безопасности.

SAE International и ISO/TC22 - объединения специалистов, разрабатывающих стандарты автомобильной инженерии и дизайна,

Международные стандарты, принятые этими организациями, служат образцом для национальных систем и облегчают интеграционные процессы на мировом рынке.

Ниже систематически изложены основные требования и направления для автомобилестроения, установленные международными стандартами (особенно ISO, UNECE, SAE и другими организациями):

1. Требования безопасности.

Международные стандарты направлены на гарантирование механической, электрической и электронной безопасности автомобильных систем.

Основные стандарты и требования:

ISO 26262 - "Функциональная безопасность" Обеспечивает функциональную безопасность электронных систем управления (например, тормозов, руля, вспомогательных датчиков) в автомобилях.

Требования: анализ вероятности ошибки (уровни ASIL), анализ риска, тестирование и валидация.

Регламент ЕЭК ООН No 94, 95, 137

Устанавливает требования к испытаниям безопасности пассажиров при передних, боковых и задних столкновениях (краш-тесты).

UNECE R16 и R17 - требования к ремням безопасности и системам крепления.

ISO 3450 - стандарты проверки надежности и полной эффективности тормозных систем.

2. *Экологические требования (экономия выбросов и топлива).*

Поскольку выхлопные газы автомобилей являются основным источником загрязнения атмосферы, международные стандарты строго ограничивают их.

Основные стандарты:

• Евро-5 / Евро-6 (Регламент ООН No 83, 49) - ограничение содержания CO2, NOx и твердых частиц в отходах.

• Стандарты ISO 14040 и ISO 14044 - "Оценка жизненного цикла (LCA) ": оценка экологического следа транспортного средства на протяжении всего его жизненного цикла.

• SAE J1711 - метод измерения энергоэффективности в гибридных и электромобилях.

3. *Менеджмент качества и стандарты производства.*

Обеспечение качества - основное требование для каждого автопроизводителя. Основными критериями в этой области являются стандарты ISO и IATF.

Основные стандарты: IATF 16949:2016 - специальный стандарт менеджмента качества на основе ISO 9001 для автомобилестроения.

Требования: анализ процессов, контроль качества поставщиков, постоянное улучшение.

• ISO 9001:2015 - Общая система управления качеством (СУК).

• ISO 14229 (UDS Protocol) - стандарт для систем диагностики (определение кодов ошибок в автомобиле).

4. *Требования к информационным и электронным системам.*

Современные автомобили имеют более 100 электронных модулей. Для них установлены специальные стандарты:

• ISO/SAE 21434 - "Инженерия кибербезопасности".

Обеспечивает кибербезопасность в автомобилях, то есть определяет системы защиты от внешних атак.

•ISO 15118 – “Vehicle-to-Grid (V2G)”

Стандарты зарядки электромобилей и обмена информацией с электрической сетью.

• Регламент ЕЭК ООН No 155 & 156

Обязательно регулирует кибербезопасность автомобилей и обновление программного обеспечения (software update management).

5. *Механические и конструктивные требования.*

• UNECE Regulation No. 13 - тормозные системы;

• UNECE R79 - система рулевого управления;

• UNECE R117 - стандарты на адгезию, шум и топливную экономичность шин;

• ISO 3833 - классификация типов транспортных средств и кузовов.

6. *Требования маркировки, сертификации и соответствия.*

Все автомобили и запчасти должны пройти гомологизацию (Approval UNECE).

• ECE Approval mark (E1, E2, E22 и т.д.) - указывает на соответствие продукции международным техническим регламентам.

• Conformity of Production (CoP) - система контроля стабильности качества в производственном процессе.

7. *Новые тенденции и инновационные направления*

Международные стандарты все больше ориентируются на следующие направления:

• Специальные стандарты безопасности и зарядки для электромобилей и гибридов (ISO 17409, ISO 18246);

• Этические и безопасные требования к автономным транспортным средствам (ISO 23374, SAE J3016);

• "Зеленая логистика" и стандарты использования перерабатываемых материалов (ISO 22628).

Современные методы принятия стандартов в автомобилестроении.

1. Платформы цифровой стандартизации.

В настоящее время во многих странах, включая Узбекистан, процессы разработки и обсуждения стандартов переходят в цифровую среду.

Через национальную информационную систему "E-Standard" разработчики, инженеры и научные специалисты имеют возможность просматривать, комментировать и обновлять проекты стандартов в режиме онлайн.

Этот метод:

• ускоряет принятие решений;

• обеспечивает прозрачность;

• облегчает электронный обмен информацией с международными организациями.

2. *Система "Fast-track"*

В условиях быстро меняющихся инноваций в автомобильной промышленности метод "fast-track" позволяет в короткие сроки принять международные стандарты ISO или UNECE в качестве национального

стандарта. Это ускорит производство экспортоориентированных моделей и упростит процедуры зарубежной сертификации.

3. *"Живые стандарты" (Living Standards)*

Поскольку новые модели в автомобилестроении обновляются каждые 1-2 года, соответствующие стандарты также должны быстро обновляться. Поэтому внедряется концепция "живых стандартов," то есть система нормативных документов, обновляемая в режиме реального времени.

Например, стандарт ISO 15118 ("Vehicle-to-Grid Communication Interface") для электромобилей с каждым годом совершенствуется в новых версиях.

4. *Анализ стандартов с использованием искусственного интеллекта.*

Внедряется использование систем искусственного интеллекта для анализа совместимости стандартов в автомобилестроении и прогнозирования необходимых обновлений. Этот метод позволяет автоматически гармонизировать национальную систему стандартов путем анализа баз ISO и UNECE.

Автомобильная промышленность в Республике Узбекистан в последние годы развивается на основе новой системы, отвечающей международным требованиям. Был реализован ряд важных инициатив:

• Стандарты менеджмента качества ISO 9001 и IATF 16949 внедрены на всех ведущих автомобильных заводах;

• На предприятиях АО "Узавтосаноат" внедрены производственные технологии, соответствующие требованиям Евро-5 и Евро-6 по экологической безопасности;

• Разработаны национальные стандарты в области производства электромобилей на основе международных стандартов ISO 6469 (безопасность электротранспорта);

• Цифровизированы процессы сертификации автомобильных компонентов и запасных частей через электронную систему "E-Standard."

В результате этих реформ значительно расширяются возможности выхода продукции отечественных автопроизводителей на зарубежные рынки.

В Республике Узбекистан в последние годы проведен ряд реформ по совершенствованию системы стандартизации. В частности:

• Налажено активное участие в качестве члена ISO и IEC;

• Цифровизирована база национальных стандартов и запущена информационная система "E-Standard";

• Закон "О техническом регулировании" (2023 г.) обновлен на основе международного опыта;

• Внедряется система сертификации экспортоориентированной продукции, соответствующая международным стандартам.

В перспективе планируется полностью гармонизировать национальные стандарты со стандартами ISO/IEC, внедрить системы автоматического анализа с помощью искусственного интеллекта и расширить масштабы научных исследований в области стандартизации.

Гармонизация сферы стандартизации с международными требованиями является основным условием повышения экономической стабильности страны, конкурентоспособности продукции и экспортного потенциала. Использование современных цифровых методов, внедрение систем быстрого принятия стандартов и применение возможностей искусственного интеллекта выведут деятельность по стандартизации на новый уровень.

Осуществляемые в Узбекистане системные реформы служат полной гармонизации данной сферы с международными требованиями и интеграции национальной экономики в систему глобальных стандартов.

Гармонизация стандартизации с международными требованиями в автомобильной промышленности служит не только обеспечению качества и безопасности, но и повышению экспортного потенциала страны, стимулированию научно-технического развития.

Современные методы, такие как цифровые технологии, система "fast-track" и "живые стандарты," позволяют быстро и эффективно адаптировать национальную систему стандартизации к международным критериям.

Процессы модернизации, осуществляемые в автомобильной промышленности Узбекистана, являются важным шагом на пути полной гармонизации этой отрасли с международными требованиями.

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ОСОБЕННОСТИ ВНЕДРЕНИЯ КЛИЕНТОЦЕНТРИЧНОГО ПОДХОДА В ДЕЯТЕЛЬНОСТЬ ОРГАНОВ ИСПОЛНИТЕЛЬНОЙ ВЛАСТИ С ИСПОЛЬЗОВАНИЕМ СОВРЕМЕННЫХ ТЕХНОЛОГИЙ ВНУТРИОРГАНИЗАЦИОННОГО И МЕЖОРГАНИЗАЦИОННОГО ВЗАИМОДЕЙСТВИЯ

Аннотация: *Статья посвящена применению концепции внутренней клиентоцентричности в органах исполнительной власти. Рассматривается трансформация госслужащего из «винтика системы» в ключевого клиента внутренних процессов, что является основой для повышения качества госуслуг. Анализируются ключевые направления реализации данного подхода: совершенствование HR-процессов, цифровая трансформация и развитие организационной культуры. Особое внимание уделяется практическим инструментам, таким как оценка по методу 360 градусов, управление на основе данных и создание сетей обмена опытом.*

Ключевые слова: *внутренняя клиентоцентричность, органы исполнительной власти, госслужащие, организационная культура, HR-процессы, цифровая трансформация, управление производительностью.*

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FEATURES OF IMPLEMENTING A CUSTOMER-CENTERED APPROACH IN THE ACTIVITIES OF EXECUTIVE AUTHORITIES USING MODERN TECHNOLOGIES OF INTRA-ORGANIZATIONAL AND INTER-ORGANIZATIONAL COOPERATION

Annotation: *The article is devoted to the application of the concept of internal customer-centricity in executive authorities. It examines the transformation of civil servants from «cogs in the system» to key customers of internal processes, which is the basis for improving the quality of public services. The article analyzes the key areas of implementing this approach: improving HR processes, digital transformation, and developing organizational culture. Special attention is given to practical tools such as 360-degree assessment, data-driven management, and creating networks for sharing experiences.*

Keywords: *internal customer centricity, executive authorities, civil servants, organizational culture, HR processes, digital transformation, performance management.*

Клиентоцентричное государство – это государство, функции и услуги которого организованы удобным для человека образом, позволяют эффективно удовлетворять потребности человека и постоянно совершенствуются на основе анализа клиентского опыта.

Трансформация государственных структур через призму ориентации на внутреннего потребителя – это управленческая философия и особая корпоративная среда, где каждый работник государственного сектора становится центральным получателем услуг внутриведомственных механизмов и систем. Задача данного подхода заключается в формировании профессионального пространства, способствующего максимальному росту эффективности труда, удовлетворённости персонала и его карьерному совершенствованию.

Клиентом государства является человек, который может взаимодействовать с ним в различных статусах: как гражданин (а также иностранец или человек без гражданства); как представитель бизнеса (коммерческой или некоммерческой организации), индивидуальный предприниматель или самозанятый; как государственный или муниципальный служащий, представляющий публичную власть в отношениях с внешними клиентами (гражданами и бизнесом), а также участвующий в межведомственном взаимодействии.

Применение принципов клиентоориентированности внутри исполнительных государственных органов выступает стратегическим методом внутриорганизационных преобразований административного механизма. Данная концепция основывается на понимании того, что качественное и позитивное взаимодействие с внешними получателями услуг – населением и предпринимательским сообществом – возможно лишь при условии профессиональной оснащённости, высокой мотивации и удовлетворённости самих государственных служащих.

Внедрение современных процессных технологий для выстраивания коммуникаций как между различными ведомствами, так и внутри отдельных структур, наряду с формированием HR-стратегии на основе клиентоориентированных принципов в государственных учреждениях и

организациях — таковы ключевые задачи «Стандарта для внутреннего клиента», призванного обеспечить фокус на потребностях получателей услуг в работе административных органов. [1]

Согласно положениям Стандарта, к категории внутренних клиентов относятся сотрудники муниципальных и государственных учреждений, персонал подчиненных структур, а также представители сторонних компаний, которым на договорной основе или в силу законодательных норм делегированы полномочия по коммуникации с внешней аудиторией от имени властных структур различных уровней и подконтрольных им организаций.

Внедрение клиентоориентированного подхода в государственных учреждениях и ведомствах происходит через модернизацию процессов взаимодействия как внутри отдельных органов, так и между различными структурами, включая совершенствование работы с персоналом. Реализация «Стандарта для внутреннего клиента» базируется на использовании инновационных методов проектирования и оптимизации рабочих процедур с обязательным соблюдением норм российского законодательства.

Ключевыми составляющими ориентированности на внутреннего клиента: выступают: открытость и честность, компетентность, внимательное отношение к индивидуальным запросам и характерным чертам каждого члена коллектива.

Безусловно, государственные структуры сталкиваются с существенными препятствиями при формировании ориентированного на персонал подхода:

– разобщенность подразделений и дефицит унифицированных норм, когда единая система работы с кадрами и общие критерии внутреннего сервиса отсутствуют, служащие различных департаментов получают несопоставимый опыт взаимодействия с работодателем;

– архаичная бюрократия и устаревшие регламенты, когда громоздкие административные схемы, доставшиеся в наследство от прошлых периодов, тормозят эффективность деятельности и провоцируют недовольство среди персонала;

– дефицит коммуникации и механизмов получения мнений, когда работники остаются в стороне от трансформационных инициатив, поскольку их позиция игнорируется руководством при выработке управленческих решений.

Решение данных проблем требует многоаспектного подхода с применением актуальных методик в области управления персоналом.

Во-первых, внедрение инновационных обучающих программ, ориентированных на развитие навыков ориентации на клиента, умения выстраивать стратегию трансформации сервиса и построения результативного взаимодействия.

Во-вторых, использование комплексной системы оценивания работника через получение мнений от непосредственного руководства, коллег по работе и подчинённых сотрудников. Данный подход помогает определить области

роста и достижений специалиста, на основе чего формируется персональная программа профессионального развития, обеспечивающая точечное и результативное обучение.

В-третьих, применение цифровых технологий и аналитический подход к управлению персоналом: сбор и обработка информации о вовлечённости работников, карьерном росте и качестве внутренних процессов обеспечивает базу для взвешенных управленческих решений и индивидуализации кадровых услуг.

В-четвертых, это поощрение новаторских подходов, создание системы мотивации (включая признание достижений, консультационную поддержку специалистов) стимулирует сотрудников к улучшению стандартов обслуживания клиентов.

В-пятых, это интеграция показателей сотрудничества в стратегическое планирование: При формировании бюджета организации необходимо принимать во внимание показатели, отражающие профессиональный багаж работников, что усиливает подотчетность за достижения в этом направлении. Одновременно данные измерения должны находить отражение в персональных программах профессионального роста специалистов и корпоративных рабочих графиках.

Соблюдение положений Стандарта приводит к получению следующих результатов:

– увеличение степени заинтересованности и удовлетворённости работников государственных структур и подчинённых им учреждений;

– формирование организационной среды, где качественное обслуживание граждан становится важнее бюрократического исполнения служебных функций;

– повышение авторитета службы в государственных и муниципальных структурах, включая деятельность подконтрольных учреждений;

– приведение работы ведомств и учреждений в соответствие с ожиданиями получателей услуг относительно качества предоставляемого сервиса.

Требования Стандартов разработаны на основе общих ценностей и принципов, утвержденных Декларацией ценностей клиентоцентричности [1].

Декларация провозглашает переход к клиентоцентричной модели государственного управления и организации государственных функций и услуг, основанной на обеспечении эффективного и комфортного взаимодействия человека и государства за счет анализа актуальных потребностей и клиентского опыта человека.

Таким образом, внутренняя клиентоцентричность в органах исполнительной власти представляет собой постоянную эволюцию управленческих механизмов и организационной среды государственных структур, а не единовременное мероприятие. Программа «Государство для людей» в нашей стране включает комплексную подготовку работников властных институтов по методикам клиентоориентированности – к

настоящему моменту такую подготовку прошли свыше 16 тысяч государственных служащих. Развивая комфортные и продуктивные условия труда для чиновников, власть одновременно улучшает профессиональное благополучие сотрудников и создаёт основу для оказания оперативных, доступных и персонализированных сервисов населению страны.

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О ВОССТАНОВЛЕНИИ ТРАНСПОРТАБЕЛЬНЫХ ЗИМНИХ СОРТОВ ДЫНИ КАРАКАЛПАКСТАНА

Аннотация. *В статье рассматривается значение дыни как важной пищевой и лекарственной культуры, адаптированной к экстремальным экологическим условиям Южного Приаралья. Приводятся агроэкологические характеристики региона, особенности биологии дыни, её пищевая и медицинская ценность, а также перспективы её возделывания в условиях климатических изменений.*

Ключевые слова: *Республика Каракалпакстан, растениеводство, сельское хозяйство, культуры*

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ON THE RESTORATION OF TRANSPORTABLE WINTER MELON VARIETIES OF KARAKALPAKSTAN

Abstract*. This article examines the importance of melon as an important food and medicinal crop adapted to the extreme environmental conditions of the Southern Aral Sea region. It presents the agroecological characteristics of the*

region, the biological characteristics of melon, its nutritional and medicinal value, and the prospects for its cultivation under climate change.

***Keywords**: Republic of Karakalpakstan, plant growing, agriculture, crops*

Актуальность. В настоящее время одной из самых актуальных проблем в Южном Приаралье является вопрос обеспечения населения высокопродуктивной растительной продукцией, богатой различными витаминами, имеющей значительными, важными макро и микроэлементами, растения которых содержат сытные продукты, имеют лекарственные свойства и которые способны расти на засолённых и маловодных, не влажных почвах.

В свете решений этих важнейших проблем народа- особое значение приобретает удовлетворение потребностей организма человека в таком питании, которое способствовало бы обеспечению здоровья, повышению трудоспособности и долголетию.

Нам известно, что овощи и плоды издавна употребляются, главным образом, как продукты питания и иногда как лечебное средство.

Так, как многочисленные полезные, а часто жизненно необходимые вещества поступают в организм человека с пищей. Одним из таких овоще-бахчевых культур являются дыня (Cucumis melo L.). Она относится к семейству тыквенных (Cucurbitaceae) и является видом рода Огурец (Cucumis).

Дыня – теплолюбивое и светолюбивое растение, устойчивое к засухе и засолению почвы, но плохо переносящее повышенную влажность.

Почвенно–климатические условия Каракалпакстана исключительно благоприятны для выращивания высоко сахарных плодов дынь. Но, в связи с усыханием Аральского моря, в его южных зонах из года в год увеличиваются степень засоления почвы, сухость климата и дефицит влаги, что является одной из причин их невысоких и нестабильных по годам урожайности и валовых сборов [Lamers J. P. A. et al. (ed.) 2015, Mitchell D. M. 2014]. Поэтому, при таких экстремальных условиях, необходимо целенаправленная работа по испытанию различных сортов дынь и выделение среди них высокоурожайных, болезни устойчивых, транспортабельных и лежких форм, для длительного хранения и переработки [Рахматов О. О., Умаралиев О. Р. 2014].

В связи с усилением негативных, экстремально - экологических условиях в Южном Приаралье (Республика Каракалпакстан находятся в эпицентре Аральской экологической катастрофы), многие сорта дыни Каракалпакстана исчезли, и многие сорта на грани исчезновения.

Правительство Республики Узбекистан и Суверенной Республики Каракалпакстан, постоянно проявляют огромную заботу об улучшении жизни и здоровья людей Узбекистана, в том числе Республики Каракалпакстана.

Международным инновационным центром Приаралья при Президенте Республики Узбекистан, весной 2019 года были начаты работы по

восстановлению разнообразия сортов бахчевых культур, в Республике Каракалпакстан. в.т.ч. дынь, арбузов и тыквенных Средней Азии, Японии, России, Украины, Грузии, Армении, Китая, Мексики и США. Семена бахчевых культур были приобретены из коллекций хранившиеся в архиве семян научно-исследовательского института растениеводства Республики Узбекистан.

В результате своевременных агротехнических мероприятии проведенных лабораторией биотехнологий и физиологии растений Центра, в настоящие дни бахчевые культуры начали давать свои первые урожаи.

Но, Республика Каракалпакстан известна своими местными сортами дынь, которые славятся высоким содержанием сахара в плодах, обычно от 14% до 18%. Дыни, выращиваемые в этом регионе, ценятся за свои вкусовые качества и являются предметом гордости.

Содержат также витамины А, B_1, B_2, С, РР, органические азотистые вещества, жиры (в семенах жиры содержится до 50%, их используют для изготовления высоко качественного пищевого масла), летучие ароматические вещества, значительное количество фолиевой кислоты, каротин, клетчатка и минеральные соли калия, кальция, магния, фосфора и железа.

Дыни потребляется в свежем натуральным виде и её можно перерабатывать на мед, повидло, джем и др. Летние виды их также широко потребляются сушеными.

В решении вопросов повышения урожайности дынь, улучшения их качества большое значение имеет сорт.

В научно-исследовательском институте земледелия (г.Чимбай) под возглавлением крупнейшим специалистом по бахчеводству республики Л.С.Крживецем (XIX веке) от селекционировано (восстановлено) около тридцати сортов Каракалпакских дынь. Ученый- селекционер вывел также четыре новых сорта дынь.

В большом ассортименте Каракалпакских дынь, созданных народной селекцией, скороспелые сорта немногочисленны (1.Тарнек, 2. Ак замча, 3. Сары замча, 4.Кизыл замча, 5. Кара замча, 6.Кок замча, 7. Ала замча, 8. Бос каун.).

Дыни летнего созревания или сочно мякотные дыни- представлены самым большим набором сортов: 1. Ак гурбек, 2. Кара гурбек, 3. Ала гурбек, 4. Гарбуз каун, 5. Алекке, 6. Кок гурбек, 7. Нан гоши, 8. Секерпара, 9. Хива бишек, 10. Бакыраман, 11. Джида жапырак, 12. Бекзады. Плоды этой группы по вкусу превосходят скороспелые и зимние сорта. Они используются в основном до середины осени (октябрь).

Осенние сорта дыни: 1. Карры кыз, 2. Ак каш бишек, 3. Ходжейли бишек, 4. Тор нават бишек и 5. Шайы каун.

Осенне-зимние сорта могут храниться 2-3 месяца. Они по вкусу мало уступают летним сортам.

Зимние сорта: 1. Кара котыр, 2.Нават бийшек, 3. Кара каш, 4. Кизыл бишек, 5. Туя каун, 6. Хамма бишек, 7. Ала хамма, 8. Кара бишек, 9. Бишек

Чимбайский-151, 10. Мадани заман, 11. Кара гуляби, 12. Кизыл гуляби, 13. Кок гуляби, 14. Сары гуляби, 15. Ак каш, 16. Карры кыз, 17. Кара каун, самые легкие и можно хранить до весны следующего года.

Позднеспелые сорта дыни получили мировую известность за свои непревзойденные вкусовые качества, транспортабельность и способность храниться почти до нового урожая.

Дыни Каракалпакстана с давних времен широко известны за пределами Средней Азии. Они завоевали себе заслуженную славу своими высокими вкусовыми качествами, сахаристостью, ароматом, транспортабельностью и долговременной лежкостью.

Каракалпакские зимние сорта дынь несколько раз демонстрировались на выставках достижений народного хозяйства бывшего союза и в Узбекистане, где они получили всеобщее признание. В 1969 г. на конкурсе ВДНХ данного союза заняли первое место и были удостоены высокой награды-Золотой медали.

Многие сорта дынь завоевали особую славу по легкости транспорта цельности, вкусовым достоинствам и привлекают и себе внимание народов многих стран земного шара. Они проникли в Иран, Афганистан, Пакистан, Индию, Китай.

Как лечебное средство дыни применяется против разных болезней, в частности для лечения бронхита, туберкулеза, мигрени и для очищения дыхательных путей.

Для лечения ревматизма рекомендуется втирание уваренного сока дынь, при гонорее прием во внутрь рассасывает опухоль и вытягивает гной. Слабым женщинам в первой половине беременности не рекомендуется есть дыню, чтоб предотвратить самопроизвольным выкидыш. Если женщина здоровая, то можно есть дыню регулярно во весь период беременности.

Зимние сорта дыни Каракалпакстана

№ п/п	Название сорта	Сахаристость (%)	Вегетационный период, день	Средний весь плода, кг	Урожайность,ц/га	Срок хранения. Транспортостабельность и лежкость, месяц.
1	Кара котыр	15%	Сорт поздноспелый. Период от всходов до первого сбора-123 дня.	4 кг.	До 542 ц/га.	Длительность хранения-до мая следующего года. Это лучший сорт по транспортабельности, вкусовым качествам и лежкости из всех зимних сортов дынь. Выход сухой дыни в среднем 7,5%, высоких

						вкусовых качеств. Рекомендуется высевать в два срока: ранний, для летне-осенного потребления в свежем виде, на сушку и переработку, в южных районах-с 10 по 15 апреля. Для зимнего хранения и вывоза-с 1 по 10 июня для северной группы районов и с 15 по 20 июня для юхной зоны.
2	Нават бишек	15-16%	105-110 дней	3-4 кг	400-450 ц/га	Пригоден для длительного зимнего хранения, очень хорош для сушки и вывоза на дальние расстояния.
3	Кара Каш	13-15%	90-130 дней	4-10 кг	300-350 ц/га	30-120 дней. Пригоден для длительного зимнего хранения и для вывоза за пределы республики.
4	Кизил бишек	13%	110-115 дней	4 кг	498 ц/га	Плоды хороши для сушки, для потребления в свежем виде до мая и для вывоза. Транспортабельность очень высокая. Выход сухой дыни-8-9%, высоких качеств. Посевы рекомендуются в два срока, как сорта Ак каш.
5	Туя каун	12%	128 дней	7-10 кг	545 ц/га	Плоды в основном идут

						для зимнего потребления в свежем виде, пригодны для вывоза. Транспортабельность хорошая. Влежке сохраняется до марта. Ввиду низкой сахаристости на сушку непригодны. Сроки посева для северной группы районов с 20 мая до 1 июня, для южных районов с 1 по июня.
6	Хамма бишек	13%	Сорт поздноспелый, период от всходов до созревания-136 дней.	8-10 кг, максимальный –до 30 кг.	528 ц/га	Лежкость -6-7 месяцев, сохраняется до мая.
7	Ала хамма	15%	Вегетационный период сорт зимний 93-146 дней, а поздноспелый сорт от всходов до съемной спелости-123 дня.	От 3 до 30 кг	542 ц/га	Лежкость -5-6 месяцев, сорт пригоден для использования в свежем виде, переработки и экспорта.
8	Кара бишек	14%	Имеется 16 форм, различающихся между собой по вегетационному периоду (90-148 дней), Сорт среднеспелый. Вегетационный период -	Мелкоплодный сорт 3-4 кг. Крупности плода (от 2,5 до 28 кг).	До 492 ц/га	Зимним мелкоплодный Лежкость -4-5 месяцев. Сорт пригоден для употребления в свежем виде, переработки и вывоза. Средний выход сухой дыни-7,2%, хороших вкусовых качеств.

			117-120 дней.			
9	Бишек Чимбай-ский-151	14-16%	105-110 дней	4-6 кг	400-450 ц/га	Выход сухой дыни-7,6%, высоких вкусовых качеств. Лежкость -150 дней. Сорт при годен для длительного зимнего хранения, для сушки и вывоза на дальние расстояния.
10	Мадани заман	Средне сахаристая	Сорт очень позднеспелый, вегетационный период от всхэодов до съемной спелости-130-135 дней.	10-14 кг. Отдельные плоды этого сорта достигают веса 32 кг.	Высоко-урожай-ный –до 538 ц/га.	Хорошо транспортабельный и лежкий-до мая.
11	Кара гуляби	14%	Вегетационный период -120-125 дней.	4-5 кг	421 ц/га	Лежкость -4-5 месяцев. Употребляется в свежем виде в осенне-зимний период, пригоден для переработки и вывоза. Средний выход сухой дыни-7%.
12	Кизыл гуляби	14%	125-130 дней	4-5 кг	460 ц/га	Лежкость -5-6 месяцев. Пригоден да в южной зоне-с 10 по 20 июня.ля переработки, средний выход сухой дыни-7%, хорошего качества. Для зимнего хранения плодов посев этого сорта в северной группе районов

						проводится с 1 по 10 июня.
13	Кок гуляби	14%	Сорт позднеспелый, вегетационный период от всходов до съемной спелости-120-125 дней, до потребительской-135-140 дней	7-9 кг, отдельные крупные плоды весят 20-25 кг.	Высоко-урожай-ный -до 520 ц/га	Транспортабельный, лео мая.ь-жкост
14	Сары гуляби	15%	Устойчив к увяданию, средне-позднеспелый, от всходов до съемной спелости проходит 110, до потребительской-120 дней.	4-6 кг	До 550 ц/га	В лежке сохраняяется до нового года, Плоды употребляются в свежем виде, пригодны для сушки, вывоза на дальние расстояния.
15	Ак каш	16%	Сорт среднеспелый, вегетационный период-120-125 дней	4-6 кг	502 ц/га	Лежкость –до 7 месяцев. Лучший сорт для вывоза на дальние расстояния и для переработки. Выход сухой продукции-7,5-8%, высокого качества.
16	Карры кыз	15-16%	Сорт позднеспелый, от всходов до съемной спелости проходит 120-125, до потребительской -135-140 дней.	8-11 кг	530 ц/га	Плоды потребляются в свежем виде, используются для сушки и для вывоза на дальние расстояния. Выход сухой продукции в среднем 7,3%, высоких вкусовых качеств. Посев

						рекомендуется производить в 2 срока: в апреле для стола, для сушки и переработки; в 3-й декаде мая для зимнего хранения.
17	Кара каун	14-15%	Сорт позднеспелый, от всходов до созревания плодов проходит 115-120 дней.	4-16 кг	400-450 ц/га	Сорт устойчив к болезни увядания. Плоды пригодны для сушки, длительного хранения и вывоза на дальние расстояния. Транспортабельный, плоды хорошо сохраняются в лежке до марта.

Великий ученый уроженец Бухары, Абу Али Ибн Сина (Авиценна) тысячу лет тому назад писал в своем сочинении о простых лекарствах; дыня особенно ее семена и мягкость, расширяет сосуды, очищает кожу. Плаценты полезны от загара, веснушек, бахары и перхоти.Как спелые так и недозрелые дыни обладают мочегонным свойством рассасывают камни в почках мочевом пузыре и печени.

В народном медицине Каракалпакстана дыни употребляли для усиления деятельности сердца при одышке общей слабости кишечных, желтухи, группа малокровия. Дынное масло также обладает лекарственными свойствами. Оно действует лучше чем пчелиный яд а для желудочных больных может заменить виноград. Эмульсия (молока) из дынных семян а также семена дыни сок недозрелых плодов- очень хорошее глистогонное средство. Плоды и семена дыни применяются еще многочисленных болезни человека.

Выводы

1.Учитывая высшее перечисленных полезных свойств дынь, рекомендуем расширить посевных площадей и для успешной селекции (восстановления) новых сортов дынь, необходимо проводить работы по отбору, гибридизации и последующему отбору лучших сеянцев. Важно учитывать желаемые признаки, такие как урожайность, устойчивость к болезням, вкус и внешний вид плодов.

2.Экспорт каракалпакских дынь, вероятно, является актуальной темой, учитывая известность региона как производителя дынь. Однако, конкретных данных об объемах экспорта именно каракалпакских дынь в текущем году, а также о конкретных странах-импортерах, не представлено в доступных

источниках. Тем не менее, можно рассмотреть общие аспекты экспорта дынь из Узбекистана, который, как известно, является крупным производителем.

3.Осуществление данной мероприятий в экстремальных экологических условиях Южного Приаралья является важным шагом в решении продовольственной проблемы региона и может рассматриваться как часть более широкой государственной продовольственной программы. Эта деятельность направлена на смягчение последствий экологической катастрофы и повышение устойчивости сельскохозяйственного производства в условиях дефицита воды и засоления почв.

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ПУТИ ПОВЫШЕНИЯ ИНВЕСТИЦИОННОЙ ПРИВЛЕКАТЕЛЬНОСТИ ПРОЕКТОВ АКЦИОНЕРНЫХ ПРЕДПРИЯТИЙ НЕФТЕГАЗОВОГО КОМПЛЕКСА УЗБЕКИСТАНА

Аннотация. В комплексе мер по технологической трансформации экономики Узбекистана важное место отводится привлечению инвестиций в стратегически важные акционерные предприятия, составляющие ядро индустриального сектора Узбекистана. Важнейшим условием привлечения иностранных инвестиций для данных предприятий выступает высокий уровень их инвестиционной привлекательности, чему содействует реализация крупных инвестиционных проектов с участием иностранных инвесторов. К сожалению, большинство действующих акционерных предприятий не уделяют должного внимания данному аспекту своей деятельности. Учитывая слабую изученность этой проблемы, авторы статьи исследуют ее состояние на примере крупных проектов предприятий нефтегазового сектора Узбекистана, предлагая новые подходы к её решению.

Ключевые слова: акционерная собственность, инновации, технологическая реструктуризация, инвестиции, инвестиционные проекты, инвестиции, инвестиционная привлекательность акционерных предприятий, традиционные инструменты повышения инвестиционной привлекательности проектов, надежность инвестиционных проектов, качество бизнес-планов проектов, риски проектного финансирования, окупаемость проектов, проектный менеджмент.

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WAYS TO ENHANCE THE INVESTMENT APPEAL OF PROJECTS OF JOINT-STOCK COMPANIES IN THE OIL AND GAS SECTOR OF UZBEKISTAN

Abstract. Within the framework of measures aimed at the technological transformation of Uzbekistan's economy, a significant role is assigned to attracting investment into strategically important joint-stock enterprises that form the core of the country's industrial sector. A key condition for attracting foreign investment to

these enterprises is a high level of their investment attractiveness, which is promoted through the implementation of large-scale investment projects involving foreign investors. Unfortunately, most existing joint-stock enterprises do not pay sufficient attention to this aspect of their activity. Considering the limited research on this issue, the authors analyze its current state using major projects of Uzbekistan's oil and gas sector enterprises as an example and propose new approaches to its improvement.

Key words: industrial cooperation, joint ventures, forms of cooperative relations, financial component, activities of industrial cooperation participants, traditional financing instruments, innovative instruments of financial support for enterprises, differentiated approach to financing industrial cooperation participants, technological sovereignty.

ВВЕДЕНИЕ

Турбулентное развитие мировой экономики, усиливающиеся тарифные войны и резкое обострение борьбы за технологическое лидерство кардинальным образом изменяют подходы к привлечению и использованию иностранных инвестиций. На этом фоне для развивающихся стран мира, к числу которых относиться и Узбекистан, получение доступа к значительным объемам иностранных инвестиций становятся сегодня решающим фактором их выживаемости.

Усиливающаяся потребность Узбекистана в значительных объемах иностранных инвестиций обусловлена необходимостью обеспечения энергетической безопасности страны, а также потребностью в кардинальной технологической трансформации её производительных сил. Наличие указанных обстоятельств и обостряющаяся с каждым годом конкуренция на мировом рынке инвестиций диктуют необходимость повышения уровня инвестиционной привлекательности ключевых потребителей иностранных инвестиций [1].

Как показывает мировая практика, одним из важных критериев инвестиционной привлекательности стратегически важных акционерных предприятий Узбекистана выступает инвестиционная привлекательность и качество освоения ими крупных проектов, обеспечивающих их технологическую трансформацию.

Поиск путей повышения инвестиционной привлекательности крупных проектов стратегически важных предприятий нефтегазового комплекса Узбекистана в глазах крупных иностранных инвесторов предопределили актуальность темы и направления поиска авторов данной статьи.

Учитывая много векторный характер механизма институционального укрепления и функционального развития механизма повышения инвестиционной привлекательности проектов стратегически важных предприятий нефтегазового комплекса Узбекистана, в процессе данного исследования использованы методы системного подхода, статистического и структурного анализа, а также другие методы инвестиционного менеджмента.

Предметом особого внимания со стороны органов государственного управления следует считать его дихотомическую природу, выражающуюся не только в привлечении необходимых объемов инвестиций, но и в получении максимального эффекта от реализации проектов при одновременном обеспечении ожидаемого уровня доходности для иностранных инвесторов [2].

Для всестороннего изучения потенциала механизма повышения инвестиционной привлекательности проектов предприятий нефтегазового комплекса проведен SWOT-анализ преимуществ, недостатков, возможностей и угроз механизма повышения инвестиционной привлекательности данной категории драйверов технологического развития Узбекистана.

При этом к сильным сторонам проектов акционерных предприятий нефтегазового комплекса Узбекистана (**Strengths**) можно отнести:

– Наличие солидной производственно-технической базы, позволяющей выпускать широкий спектр продукции.

– Обладание солидной сырьевой базой, обеспечивающей наращивание их экспортного потенциала.

– Высоко квалифицированный состав менеджеров и специалистов, имеющий многолетний опыт работы, что крайне привлекательно для инвесторов.

К слабым сторонам проектов акционерных предприятий данной отрасли (**Weaknesses**) следует отнести:

– Большинство данных предприятия нуждаются в технологической трансформации, требующей значительных объемов инвестиций.

– Низкий уровень корпоративного управления и прозрачности результатов финансовой деятельности.

– Слабое использование международных стандартов финансовой отчетности и стандартов качества продукции ISO

К возможностям **(Opportunities)**, которые предоставляют проекты предприятий нефтегазового комплекса иностранным инвесторам можно отнести:

– Крайне выгодное геополитическое расположение Узбекистана на перекрестке крупных транспортно-логистических коридоров Центральной Азии.

– Наличие огромных запасов природно-сырьевых ресурсов и избыточного количества трудоспособного населения во многих регионах Узбекистана.

И наконец, к числу наиболее реальных угроз (**Threats**) для инвесторов, с которыми могут столкнуться указанные категории предприятий нефтегазового комплекса

– Турбулентное развитие мировой экономики и нарушения транспортно-логистических процессов способно оказать негативное влияние на сотрудничество.

– Усиливающаяся конкуренция между ведущими странами мира за влияние над странами Центральной Азии.

– Усиливающиеся колебания цен на сырьевые товары могут повлиять на конечные результаты совместной коммерческой деятельности партнеров.

Качественно новая инвестиционная политика, базирующаяся на привлечении значительных объемов иностранного капитала, потребовала коренного реформирования производственных отношений и глубокой реструктуризации производительных сил республики.

За годы независимости в Узбекистане приватизировано более 33 тысяч государственных предприятий и объектов. Сегодня в нашей республике осуществляют деятельность 2692 коммерческих организаций с государственным участием, в том числе 1124 общества с ограниченной ответственностью и 241 акционерное общество в различных отраслях экономик.

В настоящее время из 599 акционерных обществ республики 42 процента имеют государственную собственность, 84 процента от общего числа их акций принадлежат государству [3].

В качестве именно таких драйверов технологической трансформации национальной экономики в последние годы выступают такие крупные акционерные общества с госпакетами акций, как АО «НГМК», АО «АГМК», АО «Узбекнефтгаз», АО «Узбекистон темир йуллари», АО «Узбекистон хаво йуллари», АО «Узхимпром» и другие. Наличие у каждого из них уникального научно-производственного потенциала, развитой инженерно-технической инфраструктуры и высоко квалифицированного персонала создает благоприятные условия для привлечения крупных прямых и институциональных зарубежных инвесторов [4].

Отмечая высокий потенциал стратегически важных акционерных предприятий и имеющиеся возможности для повышения их роли в качестве драйверов технологической трансформации индустриального сектора Узбекистана, нельзя забывать, что главным барьером на пути их инновационного развития выступает острая нехватка иностранных инвестиций. И проблема здесь заключается в недостаточном уровне их инвестиционной привлекательности и низком качестве бизнес-планов предлагаемых ими проектов.

Учитывая резко возросший спрос на иностранные инвестиций для нужд их технологической трансформации в современных условиях требует умелого задействования усилий органов государственного, отраслевого и регионального управления, которые должны ориентироваться не только на поиск оптимального их сочетания в зависимости от направлений вложения инвестиций, но и на жесткий контроль за эффективностью их освоения силами данных субъектов

Своевременное создание эффективного механизма повышения инвестиционной привлекательности данной категории эмитентов невозможна без надёжной институциональной поддержки их усилий со стороны органов

государственного управления, особенно в вопросах внедрения международных стандартов финансовой отчетности, создания благоприятного инвестиционного климата, защиты прав иностранных инвесторов, а также продвижения эмитируемых ими ценных бумаг на зарубежные рынки товаров и услуг [5].

Учитывая резко возросший спрос на иностранные инвестиций для нужд их технологической трансформации в современных условиях требует умелого задействования усилий органов государственного, отраслевого и регионального управления, которые должны ориентироваться не только на поиск оптимального их сочетания в зависимости от направлений вложения инвестиций, но и на жесткий контроль за эффективностью их освоения силами данных субъектов.

В заключении можно сделать вывод, что своевременная реализация предложенных мер по повышению эффективности механизма повышения инвестиционной привлекательности стратегически важных акционерных предприятий республики должна позволить расширить масштабы привлечения иностранных инвестиций на нужды их технологической трансформации, что позитивно отразиться на темпах м качестве инновационного развития индустриального сектора Нового Узбекистана.

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МОДЕЛЬ ЦИФРОВОЙ ТРАНСФОРМАЦИИ ПРОМЫШЛЕННЫХ ПРЕДПРИЯТИЙ ЧЕРЕЗ ВНЕДРЕНИЕ ИНТЕЛЛЕКТУАЛЬНЫХ СИСТЕМ КОНТРОЛЯ КАЧЕСТВА

Аннотация: *В статье представлена концептуальная модель цифровой трансформации промышленного предприятия, основанная на внедрении интеллектуальных систем контроля качества (ИСКК). Показано, что интеллектуализация системы менеджмента качества (СМК) является фундаментальным условием повышения эффективности производственных процессов, снижения издержек и обеспечения предиктивного управления качеством. Обосновывается необходимость перехода от традиционных методов контроля к цифровым решениям, основанным на машинном зрении, роботизированных системах и ИИ-аналитике. В работе выделены формализованные уровни цифровой трансформации, определены критерии зрелости СМК и условия успешного внедрения ИСКК. Предложенная модель является многоуровневым механизмом перестройки производственных и управленческих процессов, направленный на формирование цифровой СМК и достижение стратегических, экономических и технологических эффектов.*

Ключевые слова: *цифровая трансформация; интеллектуальные системы контроля качества; система менеджмента качества; цифровая СМК; автоматизированный контроль качества; ИСКК.*

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MODEL OF DIGITAL TRANSFORMATION OF INDUSTRIAL ENTERPRISES THROUGH THE IMPLEMENTATION OF INTELLIGENT QUALITY CONTROL SYSTEMS

Abstract: *The article presents a conceptual model of the digital transformation of an industrial enterprise based on the implementation of intelligent quality control systems (IQCS). It is demonstrated that the intellectualization of the quality management system (QMS) is a fundamental prerequisite for improving the efficiency of production processes, reducing costs, and ensuring predictive quality management. The study substantiates the need to move from traditional control methods to digital solutions based on machine vision, robotic inspection systems, and AI-driven analytics. The paper identifies formalized levels of digital transformation, defines QMS maturity criteria, and specifies the conditions required for the successful deployment of IQCS. The proposed model represents a multi-level mechanism for restructuring production and managerial processes*

aimed at forming a digital QMS and achieving strategic, economic, and technological effects.

Keywords: *digital transformation; intelligent quality control systems; quality management system; digital QMS; automated quality control; IQCS.*

Цифровая трансформация промышленного сектора выступает определяющим направлением развития современных предприятий, осуществляющих функционирование в условиях растущей конкуренции и усложнения производственных процессов, а также сталкивающихся с необходимостью обеспечения высокого уровня качества продукции и его непрерывного совершенствования. Стоит отметить, что на протяжении последних лет за цифровизацией закрепилась позиция структурного фактора промышленного развития, трансформационное воздействие которого привело к формированию новых требований к управлению качеством, организации производственных циклов и построению систем менеджмента качества (далее – СМК). В частности, как указывает И.В. Абрамов, цифровые технологии напрямую сказываются на производственных процессах; под влиянием цифровых технологий происходит постепенный перевод СМК на интеллектуальные системы управления, основной принцип работы которых связан с обработкой огромных массивов информации [1]. Происходит отказ от выборочных и ситуативных форм контроля в сторону более зрелых и организационно совершенных. По мнению Ю.А. Орловой, И.Б. Репиной и О.А. Чудновой, современные методы контроля качества становятся более эффективными при переходе к цифровым и автоматизированным подходам, которые, как минимум, ускоряют процессы в управлении качеством за счет их осуществления не человеком, а роботизированными системами (что, соответственно, сказывается на количестве рисков, допускаемых ошибок, исключении формального отношения и др.) [3; 4].

Закономерно, все более распространенный и трендовый характер приобретают вопросы внедрения интеллектуальных систем контроля качества (далее – ИСКК) как наиболее совершенной модели цифровой трансформации СМК предприятия. Причиной тому послужило и то, что на современном этапе происходит расширение потребностей производителей в системах машинного зрения, роботизированного контроля, автоматизированной диагностики и предиктивной аналитики. Спрос на соответствующие технологии возрастает. Тем самым постепенно промышленность переходит на новые подходы к управлению производственными процессами, опосредованные цифровыми технологиями, что сказывается на стратегических показателях эффективности производства и уровне его издержек [5]. Введение ИСКК становится связующим звеном между цифровой трансформацией и развитием СМК, поскольку ИСКК позволяют выявлять дефекты на ранних стадиях, автоматически анализировать отклонения, осуществлять прогнозирование отказов оборудования и формировать рекомендации по оптимизации процессов (при

этом действуют с минимальным участием человека, подходя для непрерывных производств с полным производственным циклом) [8]. Таким образом, очевидно, что цифровая трансформация промышленного предприятия невозможна без модернизации его СМК, в чем важным направлением становится её интеллектуализация и развитие за счет внедрения цифровых технологий.

Целью исследования является построение концептуальной модели цифровой трансформации промышленного предприятия через внедрение ИСКК, а также определение её структурных компонентов.

Материалами к исследованию выступили открытые данные научных статей и отчеты о состоянии рынка автоматизированного индустриального контроля качества, на основании теоретического, сравнительного анализа, обобщения, синтеза и систематизации которых были выделены элементы модели цифровой трансформации промышленного предприятия через внедрение ИСКК, а также определены компоненты такой системы.

Отметим, что дополнительным фактором, обосновывающим интерес к внедрению ИСКК на промышленных предприятиях, является динамика современного рынка автоматизированного индустриального контроля качества, который, согласно исследованиям Market Research Future, к 2035 году достигнет значений свыше 50,51 млрд. долл. США при среднегодовых темпах роста в 8,12% (см. Рис. 1):

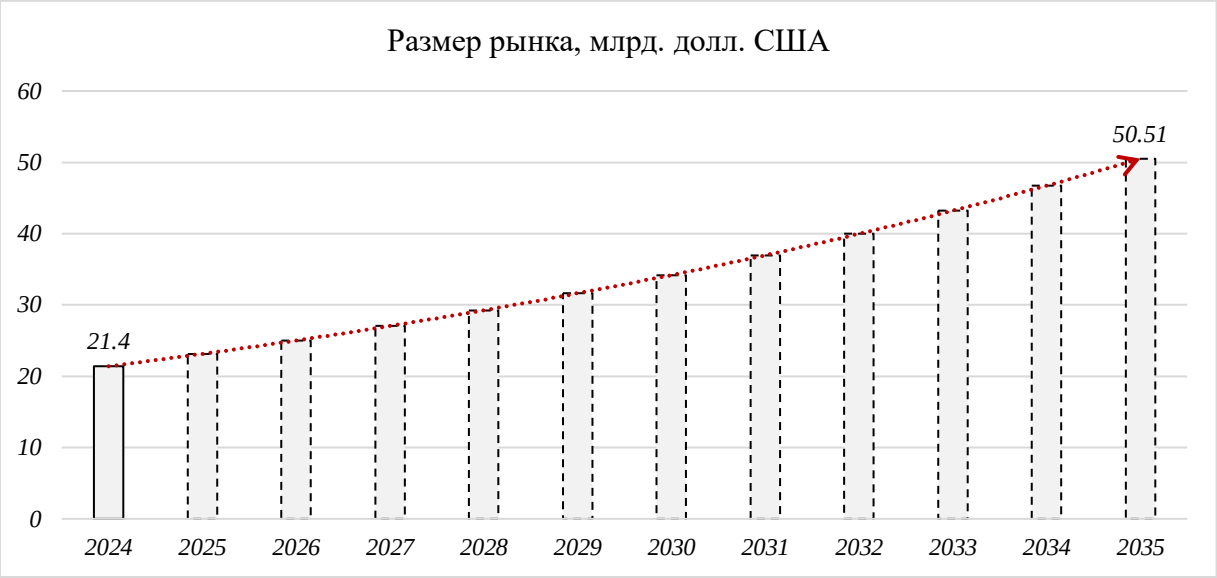


Рис. 1. Динамика глобального рынка автоматизированного индустриального контроля качества (прогноз), составлено автором по данным [5].

Опираясь на рис. 1, отметим, что сегмент автоматизированного контроля качества входит в число наиболее быстрорастущих направлений индустриальных цифровых технологий. Рост рынка обусловлен усложнением производственных процессов, повышением требований производителей к точности и мониторингу параметров продукции, дефицитом квалифицированного персонала, повышением стоимости ошибок и дефектов,

а также фундаментальной трансформацией производственных моделей в соответствии с принципами Индустрии 4.0; по данным отчета, наиболее востребованными оказываются системы машинного зрения, роботизированные и мехатронные комплексы контроля, а также системы аналитики и предиктивной диагностики, действующие на базе технологий искусственного интеллекта (далее – ИИ). С функциональной точки зрения обоснованность внедрения ИСКК определяется тем, что цифровые технологии в СМК позволяют фиксировать параметры качества в режиме реального времени, оперировать большими массивами данных при оценке качества, автоматически выявлять отклонения от нормы, прогнозировать вероятность дефектов, а также оптимизировать процесс на основе аналитики и применения ИИ [5].

Закономерно, возникает потребность в организации цифровой трансформации СМК промышленных предприятий с упором на их интеллектуализацию; интеллектуализация при этом становится одной из завершающих стадий в структуре формализованных уровней цифровой трансформации промышленного предприятия. Так, по справедливым замечаниям И.В. Абрамова [1] и В.С. Баракова [2], результативность цифровой трансформации достигается лишь при учете всех уровней зрелости организации и при переходе к новому формату управления производством, в котором основным ресурсом становятся данные. С учетом положений работ N. Chen, S. Yang, L. Li [7], R. Figliè и соавт. [8], исследований российских ученых по вопросам цифровизации контроля качества [1; 4; 6], можно выделить пять формализованных уровней цифровой трансформации, отражающих последовательность технологических изменений на промышленном предприятии (см. Рис. 2).

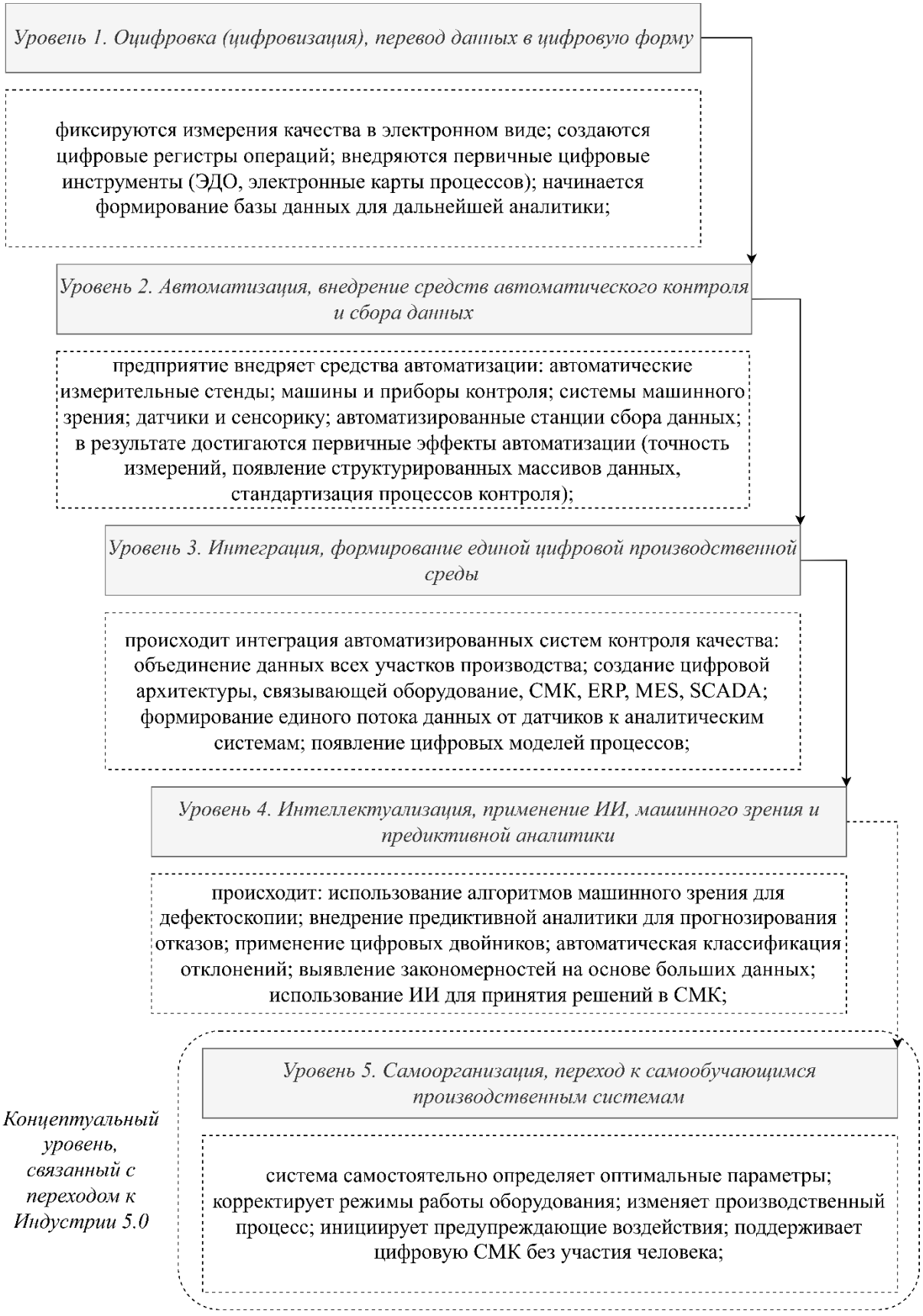


Рис. 2. Формализованная структура этапов процесса цифровой трансформации промышленного предприятия при переходе на ИСКК, составлено автором по данным [4; 7; 8 и др.].

Обращаясь к рис. 2, отметим, что у каждого из уровней цифровой трансформации промышленного предприятия при переходе на ИСКК встает собственный спектр специфических задач. Например, уровень цифровизации предполагает создание цифрового потока данных, исключающих потери информации, и направленных, напротив, на их структурированный сбор, хранение и дальнейшее использование. На втором уровне интеграции расширяются за счет точечного ввода систем; систематизация данных, их автоматический сбор и устранение человеческих ошибок создают минимально необходимый базис для создания единой цифровой среды (третий уровень) и её последующей интеллектуализации (четвертый уровень). Последняя предполагает, что промышленное предприятие переходит к концепции сквозной прослеживаемости качества, при которой каждая операция оставляет цифровой след, а информация поступает в реальном времени; постепенно предприятие вводит и совершенствует системы предиктивной аналитики, управления рисками, вариативностью и отклонениями. Соответственно, зрелую организацию по степени цифровой трансформации отличает ряд позитивных эффектов, связанных с повышением эффективности процессов в СМК, улучшением непосредственно метрик качества, а также сокращением операционных рисков, повышением конкурентоспособности предприятия [3; 7; 8].

Очевидно, что необходимость внедрения ИСКК для промышленных предприятий возникает на стыке синергии задач управления качеством и возможностей цифровых технологий. В пользу внедрения ИСКК играют и особенности современных производственных процессов на промышленных предприятиях, которые отличает:

– многообразие технологических параметров, что формирует потребность в их постоянном мониторинге;

– стремление к повышению точности операций; поскольку отклонения измеряются в микро- и нанометрах, то все чаще применяются именно цифровые решения;

– увеличение вариативности совмещенных процессов, особенно при производстве, соответствующим принципам Agile;

– повышение скорости выпуска при одновременном соблюдении стандартов качества;

– минимизация допускаемых дефектов до уровня «ноль дефектов».

Одна из основных причин, обосновывающих внедрение ИСКК, заключается в возможности осуществлять 100% контроль продукции и процессов в реальном времени. Система ИСКК в таком случае представляется в виде непрерывного потока данных от датчиков и камер с автоматической фиксацией всех отклонений, исключением субъективности человека и фиксированием трендов и ранних признаков дефектов. У каждого изделия формируется цифровой след, который при необходимости может быть изучен более детально (например, при выявлении брака или отклонений от заданных параметров). Нередко создаются цифровые двойники производства,

моделирование параметров которых позволяет управлять качеством на производстве при разных параметрах внешних и внутренних факторов. Соответственно, у ИСКК выделяются и конкретные экономические эффекты, связанные со снижением затрат на повторный выпуск переделанной продукции, минимизацией простоев, увеличением общей производительности, сокращением расходов на входной контроль и сроков производства в целом.

Также стоит указать, что процесс формирования ИСКК предполагает достижение определенного уровня зрелости СМК; в целом процесс достижения высокой зрелости можно представить в виде пяти этапов развития СМК промышленного предприятия:

1. Документированная СМК, состоящая из регламентов, протоколов, контрольных листов; процессы в ней фиксируются вручную (начальная и входная точка развития СМК и её цифровизации).

2. Стандартизированная СМК, которую отличают унифицированные процедуры, периодический анализ; в ней присутствует статистическое управление качеством.

3. Процессно-ориентированная СМК, в которой процессы измеряются, анализируются, имеются постоянно отслеживаемые показатели качества.

4. Интегрированная СМК, предполагающая частичное участие цифровых систем, наличие автоматизированных участков контроля, синхронизации данных или первичных механизмов их сбора через информационные и цифровые технологии.

5. Цифровая СМК, которая обеспечивает контроль качества на предприятии в реальном времени, в более развитом варианте с ИИ-аналитикой, предиктивными моделями, цифровыми двойниками производства и т. п.

Здесь важно подчеркнуть, что только уровни 4, 5 обеспечивают возможность эффективного внедрения ИСКК; также предприятие должно соответствовать определенным критериям цифровой трансформации СМК, которые, по мнению X. Liu, S. Hong, Z. Su, сконцентрированы вокруг вопросов хранения данных, обеспечения доступа к ним и эффективного использования [9]. Фактически для начала процесса трансформации СМК с последующим внедрением ИСКК предприятие должно обладать:

– во-первых, цифровой инфраструктурой, состоящей из датчиков, камер, средств измерений, сетей передачи данных с высокой пропускной способностью;

– во-вторых, стандартизированными процедурами качества (развитая и зрелая система СМК), чтобы автоматизация не воспроизводила хаотичные мероприятия и процедуры;

– в-третьих, единым информационным пространством, которое связывает ERP, MES, SCADA, системы контроля, управления производством и др.;

– в-четвертых, готовностью кадров (подготовка инженеров, специалистов по качеству и цифровых аналитиков) и укомплектованием штата сотрудников;

– в-пятых, обязательной поддержкой руководства, поскольку цифровизация СМК является стратегическим и нередко ресурсоемким проектом изменений.

Таким образом, при соответствии всем представленным условиям, инициируется процесс цифровой трансформации СМК с упором на ранее представленные формализованные этапы; постепенно происходит оцифровка данных и процессов контроля, их автоматизация, интеграция и последующая интеллектуализация. Основу цифровой трансформации промышленного предприятия на основе внедрения ИСКК представляет модель (см. Рис. 3).

Предложенная модель цифровой трансформации промышленного предприятия, основанная на внедрении ИСКК, представляет собой многоуровневый механизм перестройки производственных и управленческих процессов, который объединяет технологические решения, управленческие методы и принципы современного качества, развивается как процесс перехода от традиционной к интеллектуальной системе управления производством и качеством.

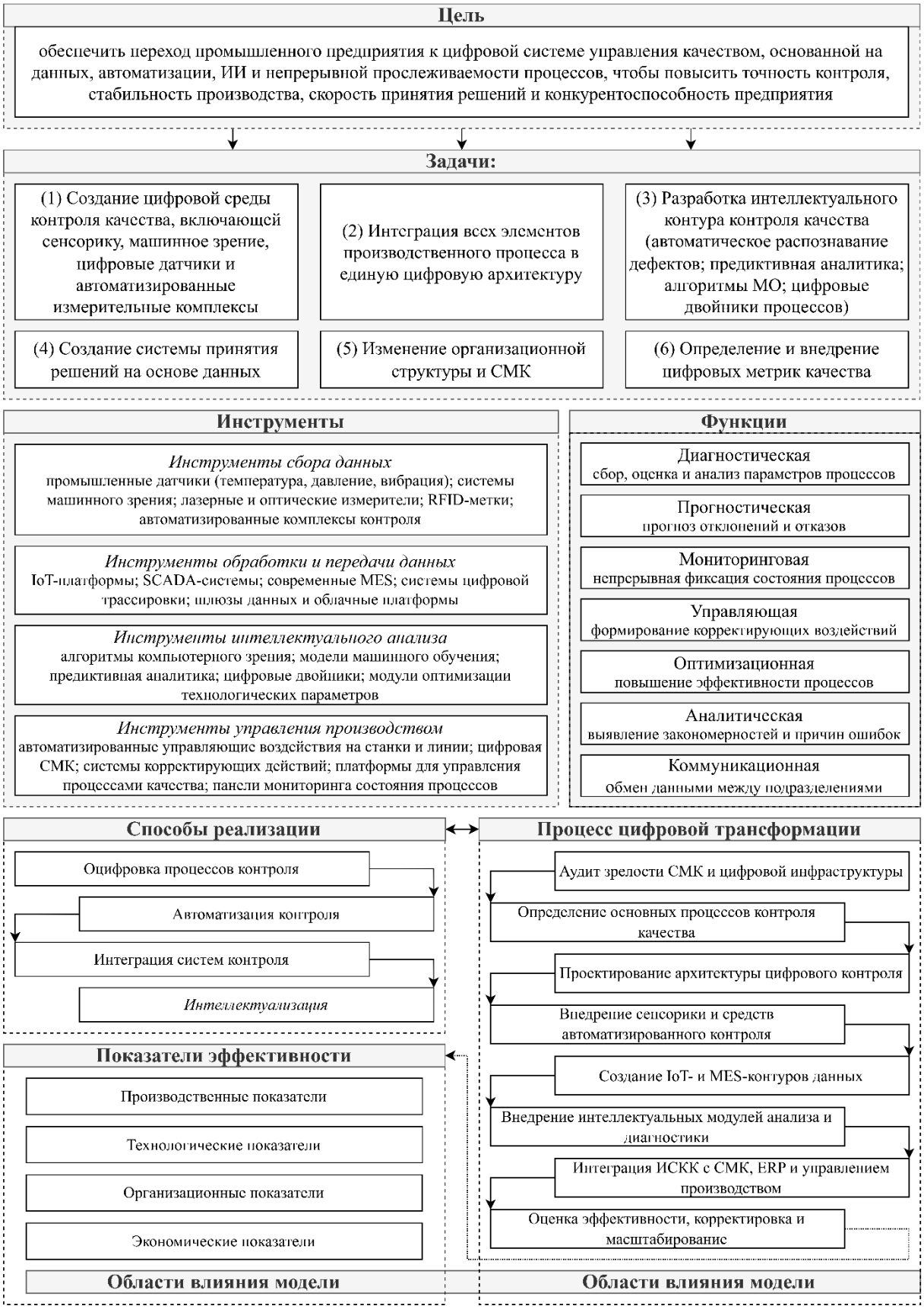


Рис. 3. Модель цифровой трансформации промышленного предприятия через внедрение ИСКК, разработано автором.

Практическая обоснованность предложенной модели заключается в создании эффекта сквозной трансформации, поскольку модель раскрывает обоснованные на теоретическом уровне процессы, способы, показатели эффективности и области влияния цифровой трансформации промышленного предприятия на его СМК и формирование ИСКК. Совокупная реализация данных элементов модели обеспечивает инициацию ряда эффектов (Табл. 1):

Табл. 1. Эффекты сквозной цифровой трансформации при внедрении модели, составлено автором.

№	Группа эффектов	Проявления
1	Эффекты устранения разрывов в данных и процессах	Ранее данные контроля могли быть разрозненными и неструктурированными. Модель формирует единый контур управления, основанный на цифровых технологиях, что повышает точность, ускоряет реакцию на дефекты, снижает трудоемкость контроля
2	Эффекты перехода к предиктивному управлению	Контроль и процессы переводятся в прогнозируемый характер, что особенно важно в высокоточных производствах
3	Эффекты повышения уровня зрелости СМК	Модель формирует цифровую СМК (e-QMS), в которой процессы прозрачны, решения принимаются на основе данных, улучшения происходят непрерывно и без остановки производства
4	Эффекты экономической выгоды	Внедрение ИСКК снижает потери от брака, стоимость переделки, затраты на проверку, риски остановок оборудования
5	Эффекты ускорения производственных циклов	Ускорение контроля приводит к ускорению корректив, что, в свою очередь, продуктивно влияет на скорости выполнения заказов
6	Стратегические эффекты	Модель формирует более стабильное и неподверженное внешней и внутренней динамике производство, способное изменяться в зависимости от условий работы промышленного предприятия

Очевидно, что предложенную модель отличают преимущества комплексности, масштабируемости (ввиду включения всей структуры процессов цифровой трансформации и развития СМК), интеграции, обоснованности ввиду ориентации на данные, а также прогнозирования.

Таким образом, проведенное исследование доказывает, что ИСКК формируют основу для перехода от традиционного контроля качества к интеллектуальному управлению производством, обеспечивают высокую точность инспекций, автоматизацию анализа данных, минимизацию человеческого фактора и возможность распределенного контроля на всех

стадиях жизненного цикла продукции. Тем самым смеем утверждать, что цифровые технологии являются фундаментом повышения эффективности внутреннего контроля и общей конкурентоспособности производства. Именно поэтому следует отметить, что внедрение ИСКК выступает одним из фундаментальных шагов в развитии современного промышленного предприятия, которое формирует технологический базис для перехода к интеллектуальному производству, ориентированному на предиктивное управление, инновационность и стратегическое развитие.

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ВЛИЯНИЕ ЭКОТУРИЗМА НА РЕГИОНАЛЬНЫЕ ЭКОНОМИЧЕСКИЕ ПОКАЗАТЕЛИ

Аннотация: *В статье рассматривается влияние экотуризма на экономические показатели регионов. Особое внимание уделено росту валового регионального продукта, созданию рабочих мест, увеличению доходов местного населения и развитию инфраструктуры. Анализируются возможности экотуризма как инструмента устойчивого регионального развития, включая стимулирование инвестиций, развитие малого и среднего бизнеса и повышение налоговых поступлений. На основе изучения статистических данных и международного опыта сделан вывод о том, что экотуризм является эффективным фактором повышения экономической устойчивости и конкурентоспособности регионов.*

Ключевые слова: *экотуризм, региональная экономика, валовой региональный продукт, занятость, инвестиции, доходы населения, устойчивое развитие, туристическая инфраструктура, малый и средний бизнес.*

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THE IMPACT OF ECOTOURISM ON REGIONAL ECONOMIC INDICATORS

Abstract: *This article examines the impact of ecotourism on regional economic indicators. Particular attention is paid to the growth of gross regional product, job creation, increased local income, and infrastructure development. The potential of ecotourism as a tool for sustainable regional development is analyzed, including stimulating investment, developing small and medium-sized businesses, and increasing tax revenues. Based on a study of statistical data and international experience, it is concluded that ecotourism is an effective factor in enhancing the economic resilience and competitiveness of regions.*

Keywords: *ecotourism, regional economy, gross regional product, employment, investment, personal income, sustainable development, tourism infrastructure, small and medium-sized businesses.*

Экотуризм является одной из наиболее перспективных отраслей современной туристической индустрии, способствующей не только сохранению природного и культурного наследия, но и экономическому

развитию регионов. В последние годы наблюдается активный рост интереса к экологически ориентированным путешествиям как среди внутренних туристов, так и иностранных гостей, что приводит к увеличению доходов местного населения, созданию рабочих мест и стимулированию развития инфраструктуры.

Экологический туризм, или экотуризм, представляет собой одну из наиболее перспективных форм развития туристической индустрии, которая сочетает сохранение природных и культурных ресурсов с экономическим развитием регионов. В последние годы наблюдается активный рост интереса к экотуризму как среди внутреннего населения, так и среди иностранных туристов, что напрямую влияет на доходы местного населения и экономическую устойчивость регионов.

Одним из ключевых аспектов воздействия экотуризма на региональную экономику является рост валового регионального продукта (ВРП). Туристы, посещающие природные парки, заповедники, экологически чистые районы и сельские территории, создают дополнительный спрос на услуги гостиничного и ресторанного бизнеса, транспортные услуги, экскурсионные программы и сувенирную продукцию. Это способствует увеличению оборота местных компаний, росту налоговых поступлений и инвестиционной привлекательности регионов.

Создание рабочих мест – еще один важный эффект. Развитие экотуризма требует квалифицированных гидов, администраторов, сотрудников гостиниц и ресторанов, специалистов по организации мероприятий и экологических проектов. Таким образом, экотуризм стимулирует занятость населения, особенно в сельских и малонаселенных территориях, где другие экономические возможности могут быть ограничены.

Помимо прямого экономического воздействия, экотуризм оказывает мультипликативный эффект на смежные отрасли. Сюда относятся сельское хозяйство, производство ремесленных товаров, транспортные услуги, экологическое строительство и инфраструктура. Рост числа туристов стимулирует расширение туристической инфраструктуры – строительство дорог, парковок, информационных центров, гостиниц и кемпингов, что, в свою очередь, повышает уровень жизни населения и укрепляет социально-экономические показатели регионов.

Инвестиционная привлекательность регионов также возрастает. Региональные власти и частные инвесторы активно вкладывают средства в развитие экотуристических маршрутов, инфраструктуры, экологических центров и образовательных программ. Это способствует долгосрочному устойчивому развитию, привлечению новых туристов и формированию положительного имиджа региона на международном уровне.

Методологической основой исследования являются анализ статистических данных региональных органов управления, сравнительный анализ экотуристических проектов в разных странах, изучение научной литературы по вопросам устойчивого развития туризма, а также системный

подход к оценке влияния экотуризма на экономические показатели регионов. В исследовании учитываются такие показатели, как валовой региональный продукт (ВРП), уровень занятости, инвестиции в туристическую и сопутствующую инфраструктуру, доходы малого и среднего бизнеса, а также налоговые поступления в бюджеты различных уровней.

Результаты исследования показывают, что развитие экотуризма способствует значительному росту экономической активности в регионах с привлекательными природными и культурными ресурсами. Создание экологически ориентированных маршрутов и туристических объектов ведет к росту доходов местного населения через занятость в гостиничном бизнесе, туристических агентствах, сфере общественного питания и ремесел.

Однако развитие экотуризма сопряжено и с определёнными проблемами:

- Недостаток квалифицированных кадров для работы в экологических и туристических проектах;
- Высокие инвестиционные затраты на создание и поддержание инфраструктуры;
- Необходимость обеспечения экологической устойчивости и сохранения природных ресурсов;
- Отсутствие комплексного законодательного регулирования экотуризма.

Для эффективного использования потенциала экотуризма необходимо комплексное взаимодействие государства, частного сектора и образовательных учреждений**.** Важны меры по подготовке специалистов, разработке маркетинговых стратегий, внедрению инновационных технологий и поддержке устойчивого развития регионов.

В заключение следует отметить, что экотуризм является стратегическим инструментом экономического развития регионов. Он способствует увеличению доходов населения, созданию рабочих мест, росту ВРП и инвестиционной привлекательности территорий, стимулирует развитие смежных отраслей и повышает международный имидж регионов. Дальнейшее развитие экотуризма требует комплексного подхода, включающего инвестиции, подготовку кадров, цифровизацию и законодательную поддержку, что позволит регионам эффективно интегрироваться в глобальный туристический рынок.

Анализ показывает, что экотуризм оказывает мультипликативное воздействие на региональную экономику. Рост числа туристов стимулирует развитие смежных отраслей — сельского хозяйства, производства сувениров и ремесленных изделий, транспортных услуг и экологического строительства. Одновременно выявляются проблемы: недостаток квалифицированных кадров, нехватка финансирования для инфраструктурных проектов, слабая маркетинговая поддержка и необходимость законодательного регулирования экотуризма. Решение этих проблем требует комплексного подхода со стороны государства, частного бизнеса и образовательных учреждений.

Обсуждение результатов показывает, что экотуризм является эффективным инструментом регионального развития, способствующим устойчивому экономическому росту, созданию рабочих мест, повышению доходов населения и улучшению качества жизни. Инвестиции в экотуристические проекты повышают привлекательность региона для туристов, укрепляют международный имидж страны и создают условия для долгосрочного устойчивого развития.

Таким образом, развитие экотуризма в регионах имеет стратегическое значение для повышения экономической устойчивости и конкурентоспособности. Для достижения максимального эффекта необходимо создание комплексных программ поддержки экотуризма, стимулирование инвестиций, подготовка квалифицированных кадров, внедрение инновационных технологий и обеспечение экологической устойчивости туристических проектов.

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ПРИМЕНЕНИЕ ИННОВАЦИОННЫХ ТЕХНОЛОГИЙ В ТУРИСТИЧЕСКОЙ ИНДУСТРИИ

Аннотация: *В статье рассматриваются особенности применения инновационных технологий в туристической индустрии. Анализируются современные цифровые решения, такие как онлайн-бронирование, мобильные приложения, системы искусственного интеллекта, виртуальная и дополненная реальность, а также цифровой маркетинг. Показано, что внедрение инноваций способствует повышению качества туристических услуг, улучшению клиентского опыта и росту конкурентоспособности туристических компаний. Сделан вывод о том, что цифровизация является ключевым фактором устойчивого развития туризма в современных условиях.*

Ключевые слова: *туризм, инновации, цифровые технологии, онлайн-бронирование, мобильные приложения, искусственный интеллект, виртуальная реальность, цифровизация, туристические услуги.*

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APPLICATION OF INNOVATIVE TECHNOLOGIES IN THE TOURISM INDUSTRY

Abstract: *This article examines the application of innovative technologies in the tourism industry. It analyzes modern digital solutions, such as online booking, mobile applications, artificial intelligence systems, virtual and augmented reality, and digital marketing. It is shown that the implementation of innovations contributes to the improvement of the quality of tourism services, the enhancement of customer experience, and the growth of the competitiveness of tourism companies. It is concluded that digitalization is a key factor in the sustainable development of tourism in the modern world.*

Keywords: *tourism, innovation, digital technologies, online booking, mobile applications, artificial intelligence, virtual reality, digitalization, tourism services.*

Современная туристическая индустрия переживает активный этап цифровой трансформации, который обусловлен глобализацией, развитием информационных технологий и ростом потребностей путешественников. Инновационные решения становятся неотъемлемой частью функционирования туристических компаний, гостиничных комплексов, транспортных организаций и других субъектов отрасли.

Применение цифровых технологий обеспечивает повышение эффективности бизнес-процессов, автоматизацию ряда операций, улучшение качества обслуживания и расширение возможностей взаимодействия с клиентами. В связи с этим изучение роли и значимости инновационных технологий в туризме приобретает актуальное значение.

В современном мире туристическая индустрия является одной из наиболее динамично развивающихся сфер экономики. Развитие информационных технологий и глобальная цифровизация создают новые возможности для туристических компаний, гостиничных комплексов, транспортных организаций и сервисных платформ. Внедрение инновационных технологий позволяет повысить качество обслуживания клиентов, оптимизировать бизнес-процессы и увеличить конкурентоспособность на международном рынке. Среди наиболее значимых технологий выделяются онлайн-бронирование, мобильные приложения, системы искусственного интеллекта, виртуальная и дополненная реальность, цифровой маркетинг и блокчейн.

Методологической основой исследования является комплексный анализ существующих цифровых решений в туристической сфере, сравнительное изучение зарубежного и отечественного опыта, а также статистический анализ тенденций туристического рынка. В ходе исследования использовались данные международных организаций, таких как Всемирная туристическая организация (UNWTO) и Организация экономического сотрудничества и развития (OECD), а также официальные отчёты Министерства туризма и аналитические обзоры ведущих туристических компаний. Применялись методы наблюдения, обобщения, сравнительного анализа и системного подхода для выявления закономерностей влияния инновационных технологий на развитие туристической отрасли.

Результаты анализа показывают, что внедрение инноваций способствует повышению эффективности всех этапов туристического сервиса: от бронирования и оплаты туров до персонализированных рекомендаций и создания интерактивного опыта путешествий. Онлайн-бронирование и мобильные приложения значительно упрощают процесс взаимодействия с клиентами, системы виртуальной и дополненной реальности предоставляют возможность виртуальных туров и предварительного знакомства с туристическими объектами, а цифровой маркетинг позволяет эффективно продвигать туристические продукты на международном рынке. Внедрение искусственного интеллекта и аналитических платформ способствует прогнозированию спроса и оптимизации ресурсов, что повышает экономическую эффективность предприятий индустрии.

Результаты исследования показывают, что внедрение цифровых технологий в туристической отрасли приводит к нескольким важным эффектам. Во-первых, онлайн-бронирование и мобильные приложения

значительно повышают удобство для клиентов, сокращают время оформления услуг и повышают прозрачность цен. Во-вторых, системы виртуальной и дополненной реальности позволяют туристам заранее знакомиться с объектами посещения, создавая эффект присутствия и повышая уровень удовлетворенности услугой. В-третьих, использование искусственного интеллекта позволяет прогнозировать спрос, оптимизировать ресурсы, формировать персонализированные предложения и повышать прибыльность туристических предприятий.

Обсуждение полученных данных показывает, что инновационные технологии играют ключевую роль в формировании конкурентных преимуществ туристических компаний и развитии отрасли в целом. Одновременно выявлены проблемы внедрения технологий: нехватка квалифицированных специалистов, высокие инвестиционные затраты и необходимость модернизации инфраструктуры. Решение этих проблем требует скоординированных действий государства, частного сектора и образовательных учреждений для подготовки кадров и создания благоприятной цифровой экосистемы.

Цифровой маркетинг и социальные сети способствуют продвижению туристических продуктов на глобальном рынке, увеличению охвата аудитории и созданию привлекательного имиджа туристических направлений. Использование технологий блокчейн обеспечивает прозрачность транзакций, защиту данных клиентов и доверие к онлайн-платформам. Современные гостиничные комплексы внедряют “умные системы”, включающие автоматизированное управление освещением, климат-контроль, роботизированные сервисы и онлайн-консьерж, что улучшает качество обслуживания и сокращает эксплуатационные расходы.

Обсуждение полученных результатов показывает, что инновационные технологии являются ключевым фактором устойчивого развития туристической индустрии. Вместе с тем, выявлены существующие проблемы: высокая стоимость внедрения технологий, нехватка квалифицированных специалистов, необходимость модернизации инфраструктуры и адаптации законодательства. Решение этих проблем требует совместных усилий государства, частного сектора и образовательных учреждений для создания цифровой экосистемы, подготовки кадров и стимулирования инвестиций в инновации.

Таким образом, инновационные технологии формируют конкурентные преимущества туристических компаний, способствуют расширению рынков сбыта, повышению доходов отрасли и укреплению имиджа страны на международной арене. Их дальнейшее внедрение, совместно с развитием инфраструктуры и подготовкой квалифицированных специалистов, обеспечит устойчивое развитие туристической индустрии и позволит стране эффективно интегрироваться в глобальный цифровой туристический рынок.

В заключение, можно утверждать, что применение инновационных технологий является стратегическим направлением развития туристической

индустрии. Оно обеспечивает высокое качество обслуживания, повышает экономическую эффективность, стимулирует инвестиции и формирует положительный имидж туристических направлений. Для максимальной реализации потенциала цифровых инноваций необходимы комплексные меры по модернизации инфраструктуры, подготовке кадров, законодательному регулированию и поддержке научно-исследовательских инициатив в сфере туризма.

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СИСТЕМА ВНУТРИФИРМЕННОГО ПЛАНИРОВАНИЯ ДЕЯТЕЛЬНОСТИ ПРОМЫШЛЕННЫХ ПРЕДПРИЯТИЙ В УСЛОВИЯХ САНКЦИЙ

Аннотация. *В статье рассматривается ресурсы и инструменты, которые могут быть применимы для формирования системы внутрифирменного планирования в условиях санкционного давления. Автором определена сущность, раскрыто содержание системы, проанализированы ее компоненты, их взаимосвязи и взаимное влияние. Инновационная подсистема выделена как основная.*

Ключевые слова*: внутрифирменное планирование, система внутрифирменного планирования, компоненты системы, инновации.*

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SYSTEM OF INTRA-FIRM PLANNING OF ACTIVITIES OF INDUSTRIAL ENTERPRISES UNDER CONDITIONS OF SANCTIONS

Abstract. *The article examines the resources and tools that can be used to form an intra-company planning system under the pressure of sanctions. The author defines the essence, discloses the content of the system, analyzes its components, their interrelations and mutual influence. The innovation subsystem is identified as the main one.*

Keywords: *intra-company planning, intra-company planning system, system components, innovations.*

Введение

Современные условия ведения бизнеса определяют разработку и реализацию планов и стратегий главной доминантой успешной деятельности хозяйствующего субъекта, когда его устойчивое функционирование зависят от умения своевременно предвидеть и реагировать на внешние факторы воздействия. Эффективность принятия управленческих решений в свою очередь во многом зависит от системы управления в целом и системы планирования в частности. Подобные процессы подразумевают новые подходы к управлению предприятием и применение новых концепций и походов к планированию деятельности компаний, в частности.

Для преодоления санкционных рисков отечественным предприятиям необходимо адаптироваться к реальности, когда вопрос экономической безопасности стоит особенно остро. Рынок, внешняя среда заставляют компании работать в режиме прибыльности, когда целью функционирования и результатом деятельности является доход [1,2]. Одним из источников получения прибыли является применение инноваций, что отмечали отечественные и зарубежные ученые [3,4,5]. Инновационно-ориентированная деятельность предприятия позволяет повысить конкурентоспособность и обеспечить ускорение экономического развития.

Методы исследования

Теоретической и методологическую базой по теории систем, а также стратегическому и внутрифирменному планированию составили труды зарубежных и отечественных ученых И. Ансофф, О.С. Виханский, И.Н. Герчикова,П. Друкер, Л. фон Берталанфи, Ю.П. Сурмина, Кузнецова А.С и других.В процессе разработки методики разработки системы стратегического планирования предприятий применялись методы эмпирического, методологического анализа, данные научных публикаций, а также ресурсы сети Интернет.

Результаты.

Процесс внутрифирменного планирования деятельности предприятий подразумевает трансформацию инструментов и моделей функционирования предприятий и параллельное внедрение изменений и новшеств в функции, бизнес-процессы, структуры. Сущность системы состоит в взаимозависимости и интеграции частей процесса внутрифирменного планирования с их свойствами, функциями и особенностями; формировании подчиненности и взаимодействия с внешней и внутренней средой для достижения целей предприятия.

Структурное представление системы связано с выделением элементов системы, связей и устойчивым множеством отношений между ними, которое сохраняется длительное время неизменным.

Система внутрифирменного планирования состоит из совокупности подсистем низшего порядка: инновационной, ресурсной, функциональной, процессной, организационной, которые в свою очередь детализируются до компонентов.

Инновационная подсистема является ключевой и выступает ядром и связующим звеном между остальными подсистемами. Она обеспечивает имплементацию нововведений, на которых базируется устойчивое развитие предприятия в условиях динамичной среды.

Ресурсная подсистема включает информационное, финансовое, материальное, техническое и пр. обеспечение. Особая роль в ресурсах отводится информационному ресурсу. Информация – это «связующий материал» между объектами и субъектами планирования, поскольку суть процесса планирования состоит в преобразовании и трансформации информации. При этом применение методов искусственного интеллекта при

работе с информационной составляющей системы играет первостепенную роль.

Функциональная подсистема состоит из следующих компонентов: оптимизация использования ресурсов предприятия; подготовка управленческих решений и разработка единого плана компании; информационное обеспечение участников планирования. Планирование обеспечивает документированное представление хода производственно-хозяйственной деятельности; прогнозирование.

Организационная подсистема включает компоненты: организация процесса планирования, делегирование прав, обязанностей, формирование орг. структуры, связей и порядка взаимодействия между структурными подразделениями.

Процессная подсистема включает компоненты целеполагания, анализа макро- и микросреды, формирование альтернатив и выбор оптимальной стратегии, декомпозиция стратегии до тактических планов, мероприятий, программ. При этом реализация планов предполагает синергетический эффект.

Особенность и новизна предложенной автором системы внутрифирменного планирования деятельности заключается в следующем:

- развитие предприятия и построение системы внутрифирменного планирования деятельности определяется вектором стратегического планирования, с учетом ограничений, сопряженных с негативными санкционными последствиями;
- особое место и роль отводится инновациям - инновационная подсистема, которая с одной стороны является центральным элементом системы, с другой - связующим центром подсистем низшего порядка.

Заключение

Таким образом, проведенные исследования позволили построить систему внутрифирменного планирования, выделив ее подсистемы, компоненты и их взаимосвязи. Инновационная подсистема является доминантой системы, обеспечивая усиление рыночных позиций за счет технологического и инновационного развития. Разработанная система будет служить основой для формирования стратегических и тактических планов предприятия.

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РОЛЬ ПРИРОДНО-ГЕОГРАФИЧЕСКИХ ФАКТОРОВ В ФОРМИРОВАНИИ СИСТЕМЫ ПРОДОВОЛЬСТВЕННОЙ БЕЗОПАСНОСТИ ФЕРГАНСКОЙ ДОЛИНЫ

Аннотация. *В статье на основе комплексного географического анализа раскрыта роль природно-географических факторов в формировании системы продовольственной безопасности Ферганской долины. Использованы данные полевых исследований 2023–2025 гг., материалы дистанционного зондирования Sentinel-2 и Landsat-9, климатические модели CMIP6. Выполнена зональная типизация агроландшафтов, построена ГИС-модель уязвимости продовольственной системы. Предложена трехуровневая стратегия адаптации к климатическим изменениям и антропогенному прессу.*

Ключевые слова: *Ферганская долина, продовольственная безопасность, природно-географические факторы, агроландшафты, климатические изменения, водные ресурсы, засоление почв, ГИС-моделирование, адаптивно-ландшафтное земледелие.*

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ROLE OF NATURAL-GEOGRAPHICAL FACTORS IN THE FORMATION OF THE FOOD SECURITY SYSTEM IN THE FERGHANA VALLEY

Abstract. *The article, based on a comprehensive geographical analysis, reveals the role of natural-geographical factors in the formation of the food security system in the Ferghana Valley. Data from field studies conducted in 2023–2025, remote sensing materials from Sentinel-2 and Landsat-9, and CMIP6 climate models were used. Zonal typification of agro-landscapes was carried out, and a GIS model of the vulnerability of the food security system was constructed. A three-level adaptation strategy to climate change and anthropogenic pressure is proposed.*

Keywords: *Ferghana Valley, food security, natural-geographical factors, agro-landscapes, climate change, water resources, soil salinization, GIS modeling, adaptive landscape farming.*

Введение. Ферганская долина остаётся ключевым сельскохозяйственным регионом трёх государств Центральной Азии. На площади 22 тыс. км² производится 28 % зерновых, 35 % хлопка-сырца и более 50 % плодоовощной продукции Узбекистана, Таджикистана и Киргизии. При этом обеспеченность пашней на душу населения составляет лишь 0,07 га, а водообеспеченность – 800 м³/чел./год (критический порог FAO – 1700 м³).

Цель исследования – количественно оценить вклад природно-географических факторов в устойчивость продовольственной системы Ферганской долины и разработать зональные рекомендации по её укреплению до 2035 г.

Объекты и методы исследования. Объект исследования: Ферганская долина в административных границах Андижанской, Наманганской и Ферганской областей Республики Узбекистан (68 % общей площади долины).

Методы:

•полевые экспедиции 2023–2025 гг. (150 почвенных разрезов, 320 проб воды, 85 агрохимических анализов);

•дистанционное зондирование (Sentinel-2A/B, Landsat-9, 2019–2025 гг.);

•климатическое моделирование (ансамбль CMIP6, сценарии RCP4.5 и RCP8.5);

•ГИС-технологии (QGIS 3.34, ArcGIS Pro 3.2);

•статистические методы (регрессионный, кластерный, индексный анализ).

Природно-географическая характеристика региона

Рельеф и геоморфология. Впадина окружена хребтами Чаткальским, Ферганским, Туркестанским и Алайским. Выделены четыре высотных уровня: низкая аллювиальная равнина (350–450 м), низкоадырный пояс (450–600 м), среднеадырный (600–800 м), предгорный (800–1500 м).

Климат. Климат резко континентальный. Среднегодовая температура +14,2 °C (рост на 1,1 °C за 1960–2025 гг.). Сумма активных температур 4600–5100 °C. Годовые осадки 170 мм (центр) – 650 мм (предгорья). Число дней с T > 35 °C увеличилось с 18 (1980-е) до 38 (2020-е).

Почвенный покров. Доминируют серозёмы (95 % пашни). Среднее содержание гумуса снизилось с 1,42 % (1970 г.) до 0,91 % (2025 г.). Вторично засолено 340 тыс. га (28,4 % орошаемых земель).

Водные ресурсы. Годовой сток: р. Нарын – 6,8 км³, р. Карадарья – 4,1 км³, малые притоки – 1,8 км³. Забор на орошение – 92 %. КПД оросительной сети – 0,52.

Количественная оценка влияния природно-географических факторов

Многофакторная регрессионная модель. ИПБ = 0,37×Водные ресурсы + 0,29×Почвенное плодородие + 0,21×Теплообеспеченность – 0,18×Засоление – 0,13×Эрозия ($R^2 = 0,91$, $p < 0,001$).

5.2. ГИС-модель уязвимости (2025 г.)

Высокая уязвимость (ИПБ < 0,40) – 38 % территории;

Средняя (0,40–0,60) – 42 %;
Низкая (> 0,60) – 20 % (предгорья).

Таблица 1.

Зональная типизация агроландшафтов Ферганской долины

Зона	Высота, м	Площад, тыс. га	Почвы	Основные культуры	Урожайность пшеницы, ц/га (2024)	Главная угроза
I Низкая	350–450	420	Светлые серозёмы, засолённые	Хлопчатник, овощи	38–45	Засоление (42 %)
II Низкоадырная	450–600	310	Типичные серозёмы	Пшеница, сады	52–62	Водная эрозия
III Среднеадырная	600–800	250	Лугово-серозёмные	Виноград, зерновые	58–70	Дегумификация
IV Предгорная	800–1200	140	Тёмные серозёмы	Сады, богара	25–35	Сели, оползни

Количественная оценка влияния природно-географических факторов

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Низкая (> 0,60) – 20 % (предгорья).

Прогноз до 2050 г. (RCP8.5). Снижение ИПБ на 24 %, рост засолённых земель до 48 %, сокращение стока рек на 18–22 %.

Региональный уровень. Создание Межгосударственного координационного совета по водно-продовольственной безопасности Ферганской долины.

Внедрение бассейнового управления (IWRM) до 2030 г.

Зональный уровень. Зона I: перевод 200 тыс. га на капельное орошение к 2035 г.; вывод сильнозасолённых земель (80 тыс. га) под биосолончаки. Зоны II–III: лазерное выравнивание 70 % полей; сидеральные пары на 40 % пашни. Зона IV: террасирование склонов; расширение орехоплодных и косточковых садов.

Локальный уровень. Внедрение точного земледелия (датчики влажности, дроны). Создание 250 сельскохозяйственных кооперативов по переработке плодоовощной продукции.

Заключение. Природно-географические факторы Ферганской долины формируют двойственную основу продовольственной безопасности: высокий тепловой ресурс и плодородные предгорные почвы создают потенциал для

1,5-кратного превышения внутреннего потребления, тогда как дефицит воды, засоление и эрозия ограничивают этот потенциал на 35–40 %. Реализация предложенной трехуровневой стратегии позволит к 2035 г.:

- повысить КПД оросительной сети с 0,52 до 0,78;
- снизить площадь засолённых земель на 45 %;
- увеличить производство продовольствия на 32 % без расширения пашни;
- достичь самообеспечения зерновыми на 92 %, плодоовощной продукцией – на 185 %.

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ТЕХНИКА БЕЗОПАСНОСТИ ПРИ ИСПОЛЬЗОВАНИИ ПРОМЫШЛЕННЫХ РОБОТОВ

Аннотация:*В данной статье освещены вопросы промышленной робототехники и обеспечения техники безопасности при работе с роботами. Требования безопасности при работе с роботами имеют особое значение. Большинство несчастных случаев происходит не во время автоматической работы роботов, а в специальных режимах работы - при наладке, техническом обслуживании, программировании, устранении неисправностей. Поэтому следует использовать технические средства, ограничивающие доступ человека в опасные зоны, такие как механические ограждения, световые барьеры и датчики безопасности. В работе также подчеркивается необходимость создания надежных систем управления безопасностью для предотвращения ситуаций, связанных с выделением энергии, неправильными командами, выбросом частей робота, соблюдения международных и национальных стандартов безопасности, оценки рисков, обучения сотрудников и введения постоянного контроля.*

Ключевые слова: *промышленные роботы, робототехника, опасная зона, специальный режим работы, источник энергии, манипулятор, система блокировки, система безопасности, протокол безопасности, безопасное состояние.*

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SAFETY TECHNIQUES IN THE USE OF INDUSTRIAL ROBOTS

Abstract:*This article addresses issues of industrial robotics and ensuring safety when working with robots. Safety requirements in working with robots are of particular importance. Most accidents occur not during the automatic operation of robots, but in special operating modes - during setup, maintenance, programming, or troubleshooting. Therefore, technical measures should be employed to restrict human access to hazardous areas, such as mechanical barriers, light curtains, and safety sensors. The paper also emphasizes the need to create reliable safety management systems to prevent situations related to energy release, incorrect commands, ejection of robot parts, adherence to international and national safety standards, risk assessment, employee training, and the implementation of continuous monitoring.*

Keywords: *industrial robots, robotics, hazardous zone, special operating mode, energy source, manipulator, interlock system, safety system, safety protocol, safe state.*

Введение

Робот — это устройство, состоящее из механических, электронных и программных компонентов, которое может автоматически выполнять движения или задачи человека. Иными словами, это «умная машина», управляемая программой, способная помогать человеку и выполнять определённые задачи непрерывно и точно.

Основные части робота:

Механическая часть - подвижная конструкция (руки, колёса, манипуляторы).

Датчики (сенсоры) - для восприятия окружающей среды (например, камеры, термометры, ультразвуковые датчики).

Процессор (блок управления) - «мозг» робота, принимающий решения.

Программа - набор команд, определяющий работу робота.

Источник энергии - электричество, батарея или другой источник питания.

Промышленные роботы классифицируются по выполняемым операциям:

Технологические - выполнение основных операций (обработка, сборка, сварка, окраска).

Вспомогательные - обслуживают основные технологические установки (установка, удаление зазоров, транспортировка, хранение).

Универсальные - объединяют функции первых двух групп.

В промышленности широко используются роботы с жёстким программным управлением. Они состоят из манипуляторов, системы управления, чувствительных элементов, приводов и инструментов.

Несчастные случаи с промышленными роботами

С 1980-х годов регистрируются опасные несчастные случаи с участием

промышленных роботов. Статистика показывает, что большинство инцидентов происходит не во время автоматической работы, а в специальных режимах - запуск, программирование, испытания, устранение неисправностей, техническое обслуживание. В таких случаях человек находится в опасной зоне.

При разработке требований и мер техники безопасности необходимо защищать сотрудников от возможных негативных последствий.

Меры безопасности при обычной работе

Работа с робототехникой требует анализа и оценки рисков и строгого соблюдения правил безопасности. Основные рекомендации:

Предотвращение доступа человека в опасные зоны:

Использование механических ограждений, предотвращающих проникновение рук или тела человека.

Применение защитных устройств (световые барьеры, датчики безопасности) для автоматического отключения машины при проникновении человека.

Разрешение доступа в полностью безопасное состояние, например, с помощью замков на дверцах.

Защита от энергии и выброса частей робота:

Конструкция робота должна быть прочной и безопасной, чтобы предотвратить утечку энергии.

Все детали должны быть правильно соединены и надежны.

Если используется механизм смены инструментов, он должен иметь систему блокировки для предотвращения работы при неправильном подключении.

Меры безопасности при специальных режимах работы

Специальные режимы работы (наладка, программирование) требуют обеспечения того, чтобы никакое движение не представляло опасности для человека:

-движения должны соответствовать разрешённому типу и скорости;

-продолжительность движений должна соответствовать программе;

-никакая часть тела человека не должна находиться в опасной зоне.

Использование систем управления специальными режимами позволяет безопасно выполнять операции с помощью кнопок и рычагов. Скорость движения снижается до безопасного уровня, а перед включением подтверждается безопасное состояние.

Требования к системам управления безопасностью

Системы управления безопасностью должны гарантировать выполнение необходимых функций даже при сбоях:

-любые ошибки не должны приводить к опасному состоянию;

-ошибки должны быть обнаружены немедленно или максимально быстро.

Решения для обеспечения надежности систем управления безопасностью:

-соблюдение международных и национальных стандартов безопасности;

-использование датчиков и систем мониторинга (лазерные сканеры, камеры, ИК-датчики);

-интеграция функций безопасности в программное обеспечение;

-регулярное обучение и инструктаж сотрудников;

-техническое обслуживание и периодический контроль систем.

Анализ риска и меры по его снижению

В зависимости от уровня риска применяются технические, организационные и воспитательные меры.

Основные меры предосторожности:

-предотвращение доступа человека в зону автоматических движений;

-проверка безопасного состояния при входе в рабочую зону;

-предотвращение опасных действий из-за неправильной команды;

-контроль всех операций при ремонте или замене частей робота;

-запрет касания находящихся под напряжением частей;

-предотвращение травм при утечке жидкостей или газов;

- соблюдать безопасных процедур при снятии защитных ограждений.

Роботы сегодня играют важную роль в промышленности, облегчая выполнение сложных и монотонных задач, повышая точность и эффективность производства. Однако их использование связано с потенциальной опасностью для человека, особенно при обслуживании, наладке и программировании. Для безопасной работы с промышленными роботами необходимо сочетание надежной конструкции, продуманной системы управления, современных датчиков и средств защиты, а также строгого соблюдения правил техники безопасности и постоянного обучения персонала.

Тщательный анализ рисков и внедрение комплексных мер безопасности - от технических до организационных - позволяет минимизировать опасность и создать безопасные условия труда. Таким образом, грамотная интеграция роботов в производство обеспечивает не только повышение производительности, но и защиту сотрудников, что делает робототехнику надежным и безопасным инструментом современного производства.

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СОВРЕМЕННЫЕ ПРИНЦИПЫ ВЕДЕНИЯ ПАЦИЕНТОВ С НЕАЛКОГОЛЬНОЙ ЖИРОВОЙ БОЛЕЗНЬЮ ПЕЧЕНИ

Аннотация:*Неалкогольная жировая болезнь печени (НАЖБП) широко распространена в популяции, является важной причиной цирроза и гепатоцеллюлярной карциномы. НАЖБП включает континуум от стеатоза через неалкогольный стеатогепатит к циррозу. НАЖБП имеет двунаправленную связь с компонентами метаболического синдрома и сахарного диабета II типа, увеличивая риск осложнений. Основными причинами смерти при НАЖБП являются сердечно-сосудистые заболевания и внепечёночные злокачественные новообразования, но выраженный фиброз печени — ключевой прогностический маркер, а риск смерти может оцениваться с помощью комбинации неинвазивных тестов. В настоящее время нет одобренной терапии НАЖБП, хотя несколько препаратов находятся на продвинутой стадии разработки.*

Ключевые слова: *неалкогольная жировая болезнь печени, неалкогольный стеатогепатит, метаболический синдром.*

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MODERN PRINCIPLES OF CARE FOR PATIENTS WITH NON-ALCOHOLIC FATTY LIVER DISEASE

Abstract:*Non-alcoholic fatty liver disease (NAFLD) is widespread in the population and is an important cause of cirrhosis and hepatocellular carcinoma. NAFLD includes a continuum from steatosis through non-alcoholic steatohepatitis to cirrhosis. NAFLD has a bidirectional relationship with components of metabolic syndrome and type 2 diabetes, increasing the risk of complications. The leading causes of death in NAFLD are cardiovascular disease and extrahepatic malignancies, but advanced liver fibrosis is a key prognostic marker, and mortality risk can be assessed using a combination of noninvasive tests. There is currently no approved therapy for NAFLD, although several drugs are in advanced development.*

Keywords: *non-alcoholic fatty liver disease, non-alcoholic steatohepatitis, metabolic syndrome.*

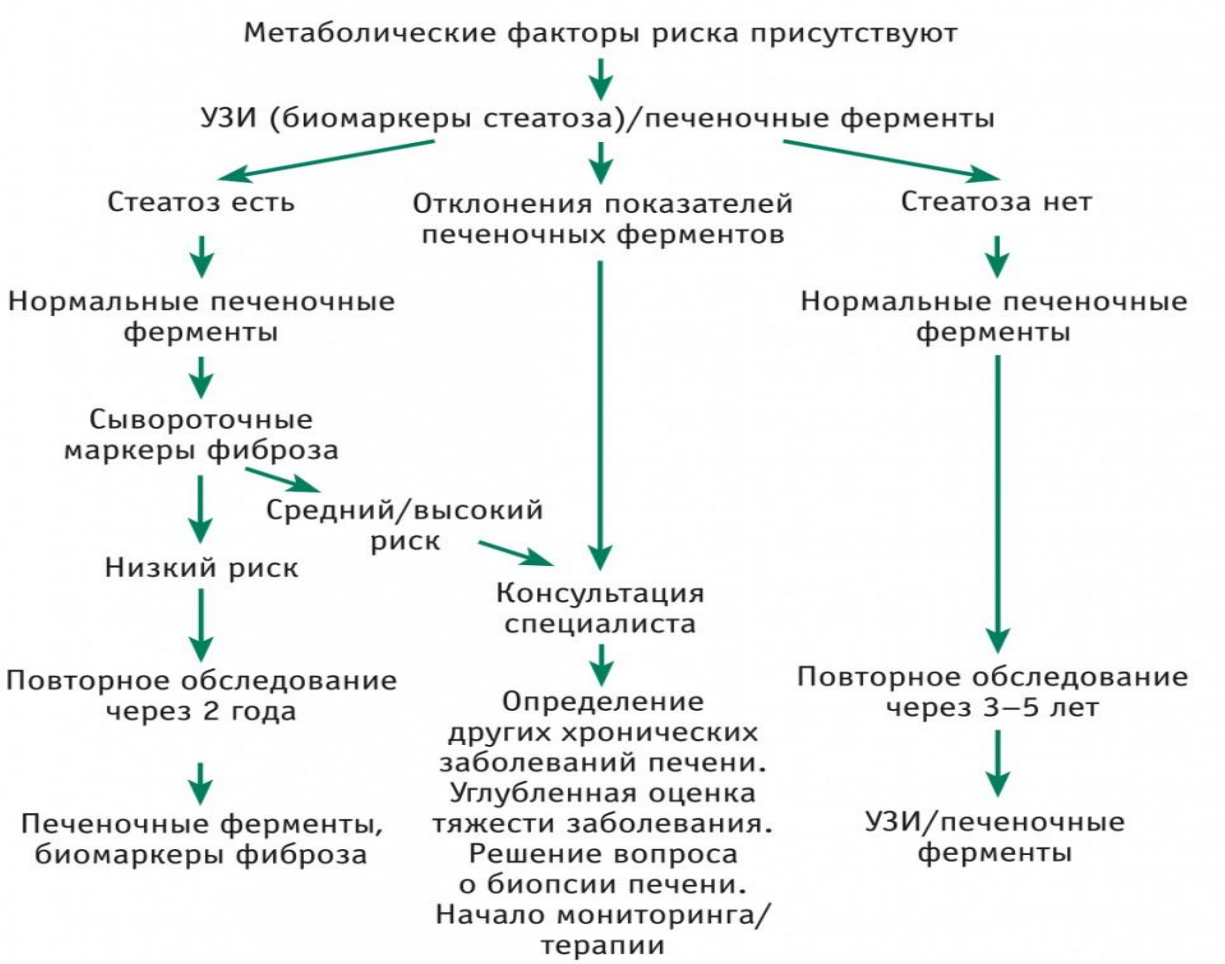
За последние четыре десятилетия неалкогольная жировая болезнь печени (НАЖБП) стала наиболее распространённым хроническим заболеванием печени с глобальной распространенностью около 25% у взрослого населения [1]. Она признана имеющей двунаправленную связь с компонентами метаболического синдрома [2]. У менее чем 10% людей с НАЖБП развиваются осложнения, связанные с печенью, но они являются ключевым фактором, влияющим на прогноз. Среди многих людей с НАЖБП важно определить тех, кто имеет наивысший уровень риска. Из-за высокой распространённости НАЖБП она в настоящее время является наиболее быстро растущей причиной смертности, связанной с печенью, во всем мире [3] и становится важной причиной терминальной стадии болезни печени [4], первичного рака печени [5] и трансплантации печени, ассоциируется со значительным экономическим бременем.

НАЖБП — это печёночный компонент группы состояний, которые связаны с метаболическими нарушениями. НАЖБП определяется наличием стеатоза более 5% гепатоцитов в сочетании с факторами метаболического риска, в частности, ожирением, сахарным диабетом (СД) II типа, но при отсутствии чрезмерного употребления алкоголя (≥30 г в день для мужчин и ≥20 г в день для женщин) или других хронических заболеваний печени [6].

Следует учитывать, что «золотого стандарта» неинвазивной диагностики НАЖБП нет [7], то есть она по-прежнему остается диагнозом исключения. Для определения этой патологии у пациента необходимо провести дифференциальную диагностику с алкогольной болезнью печени, гепатитом С, болезнью Вильсона — Коновалова, гемохроматозом, аутоиммунными заболеваниями печени, лекарственным гепатитом [8].

Скрининг целесообразно проводить среди пациентов с факторами риска, к которым относят наличие метаболического синдрома, ожирения, СД II типа и/или ненормальных печеночных проб в анализе крови [6]. В трех современных международных гайдлайнах по НАЖБП постулируется, что для диагностики патологии следует использовать комплексную оценку результатов биохимического анализа крови и данных, полученных с помощью лучевых методов визуализации печени (ведущими из них являются транзиентная эластография и магнитно-резонансная спектроскопия), а также, при необходимости, биопсии печени [10, 11, 12]. Алгоритм диагностики НАЖБП адекватно представлен в европейском гайдлайне по этой патологии (*рис. 1*) [10].

Рис. 1. Алгоритм диагностики неалкогольной жировой болезни печени [10]

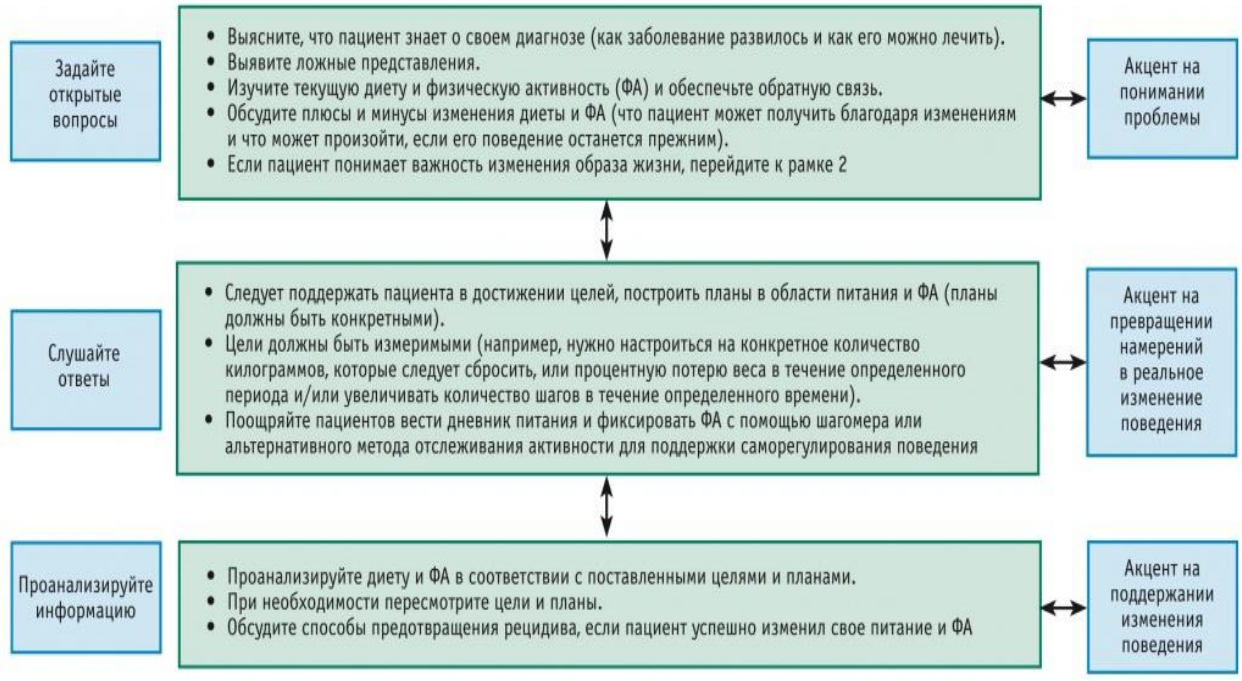


К показаниям для медикаментозного лечения НАЖБП в настоящее время принято относить НАСГ, сочетание с фиброзом печени и/или наличием нескольких компонентов метаболического синдрома [8, 9]. Современные европейские [10], американские [11], азиатские [12] и российские [13] гайдлайны содержат рекомендации по модификации образа жизни, повышению физической активности и снижению веса у пациентов с НАЖБП в качестве терапии первой линии. Рекомендации включают снижение калорийности диеты (уменьшение в день на 500-1000 ккал в сравнении с привычным режимом), увеличение доли продуктов, содержащих ω3-полиненасыщенные жирные кислоты (ПНЖК) (морепродукты), снижение доли рафинированных углеводов, систематические физические упражнения средней интенсивности и в целом повышение физической активности, снижение веса в случае его избыточности на 7-10% от исходных величин.

M. Romero-Gomez и соавт. справедливо отмечают, что изменение образа жизни и уменьшение веса представляют собой трудную задачу [14]. Неоднократно устанавливалось, что снижение веса в результате изменений диеты максимально в течение 6 месяцев, после чего нередко происходит его восстановление [15]. В связи с этим важно не только решать частные задачи по изменению диеты, повышению физической активности и снижению веса, но в целом менять поведенческие стереотипы пациента. На *рисунке*

2 показано направление необходимых изменений в поведении больного с НАЖБП. Целесообразно не только декларировать намерения, но и разрабатывать конкретные планы модификации образа жизни и контролировать характер изменений. Врач и пациент должны понимать, что подобная работа должна быть постоянной.

Рис. 2. Рекомендации по модификации поведенческих стереотипов у пациентов с неалкогольной жировой болезнью печени (адаптировано по [12])



Хотя распространённость НАСГ является значительной и возрастает в последнее время, сердечно-сосудистые заболевания и злокачественные новообразования остаются основными причинами смерти людей с НАЖБП [16]. Следовательно, лечение НАСГ требует целостного подхода, обеспечивающего минимизацию сердечно-сосудистого риска, уменьшение влияния факторов, вызывающих стеатоз и системное воспаление. Представляется логичным раннее начало НАЖБП на стадии стеатоза. К сожалению, различные способы фармакотерапии таких больных не получили международного признания из-за недостаточной доказательной базы, и основу лечения составляют немедикаментозные вмешательства.

Баланс между потреблением питательных веществ и затрачиваемой человеком энергией имеет решающее значение для развития НАЖБП и НАСГ. Центральное ожирение — важный патогенный фактор, влияющий посредством инсулинорезистентности и провоспалительных сигналов. Не вызывает возражений повышение физической активности, которое должно быть адаптировано к индивидуальным возможностям и предпочтениям. Диетические рекомендации должны включать ограничение калорийности и исключение компонентов, способствующих развитию НАЖБП (простые углеводы, напитки с высоким содержанием фруктозы, фаст-фуд). Питание

с ограничением углеводов, в том числе так называемая средиземноморская диета, способствует разрешению стеатоза [17]. Потеря веса более чем на 5 – 7% уменьшает отложение жира в печени и приводит к редукции стеатогепатита, а при потере более 10% веса значительно уменьшается фиброз печени [18]. Бариатрическая хирургия не считается терапией первой линии из-за хирургического риска, но может привести у пациентов с выраженным ожирением к значительному (на 15 – 25%) устойчивому снижению веса с улучшением гистологических характеристик при НАСГ и фиброзе печени [19]. Снижение веса уменьшает проявления НАЖБП и всех связанных с ней сопутствующих кардиометаболических расстройств, что благоприятно влияет на сердечно-сосудистую систему и уменьшает риск злокачественных новообразований.

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НЕЙРОГИСТОЛОГИЧЕСКИЕ ИЗМЕНЕНИЯ БЛУЖДАЮЩЕГО НЕРВА ПОД ВЛИЯНИЕМ КОЛХИЦИНА В ЭКСПЕРИМЕНТЕ

Аннотация: *В эксперименте колхицин применялся для изучения аксонального транспорта и трофики нерва при аппликации на нервные волокна. Исследование проводилось на крысах Вистар. Спустя 3 дня после аппликации выявлено неравномерное утолщение цилиндрических миелиновых нервных волокон и набухание нейрофибрилл. Общие морфологические изменения в нервных волокнах могут быть объяснены воздействием колхицина на нейрофибриллярные структуры. Эти структуры участвуют в формировании общей клеточной структуры нервных волокон и поддержании тонуса плазматической мембраны. Это, в свою очередь, имеет определённое значение для механизма медленного аксонального транспорта в нейронах.*

Ключевые слова: *эксперимент, колхицин, крыса, блуждающий нерв, применение, нервная клетка, морфология, нервные волокна, нейрогенная миопатия.*

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NEUROHISTOLOGICAL CHANGES IN THE VAGUS NERVE UNDER THE INFLUENCE OF COLCHICINE IN AN EXPERIMENT

Abstract: *In the experiment, colchicine was used to study axonal transport and nerve trophism upon application to nerve fibers. The study was conducted on Wistar rats. Three days after application, uneven thickening of cylindrical myelinated nerve fibers and swelling of neurofibrils were observed. The overall morphological changes in nerve fibers can be attributed to the effect of colchicine on neurofibrillary structures. These structures are involved in forming the overall cellular structure of nerve fibers and maintaining the tone of the plasma membrane. This, in turn, has a certain significance for the mechanism of slow axonal transport in neurons.*

Keywords*: experiment, colchicine, rat, vagus nerve, application, nerve cell, morphology, nerve fibers, neurogenic myopathy.*

Ввдение. Анализ механизмов нервной регуляции деятельности внутренних органов на протяжении десятилетий был и остается в центре внимания отечественной и мировой нейрофизиологии [1.2.]. В основе подобной регуляции лежат локальные и центральные нервные механизмы. Первые - реализуются в нейронных сетях метасимпатической нервной системы и базируются на системе местных рефлекторных дуг, замыкающихся в пределах внутреннего органа [3.4.5]. Локальные рефлексы обеспечивают лишь основные функциональные отправления внутреннего органа и, при определенных условиях, позволяют ему функционировать вне связи с центральной нервной системой. Вторые -располагаются на разных уровнях центральной нервной системы и управляют деятельностью внутреннего органа, приводя ее в соответствие с потребностями и условиями внутренней и внешней среды [6]. Аппликация колхицина на нервные проводники применяется с целью экспериментального изучения аксонального транспорта и нервной трофики. Изучение этих вопросов имеет большое значение в исследовании патогенеза нейрогенных миопатий и, в частности, кардиогенных миопатий. В литературе морфологические изменения в нервных проводниках оцениваются не однозначно: находит значительных изменений ультраструктуры; многие авторы отмечают уменьшение количества нейрофиламенов, указывают на разбухание нервных отростков, асимметрическое нарушение их формы [7]. В культуре с добавлением к среде колхицина наблюдается неровность контуров отростков, варикозности, отрыв отростков от субстрата, подтягивание к телу клетки. Учитывая избирательное действие колхицина в малых и средних дозах на микротрубочки, комплекс морфологических изменений в нервных проводниках требует расшифровки, что и явилось целью настоящего исследования.

Цель исследования. Исследовать в эксперименте изменение проводимости и трофики аксонов нейронов в результате аппликации колхицина на блуждающий нерв.

Материалы и методы исследования. Эксперимент поставлен на 30 крысах-самцах Вистар весом 150-200 г. Все операции и манипуляции с животными проводились под общим наркозом, следуя гуманным принципам Руководства Европейского сообщества (86/609/EES) и Хельсинкской декларации, а также в соответствии с «Правилами проведения работ с использованием экспериментальных животных». Под нембуталовым наркозом на шейную часть правого блуждающего нерва произведена аппликация 100 мкг колхицина в наполнителе. В качестве контроля исследованы 7 крыс с аппликацией наполнителя без колхицина 5 интактных крыс. Через 2, 3, 4, 5, 7 н 10 суток исслекали сегмент правого блуждающего нервна в месте аппликации. Материал от экспериментальных и интактных крыс исследован светооптически (импрегнация серебром по Бильшовскому-Грос). Следующим этапом было исследование гистологических препаратов, использовали световой микроскоп МТ 5300L с цифровой камерой при

увеличении от ×100 до ×400 в соответствии с рекомендациями для морфометрических исследований.

Результаты исследования. Светооптически, начиная с 3 суток после аппликации, обнаружено неравномерное утолщение осевых цилиндров, разбухание нейрофибрил. На полутонких срезах, окрашенных толуидиновым синим, изучены изменения конфигурации поперечного сечения миелиновых отростков. Отростки диаметром менее 4 мкм имеют в контроле и экспериментальном материале форму, близкую к округлой. Отростки диаметром 4 мкм и более у интактных крыс полиморфны, очертания, близкие к окружности, составляют в среднем 33%. Через 3 суток после аппликации конфигурация сечений становится более изоморфной (до 71% округлых сечений). Через 5 суток количество округлых сечений резко уменьшается (до15%), конфигурация отростков характеризуется резкой складчатостью, наблюдаются инвагинации внутрь отростка части плазматической мембраны вместе с миелиновой оболочкой. Такие фигуры выглядят как «отросток в отростке» и в интактных нервах не встречаются. Через, 10, суток соотношение сечений разной конфигурации, приближается к норме. но продолжают встречаться двойные миелиновые контуры отдельных отростков. На субмикроскопическом уровне выявлены пузырьковидные вздутия осевых цилиндров: расширенные сегменты заполнены нейрофиламентами и фрагментами микротрубочек без определенной ориентации. Часть осевых цилиндров бедна нейрофибриллами и выглядит просветленной. На косых срезах видно прилегание микротрубочек к плазматической мембране аксонов. Обнаруженное двухфазное изменение формы поперечного сечения осевых цилиндров диаметром 4 мкм и более, по-видимому, зависимость тонуса плазматической мембраны о состояния цитоскелетных структур, что наблюдается в культуре ткани, а также условиях экспериментальной и врожденной патологии нервных стволов. Мономорфность мелких и полиморфизм крупных осевых цилиндров, по-видимому, связаны с разным соотношением в них микротрубочек и нейрофиламентов и акцентрируют более устойчивую к действию колхицина цитоскелетную структуру отростков и малого калибра.

Заключение. При аппликации 100 мкг колхицина на правый блуждающий нерв крысы наблюдается деформация отростков, двухфазное изменение конфигурации поперечного сечения осевых цилиндров, дезагрегация микротрубочек дезориентация нейрофиламентов. Комплекс морфологических

изменений может быть объяснен действием колхицина на нейрофибриллярные структуры, участвующие в организации цитоскелета отростков и в поддержании тонуса плазматической мебраны, что имеет определенное значение в механизме медленного аксонального транспорта

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ОСОБЕННОСТИ ТЕЧЕНИЯ АНЕМИИ, СВЯЗАННОЙ С ДЕФИЦИТОМ ЖЕЛЕЗА У ДЕТЕЙ

Аннотация. *Железодефицитная анемия у детей характеризуется проявлением астеновегетативного, эпителиального, иммунодефицитного, сердечно-сосудистого и других синдромов. В статье представлены литературные данные, раскрывающие понятие заболевания, его этиологию, клинические проявления, методы диагностики, принципы лечения и профилактики у детей с железодефицитной анемией. Также обозначены основные направления диспансерного наблюдения данной категории пациентов.*

Ключевые слова: *дети, железодефицитная анемия, этиология, клиническая картина, диагностика, диспансерное наблюдение, лечение, профилактика.*

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CHARACTERISTICS OF IRON DEFICIENCY ANEMIA IN CHILDREN

Abstract. *Iron deficiency anemia in children is characterized by asthenovegetative, epithelial, immunodeficiency, cardiovascular, and other syndromes. This article presents literature data describing the disease, its etiology, clinical manifestations, diagnostic methods, treatment principles, and prevention in children with iron deficiency anemia. The article also outlines the main areas of follow-up care for this patient population.*

Keywords: *children, iron deficiency anemia, etiology, clinical presentation, diagnosis, follow-up care, treatment, and prevention.*

Актуальность. Железодефицитная анемия **(ЖДА)** представляет собой патологическое состояние, при котором наблюдается снижение уровня гемоглобина вследствие дефицита железа в организме. Этот дефицит может возникать из-за недостаточного поступления железа с пищей, нарушения его

всасывания или чрезмерных потерь. По данным Всемирной организации здравоохранения, дефицит железа отмечается примерно у 30% населения Земли. Распространённость железодефицитной анемии среди детей первых трёх лет жизни достигает 40%, а среди подростков — около 30%. Наиболее уязвимыми к развитию ЖДА являются дети раннего возраста (до 3 лет) и подростки в период полового созревания [1–5].

Железо является одним из ключевых микроэлементов, обеспечивающих жизнедеятельность организма. Различают две основные формы железа — гемовые и негемовые соединения. К гемовым соединениям относятся гемоглобин, миоглобин, каталаза, цитохром и пероксидаза; к негемовым — трансферрин, ферритин, гемосидерин, ксантиноксидаза и дегидрогеназа. Физиологические функции железа зависят от формы его соединений: гемоглобин и трансферрин участвуют в транспорте кислорода, миоглобин обеспечивает транспорт и депонирование кислорода в мышечной ткани, каталаза катализирует разложение перекиси водорода, цитохром принимает участие в процессах тканевого дыхания, а пероксидаза способствует окислительно-восстановительным реакциям. Ферритин и гемосидерин обеспечивают депонирование железа в тканях, а ксантиноксидаза участвует в образовании мочевой кислоты.

ЭТИОЛОГИЧЕСКИЕ ФАКТОРЫ РАЗВИТИЯ ЖДА

Все **этиологические факторы** железодефицитной анемии (ЖДА) в зависимости от времени их воздействия подразделяются на три группы: **антенатальные, интранатальные и постнатальные** [2–10].

К антенатальным причинам относят нарушения маточно-плацентарного кровообращения, фетоматеринские и фетоплацентарные кровотечения, недоношенность, многоплодную беременность, а также выраженный и длительный дефицит железа у беременной женщины.

Интранатальные причины включают фетоплацентарные трансфузии, преждевременную или, наоборот, позднюю перевязку пуповины, кровотечения, возникающие при травматичных акушерских манипуляциях, а также пороки развития плаценты и пуповины.

Постнатальные причины связаны с недостаточным поступлением железа с пищей, повышенной потребностью организма в период интенсивного роста, чрезмерными потерями железа при кровотечениях различного происхождения, а также нарушением его кишечного всасывания [11–18].

В зависимости от концентрации гемоглобина и количества эритроцитов в единице объёма крови выделяют **три степени тяжести анемии**:

Лёгкая степень — уровень гемоглобина 110–90 г/л, количество эритроцитов 3,5–3,0 × 10^{12}/л;

Средняя степень — гемоглобин 89–70 г/л, эритроциты 3,0–2,5 × 10^{12}/л;

Тяжёлая степень — гемоглобин ≤69 г/л, эритроциты 2,5–2,0 × 10^{12}/л.

Основные **клинические синдромы** железодефицитной анемии включают астено-невротический, эпителиальный, сердечно-сосудистый, мышечный, а также синдром вторичного иммунодефицита. К более редким проявлениям дефицита железа относятся гепатоспленомегалия, отёчность тканей и дисменорея у девочек [4–7].

Факторы риска развития железодефицитной анемии

К основным факторам, способствующим развитию железодефицитной анемии (ЖДА) у детей, относятся:

- анемия у беременных;
- недоношенность;
- нерациональное питание;
- заболевания желудочно-кишечного тракта;
- глистные инвазии;
- кровопотери различного происхождения.

Клинические проявления железодефицитной анемии у детей

Клиническая картина ЖДА у детей может протекать с преобладанием симптомов различных синдромов: астено-вегетативного, эпителиального, диспепсического, сердечно-сосудистого, иммунодефицитного и гепатолиенального.

Астено-вегетативный синдром развивается вследствие тканевой гипоксии, в том числе гипоксии головного мозга. У детей могут наблюдаться мышечная гипотония, задержка физического и психомоторного развития (в тяжелых случаях — интеллектуальная недостаточность), повышенная раздражительность, плаксивость, головокружения, обмороки, эпизоды ортостатического коллапса, признаки вегетососудистой дистонии.

Эпителиальный синдром проявляется изменениями со стороны кожи и её придатков: сухостью кожных покровов, гиперкератозом на локтях и коленях, появлением трещин в уголках рта (ангулярный стоматит), глосситом, хейлитом, тусклостью и выпадением волос, ломкостью и исчерченностью ногтей.

Диспепсический синдром характеризуется снижением аппетита вплоть до анорексии, дисфагией, метеоризмом, запорами или диареей. Нередко отмечается извращение вкуса — стремление употреблять несъедобные вещества (мел, землю и др.) и изменение обонятельных предпочтений (влечение к запахам бензина, красок, лаков). Поражения желудочно-кишечного тракта усугубляют нарушение всасывания железа, что способствует прогрессированию анемии.

Изменения со стороны сердечно-сосудистой системы наблюдаются при тяжёлых формах ЖДА и проявляются тахикардией, одышкой, артериальной гипотонией, систолическими шумами, признаками дистрофии миокарда.

Синдром вторичного иммунодефицита характеризуется длительным субфебрилитетом, частыми острыми респираторными и кишечными инфекциями, а также их затяжным течением.

Гепатолиенальный синдром (гепатоспленомегалия) встречается, как правило, у детей с тяжёлой степенью железодефицитной анемии, нередко сочетающейся с рахитом или другими хроническими заболеваниями.

Диагностика железодефицитной анемии у детей

Диагностика железодефицитной анемии (ЖДА) основывается на совокупной оценке клинических проявлений и лабораторных показателей, позволяющих определить наличие, степень тяжести и характер нарушений обмена железа в организме ребёнка.

Ключевыми лабораторными критериями, подтверждающими наличие ЖДА, являются:

- снижение уровня гемоглобина — Hb <110 г/л;
- уменьшение цветового показателя (ЦП <0,86);
- снижение концентрации сывороточного железа — <14 мкмоль/л;
- повышение общей железосвязывающей способности сыворотки (ОЖСС >63 мкмоль/л);
- снижение уровня сывороточного ферритина — <12 мкг/л [2–10].

Основным методом диагностики ЖДА является общий анализ крови, включающий оценку следующих параметров:

- количество эритроцитов;
- уровень гемоглобина;
- цветовой показатель;
- среднее содержание гемоглобина в эритроците (MCH);
- средняя концентрация гемоглобина в эритроците (MCHC);
- средний объём эритроцитов (MCV);
- морфологические особенности эритроцитов;
- количество ретикулоцитов.

Нижней границей нормы количества эритроцитов у детей до 5 лет считается 4,0 × 10^{12}/л, а у детей старше 5 лет — 4,5 × 10^{12}/л. Согласно рекомендациям ВОЗ, нижней границей нормы уровня гемоглобина является 110 г/л для детей младше 5 лет и 120 г/л — для детей старшего возраста.

Нормальные значения цветового показателя колеблются в пределах 0,85–1,05.

При выявлении анемии ребёнок подлежит дополнительному обследованию у врачей-специалистов: гастроэнтеролога, нефролога, аллерголога, а при необходимости — гематолога и эндокринолога.

Биохимические показатели обмена железа

Сывороточное железо отражает концентрацию негемового железа в плазме крови.

Нормальные значения:

у новорождённых — 5,0–19,3 мкмоль/л;

у детей старше 1 месяца — 10,6–33,6 мкмоль/л.

Общая железосвязывающая способность сыворотки (ОЖСС) характеризует количество железа, которое может быть связано транспортным белком — трансферрином. Норма — 40,6–62,5 мкмоль/л.

Коэффициент насыщения трансферрина железом — показатель, отражающий долю сывороточного железа от общей железосвязывающей способности. Нормальные значения составляют не менее 17%.

Определение уровня сывороточного железа и проведение общего анализа крови возможно в амбулаторных условиях. Более углубленные исследования — определение ферритина, ОЖСС, насыщения трансферрина и других биохимических показателей — выполняются в условиях стационара [9–11].

ЛЕЧЕНИЕ ЖЕЛЕЗОДЕФИЦИТНОЙ АНЕМИИ У ДЕТЕЙ

Основными принципами терапии железодефицитной анемии (ЖДА) у детей являются:

1. Устранение причин, вызвавших дефицит железа;
2. Коррекция питания и режима дня;
3. Назначение препаратов железа для восполнения его запасов в организме.

Диетотерапия и грудное вскармливание

До достижения ребёнком шестимесячного возраста рекомендуется исключительно грудное вскармливание как оптимальный источник биодоступного железа. Детям с установленным дефицитом железа, находящимся на грудном вскармливании, следует назначать препараты железа, начиная с 6-месячного возраста.

Детям, получающим искусственное вскармливание, необходимо использовать адаптированные молочные смеси, обогащённые железом, до начала употребления твёрдой пищи (примерно до 12 месяцев).

Важное значение имеет обучение родителей принципам рационального питания ребёнка — с достаточным содержанием продуктов, богатых железом (мясо, печень, рыба, гречневая крупа, яблоки, зелёные овощи).

Медикаментозная терапия

Основу лечения составляет коррекция железодефицита с помощью железосодержащих препаратов [3,6]. Наиболее часто применяются:

- препараты двухвалентного железа: Актиферрин, Сорбифер Дурулес, Тардиферон, Тотема, Ферроплекс, Фенюльс;
- препараты трёхвалентного железа в форме гидроксид-полимальтозного комплекса: Мальтофер, Феррум Лек.

Детям младшего возраста препараты железа назначаются преимущественно в жидких лекарственных формах (капли, сиропы, суспензии).

Рекомендуется приём препаратов за 1–2 часа до еды, запивая водой или фруктовыми соками (не молоком, так как кальций снижает всасывание железа).

Применение инъекционных форм препаратов железа обосновано только в исключительных случаях — при постгеморрагических анемиях или нарушении всасывания железа в кишечнике [4].

Наблюдение и диспансеризация

Дети с железодефицитной анемией подлежат диспансерному наблюдению в течение одного года. Контроль осуществляется следующим образом:

- во время основного лечения — 1 раз в 2 недели проводится осмотр врача и клинический анализ крови;
- в первые три месяца ремиссии, когда ребёнок получает поддерживающую ферротерапию — 1 раз в месяц;
- в последующие месяцы ремиссии — ежеквартально.

Перед снятием с диспансерного учёта проводится повторное исследование крови с определением уровня гемоглобина, сывороточного железа, ферритина и общей железосвязывающей способности сыворотки [12]. Основной курс лечения железодефицитной анемии у детей составляет 4–6 недель, поддерживающая терапия продолжается ещё 2–3 месяца. Одновременно проводится лечение основного заболевания, послужившего причиной дефицита железа.

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МОРФОЛОГИЧЕСКИЕ И СТРУКТУРНЫЕ ИЗМЕНЕНИЯ ТКАНИ СЕЛЕЗЁНКИ У БОЛЬНЫХ САХАРНЫМ ДИАБЕТОМ

Аннотация: *Сахарный диабет — системное заболевание, затрагивающее множество органов и тканей, включая лимфоидные структуры. Селезёнка, как важный орган иммунной и кроветворной систем, подвержена патологическим изменениям при гипергликемии. В статье рассматриваются морфологические и структурные изменения ткани селезёнки у больных сахарным диабетом 1 и 2 типов на основании литературных данных и гистологических исследований.*

Ключевые слова: *Сахарный диабет, селезёнка, морфология, микроскопия, структурные изменения, микроангиопатия, лимфоидная ткань.*

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MORPHOLOGICAL AND STRUCTURAL CHANGES IN THE SPLEEN TISSUE OF PATIENTS WITH DIABETES MELLITUS

Annotation: *Diabetes mellitus is a systemic disease affecting multiple organs and tissues, including lymphoid structures. The spleen, as an important organ of the immune and hematopoietic systems, undergoes pathological changes under hyperglycemia. This article reviews the morphological and structural alterations of spleen tissue in patients with type 1 and type 2 diabetes based on literature data and histological studies.*

Key words: *Diabetes mellitus, spleen, morphology, microscopy, structural changes, microangiopathy, lymphoid tissue.*

Актуальность. Сахарный диабет — распространённое хроническое заболевание, сопровождающееся нарушениями обмена веществ и микроциркуляции, приводящими к поражению органов и тканей. Несмотря на изучение сосудистых и метаболических осложнений, изменения в органах иммунной системы, особенно в селезёнке, остаются малоизученными. Поскольку селезёнка играет ключевую роль в иммунной и кроветворной системах, её морфологические изменения при СД имеют клиническое значение для оценки иммунного статуса и понимания патогенеза осложнений, что подчёркивает актуальность дальнейших исследований.

Цель исследования. Изучить морфологические и структурные изменения селезёнки у больных сахарным диабетом и их связь с длительностью и тяжестью заболевания.

Задачи исследования: провести гистологический анализ ткани селезёнки у больных СД; оценить характер и выраженность изменений в белой и красной пульпе; выявить особенности сосудистых нарушений; сравнить данные с морфологией селезёнки контрольной группы; определить

связь выявленных изменений с клиническими параметрами заболевания (тип, длительность, степень компенсации).

Методы исследования. Изучены образцы селезёнки у 28 пациентов, умерших от осложнений сахарного диабета, и 10 человек без диабета (контрольная группа). Ткани фиксировали в 10% нейтральном формалине, обрабатывали по стандартной гистологической методике, заливали в парафин и нарезали срезы толщиной 4–6 мкм. Окрашивание проводили гематоксилином и эозином для общей структуры, по Ван Гизону — для соединительной ткани, по Маллори — для оценки фиброза. Применялись специальные методы для выявления сосудов и иммунных клеток, а количественные параметры измеряли с помощью компьютерной программы. У больных СД длительность заболевания составляла 6–25 лет, уровень HbA1c в среднем был 9,2%, часто наблюдались поражения почек, сосудов, глаз и хронические инфекции, сопровождавшиеся снижением иммунитета. Изучали структуру белой и красной пульпы, состояние капсулы и сосудов.

Результаты исследования.

У больных диабетом селезёнка характеризовалась утолщением капсулы, уменьшением лимфоидной ткани и дезорганизацией иммунных фолликулов. В красной пульпе наблюдались застой крови, разрушение клеток и кровоизлияния. Сосуды утолщены, с признаками повреждений и рубцевания, что ограничивает кровоснабжение. Количество Т- и В-лимфоцитов снижено, указывая на ослабление иммунной функции органа.

Вывод.

У больных сахарным диабетом выявляются значительные изменения в структуре селезёнки, которые связаны с длительным течением заболевания и высоким уровнем сахара в крови. Отмечается уменьшение иммунной ткани и снижение количества иммунных клеток, что приводит к ослаблению защитных функций органа. Кроме того, происходят повреждения сосудов селезёнки — утолщение их стенок и сужение просвета, что ухудшает кровоснабжение и способствует развитию фиброза. Эти морфологические изменения могут способствовать снижению иммунитета и повышать риск осложнений при сахарном диабете.

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ПОСТНАТАЛЬНОГО МОРФОГЕНЕЗА ОРГАНОВ ИММУННОЙ СИСТЕМЫ ПОТОМСТВА, РОЖДЕННОГО В УСЛОВИЯХ ТИРОИДНОЙ ГИПОФУНКЦИИ У МАТЕРИ. Oriental Journal of Medicine and Pharmacology, 2(1), 116-123.
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РЕИНЖИНИРИНГ БИЗНЕС-ПРОЦЕССОВ ПРЕДПРИЯТИЯ КАК СПОСОБ ПОВЫШЕНИЯ ЭФФЕКТИВНОСТИ ЕГО ДЕЯТЕЛЬНОСТИ

Аннотация: *В статье рассмотрены основные теоретические подходы к определению реинжиниринга и предпосылки его применения в деятельности организации. На основании проведенного анализа выделена проблема плюрализма мнений, что неизбежно приводит фирмы к неудачам вследствие непонимания сути концепции. Предложено определение реинжиниринга, содержащее комплексный подход к изученным теориям и нивелирующее теоретические противоречия.*

Ключевые слова*: реинжиниринг, оптимизация, бизнес-процесс, цифровой реинжиниринг, реинжиниринг развития*

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REENGINEERING OF BUSINESS PROCESSES OF THE ENTERPRISE AS A WAY OF INCREASING THE EFFICIENCY OF ITS ACTIVITIES

Abstract: *The article discusses the main theoretical approaches to the definition of reengineering and the prerequisites for its application in an organization's activities. Based on the analysis, the problem of pluralism of opinions is highlighted, which inevitably leads companies to failures due to a lack of understanding of the concept. A definition of reengineering is proposed, which*

includes a comprehensive approach to the studied theories and eliminates theoretical contradictions.

Keywords: *reengineering, optimization, business process, digital reengineering, development reengineering*

Современные тенденции диктуют новые условия функционирования предприятий на рынке. Ужесточенная конкурентная борьба, усиливающиеся требования потребителя, постоянно обновляющиеся тенденции на рынке – факторы, которые наталкивают предприятия внедрять, менять, оптимизировать бизнес-процессы.

Для компании оптимизация в быстром темпе становится неотъемлемым фактором ее существования на рынке, а отрицание менеджментом фирмы необходимости изменений приводит к неизбежной ликвидации деятельности. Более того, часто недостаточно просто оптимизировать процесс. Например, в случае, если наблюдается отсутствие понимания конечного результата деятельности или же несоответствие фактических показателей осуществления бизнес-процесса прогнозируемым значениям, тогда в компании нередко прибегает к реинжинирингу. Это считается достаточно кардинальным методом пересмотра бизнес-процессов.

Основные преимущества применения реинжиниринга в деятельности – это прежде всего рост эффективности деятельности и сокращение затрат, гибкость и возможность оперативно реагировать на изменения на рынке, как следствие повышение конкурентоспособности фирмы, а также снижение рисков и позитивное влияние на корпоративную культуру компании вследствие перманентных изменений и необходимости обучения. Однако можно также выделить и очевидные недостатки данной концепции: высокая стоимость реализации, которая зачастую непосильна для большого количества фирм, возможные ошибки исполнителей процессов при реализации новой разработанной модели бизнес-процессов.

По статистике 80% организаций, внедряющих данную практику в свою работу, терпят неудачу. Это обусловлено прежде всего недостаточной подготовкой компании к реализации проекта реинжиниринга, теоретическими пробелами в литературе и, как следствие, непониманием основ вопроса. Многие экономисты-теоретики и предприниматели на практике приходят к выводу, что в случае, когда организация уже не может противостоять давлению на рынке и сопротивляться возникшим изменениями, реинжиниринг – это чуть ли не единственный способ сохранить организацию.

В экономической литературе можно встретить несколько подходов к определению реинжиниринга. Рассмотрим основные из них в отечественной и зарубежной литературе.

М. Хаммер и Дж. Чампи (1993 г.) являются одними из первых ученых, рассматривающих реинжиниринг как результативную практику для организаций, нуждающихся в изменениях. Они рассматривали данную

концепцию как фундаментальное переосмысление и радикальное перепроектирование бизнес-процессов. В своем подходе авторы выделяли, что практика реинжиниринга в компаниях – это не просто изменения и совершенствование текущих бизнес-процессов, а именно их полная замена.

Нередко это определение поддавлось критике со стороны других ученых, в том числе Т.Дэвенпортом. Он выделял излишнюю радикальность в подходе коллег и предпочитал оценивать реинжиниринг как способ перестройки бизнес-процессов, но с упором на эволюционный характер, то есть наставивал на пересмотре текущих бизнес-процессов, дополняя их.

В отечественной литературе можно рассмотреть подход Молотковой Н.В. Она делает упор на комплексности этого подхода к трансформации, оказывающего влияние на материальные и информационные потоки и предполагающего реорганизацию структуры фирмы, сокращение временных затрат, рост качества предоставляемых услуг. Таким образом, многообразие мнений и подходов к реинжинирингу вызывают непонимание и трудности восприятия, адаптации и реализации реинжиниринга на практике.

Более того, в зависимости от состояния и положения фирмы на рынке, реинжиниринг можно рассматривать как вариативный инструмент. Так, кризисный реинжиниринг – это полная, оперативная и комплексная трансформация большего пласта бизнес-процессов в компании. Его рассматривают как экстренный инструмент изменения текущей ситуации в компании. В то время, как, например, реинжиниринг развития – это более постепенная система изменений, которая позволяет поддерживать фирме высокую конкурентоспособность на рынке.

Выбор конкретного типа реинжиниринга может также зависеть от стадии жизненного цикла предприятия. Так, например, считается если предприятие находится на начальном этапе своего развития, прибегать к реинжинирингу вовсе не стоит, так как ее бизнес-процессы находятся только в стадии зарождения. На данной ступени развития компании стоит обратить свое внимание на тот же бенчмаркинг.

На этапе рассвета организации, а также в состоянии стабильности компании следует обратиться к реинжинирингу развития, так как благодаря этой практике фирма сможет усилить свои позиции на рынке. Соответственно, в то время, когда компания переживает спад, необходимо использовать кризисный реинжиниринг.

Реинжиниринг становится все более востребованнее среди компаний. Вследствие его эффективности уже множество компаний интегрируют данную практику в свою деятельность.

Однако прослеживается значимая теоретическая проблема в области реинжиниринга – это многообразие мнений касательно определения понятия, что негативным образом складывается на базовом понимании концепции, а также неудачах компаний при ее применении и адаптации в свою деятельность. Для нивелирования данной проблемы необходимо выработать единую дефиницию, которая будет содержать понятное определение

реинжиниринга в рамках современного менеджмента и представляющее компиляцию мнений разных школ и ученых.

Так предложено следующее определение: реинжиниринг в современном понимании – это всеобъемлющий, кардинальный способ трансформации, переоценки и замены текущих бизнес-процессов фирм, технологий и способов управления, используемых в организации, направленный на скачкообразное улучшений различных показателей эффективности, таких как сокращение временных и финансовых затрат, рост валовой выручки и т.д., а также соединяющий в себе учет организационный культуры компании и использование технологичных и цифровых инструментов.

Вышеизложенное определение является полным, понятным, отвечающим современным тенденциям в менеджменте и отвечающим потребностям субъектов экономики, использующих реинжиниринг в своей практике.

Применение реинжиниринга оказывает огромное влияние на существование фирмы на рынке: для фирм, столкнувшихся с трудностями – помочь выбиться в лидеры, а для «первых» на рынке – помочь сохранить свои позиции и конкурентоспособность, поэтому отсутствие противоречий, грамотно разработанная теоретическая и методологическая база с учетом современных тенденций поможет фирмам избежать неудач при интегрировании реинжиниринга в свою деятельность.

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ТАКТИКА ВЕДЕНИЯ ЛЕЧЕНИЯ ДЕТЕЙ С ВРОЖДЕННОЙ РАСЩЕЛИНОЙ ВЕРХНЕЙ ГУБЫ И НЁБА: МЕЖДИСЦИПЛИНАРНАЯ ПРОБЛЕМА

Аннотация: *Врожденная расщелина губы и неба (ВРГН) -один из самых распространенных пороков развития челюстно-лицевой области, встречающийся у 90% детей. Неонатологи и педиатры- первые врачи, которые сталкиваются с таким ребенком, и их задача-правильно оценить физическое состояние новорожденных с расщелиной губы и неба, скорректировать питание с учетом этого врожденного порока и своевременно направить их к челюстно-лицевому хирургу. Однако важным моментом является комплексная реабилитация детей, с пороком в виде ВРГН, которая не ограничивается хирургическим лечением этой деформации. Неправильное прикрепление мышц мягкого неба способствует развитию дисфункции барабанной камеры у детей с этим пороком, что приводит к хроническому воспалительному процессу в полости барабанной камеры и в конечном итоге к потере слуха. Поэтому пациентов с ВРГН следует направлять на консультацию к отоларингологу каждые 2-3 месяца. Наблюдение стоматологом детей сВРГН надо начинать с первых дней жизни с целью коррекции верхней челюсти, альвеолярного отростка, в дальнейшем восстановления зубного ряда. Сразу после хирургического лечения данного врожденного порока необходимы занятия с логопедом, так как от полноценного нёбноглоточного смыкания зависит социально адекватная речь данных пациентов. Таким образом, реабилитация детей с ВРГН является комплексной междисциплинарной проблемой.*

Ключевые слова: *врожденная расщелина верхней губы и нёба, дети, комплексное лечение, реабилитация.*

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TACTICS OF TREATMENT OF CHILDREN WITH CONGENITAL CLEFT OF THE UPPER LIP AND PALATE: AN INTERDISCIPLINARY PROBLEM

Abstract: *Congenital cleft lip and palate (VGN) is one of the most common malformations of the maxillofacial region, occurring in 90% of children. Neonatologists and pediatricians are the first doctors to encounter such a child, and their task is to correctly assess the physical condition of newborns with cleft lip and palate, adjust nutrition taking into account this congenital defect and promptly refer them to a maxillofacial surgeon. However, an important point is the comprehensive rehabilitation of children with a defect in the form of VGN, which is not limited to surgical treatment of this deformity. Improper attachment of the muscles of the soft palate contributes to the development of dysfunction of the tympanic chamber in children with this defect, which leads to a chronic inflammatory process in the cavity of the tympanic chamber and eventually to hearing loss. Therefore, patients with VGN should be referred to an otolaryngologist every 2-3 months. The dentist's supervision of children with sVRGN should begin from the first days of life in order to correct the upper jaw, alveolar process, and further restore the dentition. Immediately after surgical treatment of this congenital malformation, classes with a speech therapist are necessary, since the socially adequate speech of these patients depends on a full-fledged palatopharyngeal closure. Thus, the rehabilitation of children with VGN is a complex interdisciplinary problem.*

Keywords: *congenital cleft of the upper lip and palate, children, comprehensive treatment, rehabilitation.*

Введение. Дети с ВРГН требуют активного наблюдения с самого рождения. Выраженные анатомические, функциональные и косметические проблемы, а также патологические осложнения требуют динамического наблюдения и лечения у разных специалистов: челюстно-лицевых хирургов, отоларингологов, стоматологов, педиатров и логопедов. Хороших результатов в лечении таких детей можно добиться только при объединении усилий врачей разных специальностей: психоневрологи играют важнейшую роль в формировании психосоциального развития детей с ВРГНи начинают работать с родителями с пренатального периода. Однако неонатологи и педиатры - первые врачи, которые сталкиваются с такими новорожденными, и именно они должны правильно оценить их состояние и своевременно направить к специалисту, учитывая особенности таких пациентов.Во многих случаях ВРГН является частью симптомокомплекса различных врожденных синдромов (например, синдрома Пьера Робина, синдрома Корнелии де Ланге, синдрома Гольденхара, синдрома Ван дер Вуда). Поэтому совместная подготовка генетиков и педиатров к проведению плановых хирургических вмешательств у детей с вышеперечисленными синдромами является залогом успешной послеоперационной реабилитации ребенка. Характерной

особенностью развития пациентов с ВРГН является затрудненное кормление из-за широкого носоо-рального соединения и невозможности создания отрицательного давления в ротовой полости во время кормления. В связи с этим большинство детей находятся на искусственном вскармливании, что приводит к снижению защитной функции иммунной системы и в ряде случаев к развитию таких заболеваний, как железодефицитная анемия, рахит и дисбактериоз кишечника [2]. По этой же причине кормление сопровождается аспирацией жидкой пищи, что негативно сказывается на состоянии слизистой оболочки носа (вызывая со временем патологические изменения в подвижности мезентериального эпителия).

Поэтому одной из первых задач педиатров и неонатологов является: иметь разнообразные соски и ложки, адаптированные для новорожденных и детей с ГВЗ, которые можно использовать для нормализации процесса послеоперационного кормления и облегчения хирургической подготовки пациента. Другой особенностью является смешанный тип дыхания, в результате воздух недостаточно нагревается, увлажняется и очищается, носовая полость и ротоглотка оказываются менее защищенными [2] и нарушается нормальное состояние ротоглотки (т.е. преобладание грамотрицательной микрофлоры полости рта, такой как Klebsiella pneumoniae, Neisseria sp. и E. coli, K.pneumoniae, S. aureus и Candida spp.). Это приводит к более высокой заболеваемости инфекциями верхних дыхательных путей (включая оториноларингологические) и нижних дыхательных путей по сравнению со здоровыми детьми [3]. Это приводит к более высокой заболеваемости инфекциями верхних дыхательных путей (включая оториноларингологические) и нижних дыхательных путей по сравнению со здоровыми детьми [3]. Деформации носа почти всегда присутствуют у детей с ВРГН. Они включают уплощение крыльев носа с латеральной стороны носовой расщелины, деформацию верхушки носа и отклонение носовой перегородки [4-6]. Недостаточная проходимость носовых ходов, попадание пищи в полость носа, смешанное дыхание и плохая подвижность мезоэпителия приводят к затяжному риниту, острому/рецидивирующему тонзиллиту, аденоидиту и синуситу у этих детей. При недостаточном и неадекватном лечении инфекционный процесс может распространиться на нижние дыхательные пути, что приведет к ларингиту и бронхиту. При выборе препаратов для лечения и профилактики инфекционно-воспалительных состояний оториноларингологических органов необходимо помнить о таких особенностях микрофлоры, встречающейся у детей. После реконструктивных операций по поводу ВРГН у детей старшего возраста происходит деформация переносицы и рецидив воспаления в полости носа и придаточных пазухах. В связи с этим могут развиваться вазомоторный ринит и гипертрофический ринит, в некоторых случаях приводящие к повышению давления воздуха в средних носовых протоках и затяжному воспалительному процессу. Также встречается патология лимфоглоточного кольца. Для детей с этим заболеванием характерны увеличенные небные миндалины, реже -

увеличенные глоточные миндалины. Воспалительные заболевания верхних дыхательных путей часто приводят к хроническому тонзиллиту. Хронический тонзиллит и/или аденоидит. Рецидивирующий или экссудативный средний отит нередко встречается у детей с ВРГН, вызывая кондуктивную тугоухость. Развитие экссудативного среднего отита обусловлено дисфункцией слухового прохода вследствие аномального прикрепления мышц, которые тянут опускающееся нёбо (мышцы tensor palatini) и поднимают мягкое нёбо (мышцы levator palatini) [7].

Дети обычно рождаются с узелковой дисфункцией, которая со временем приводит к выпоту в полости уха и последующей потере слуха. Экссудативный средний отит протекает бессимптомно, и единственной жалобой является потеря слуха. Своевременная диагностика заболевания повышает шансы ребенка на выздоровление, так как длительное нахождение выпота в полости среднего уха может привести к необратимым изменениям и стойкой потере слуха [8, 12]. Помимо хирургического лечения этого дефекта, качество социально адекватной речи зависит от полного смыкания нёбно-глотки, что оказывает существенное влияние на полную реабилитацию пациентов с ВРГН [11]. В связи с этим необходимы исследования функции нёбо-глотки до,во время и после логопедических занятий у таких пациентов.

Заключение: Комплексная реабилитация пациентов с ВРГН невозможна без коррекции верхнечелюстного аппарата и формирования альвеолярной дуги. Поэтому наблюдение стоматологов за пациентами с этим пороком развития должно начинаться уже через несколько дней после рождения [9, 10].Таким образом, лечение и реабилитация детей с ВРГН - сложная, мульти-дисциплинарная проблема, требующая участия многих специалистов: челюстно-лицевых хирургов (хирургическая коррекция ВНЧС), неонатологов, педиатров (правильное питание, выявление и коррекция различных физических патологий, профилактика ОРВИ, подготовка пациентов к оперативному вмешательству); стоматологов и ортодонтов (коррекция врожденной расщелины неба, при необходимости подготовка пациентов к оперативному вмешательству); стоматологи и ортодонты (коррекция врожденной расщелины неба, при необходимости; стоматологи и ортодонты (коррекция врожденной расщелины неба, вторичных пороков развития альвеолярного аппарата, восстановление зубов); отоларингологи (лечение и профилактика заболеваний носовой полости, глотки и среднего уха); логопеды и психологи (необходимые для полноценной социальной адаптации ребенка (мероприятия по психологической реабилитации).

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КЛЮЧЕВЫЕ ОСОБЕННОСТИ ПСИХОНЕВРОЛОГИЧЕСКОГО СТАТУСА И ХАРАКТЕРИСТИК ДЕТЕЙ С ВРГН

Аннотация: *Решение проблем лечения детей с врожденными расщелинами губы и неба является одной из главных задач в области челюстно-лицевой хирургии. Эта проблема становится все более актуальной из-за высокой частоты рождаемости детей с данной патологией и ее серьезного влияния на морфофункциональное развитие новорожденных. Невозможность грудного вскармливания и переход на искусственное питание в раннем возрасте ослабляет организм и может привести к задержке роста и развития ребенка. Дети с врожденными расщелинами губы и неба отличаются от своих сверстников уже с первых месяцев жизни. Исследования показывают, что эта патология часто сочетается с другими аномалиями развития органов, и в нашей республике эти цифры могут быть еще выше, чем в общепринятых статистических данных.*
Ключевые слова: *врожденная расщелина губы и нёба, неврологическая симптоматика, психоневрологические нарушения, нарушение речевосприятия, речепроизводство.*

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REVIEW OF IDENTIFYING CONCOMITANT DISEASES IN CHILDREN WITH CONGENITAL PATHOLOGY OF CLEFT LIP AND PALATE

Abstract: *Solving the problems of treating children with congenital clefts of the lip and palate is one of the main tasks in the field of maxillofacial surgery. This problem is becoming increasingly relevant due to the high birth rate of children with this pathology and its serious impact on the morphofunctional development of newborns. The impossibility of breastfeeding and the transition to artificial feeding at an early age weakens the body and can lead to delays in the growth and*

development of the child. Children with congenital clefts of the lip and palate differ from their peers from the first months of life.Research shows that this pathology is often combined with other anomalies in the development of organs, and in our republic these figures may be even higher than in generally accepted statistics.

Keywords: *congenital cleft lip and palate, neurological symptoms, psychoneurological disorders, speech perception disorder, speech production.*

Введение. Дети с врождённой расщелиной губы и неба (ВРГН) сталкиваются с рядом психоневрологических особенностей, которые могут быть обусловлены как физиологическими факторами, связанными с нарушениями в развитии лица и дыхательных путей, так и психоэмоциональными проблемами, вызванными социальным восприятием и трудностями адаптации. Важно понимать, что лечение и реабилитация детей с такой аномалией требует комплексного подхода, включающего как медицинское, так и психосоциальное сопровождение. Анализ психоневрологических особенностей детей с врождёнными расстройствами нервной системы (ВРНС) или врождёнными нервно-психическими нарушениями (ВРГН) требует комплексно-

го подхода, охватывающего как неврологическую, так и психическую составляющие развития ребёнка. Врождённые расстройства нервной системы могут проявляться в разных формах, и их влияние на психику детей зависит от степени поражения нервной системы.

Основные психоневрологические особенности детей с ВРГН:

Нарушения психомоторного развития зачастую задержка психомоторного развития: дети могут иметь отставание в физическом, когнитивном и речевом развитии. Такие дети часто развиваются медленнее, чем их сверстники, и могут нуждаться в специализированной помощи для достижения возрастных норм. Трудности в координации движений: нарушения в координации могут проявляться в виде гипотонии (пониженного мышечного тонуса) или гипертонии (повышенного мышечного тонуса), что затрудняет выполнение повседневных действий.

Когнитивные нарушения, проблемы с вниманием и памятью: дети могут испытывать трудности с концентрацией, что затрудняет процесс обучения и усвоения новых знаний. Трудности с обучением: дети с ВРГН могут иметь проблемы с чтением, письмом, арифметикой, что связано с недостаточной нейропсихологической зрелостью. Повышенная раздражительность и эмоциональная лабильность: дети могут проявлять чрезмерную тревожность, нервозность, часто бывают раздражёнными или истеричными. Нарушения самооценки: из-за трудностей в обучении и взаимодействии с окружающими такими детьми могут быть восприняты как "недоразвившиеся", что снижает их самооценку и вызывает чувство неполноценности. Речевые задержки: дети с ВРГН часто имеют задержки в развитии речи, что связано как с неврологическими, так и с психоэмоциональными факторами. Это может выражаться в трудностях с артикуляцией, нарушениях синтаксиса и лексики.

Дисфазия (нарушение речевого развития) или дизартрия (расстройства произношения) также могут быть частью клинической картины.

Проблемы в социализации: из-за недостаточности социальной зрелости дети с ВРГН могут испытывать трудности в общении с ровесниками, что может привести к изоляции и эмоциональным трудностям. Трудности с пониманием социальных норм и эмоций других людей: это может выражаться в неадекватных реакциях в социальных ситуациях, что ещё больше усугубляет их проблемы в общении.

Работа с семьёй и с родителями детей с ВРГН важно научиться понимать и поддерживать ребёнка, а также применять индивидуальные методики воспитания и обучения. Таким образом, психоневрологические особенности детей с ВРГН требуют внимательного и индивидуального подхода, чтобы минимизировать последствия неврологических нарушений и поддерживать нормальное развитие ребёнка.

Дети с врождённой расщелиной губы и неба (ВРГН) сталкиваются с рядом психоневрологических особенностей, которые могут быть обусловлены как физиологическими факторами, связанными с нарушениями в развитии лица и дыхательных путей, так и психоэмоциональными проблемами, вызванными социальным восприятием и трудностями адаптации. Важно понимать, что лечение и реабилитация детей с такой аномалией требует комплексного подхода, включающего как медицинское, так и психосоциальное сопровождение.

Врождённая расщелина губы и неба часто приводит к задержке или нарушениям развития речи. Это связано с анатомическими дефектами, которые затрудняют артикуляцию и нормальное произношение. Ребёнок может иметь трудности с произношением звуков, что в свою очередь может влиять на общение и социальную интеграцию. В некоторых случаях расщелина губы и неба может быть связана с другими неврологическими отклонениями, что может приводить к задержке в общем развитии, особенно в области моторики, координации движений, а также в когнитивной сфере. Трудности с самооценкой: Дети с расщелиной губы и неба могут испытывать значительные проблемы с самооценкой, особенно в возрасте, когда начинают осознавать своё физическое отличие от сверстников. Это может приводить к низкой самооценке, чувству неполноценности, стеснительности, а в более старшем возрасте — даже к депрессии. Психоэмоциональная нестабильность:

На фоне физической аномалии могут развиваться эмоциональные проблемы, такие как тревожность, депрессия, раздражительность, а также поведенческие расстройства. Такие дети могут быть склонны к социальной изоляции из-за страха быть отвергнутыми или высмеянными сверстниками. Проблемы с коммуникацией: Речевые проблемы могут затруднить взаимодействие с окружающими, особенно в раннем возрасте. Дети с расщелиной губы и неба могут быть более замкнутыми, избегать общения из-за страха, что их не поймут или высмеют. В некоторых случаях у детей с расщелиной губы и неба могут быть выявлены задержки в когнитивном

развитии, например, в обучении и усвоении новых знаний. Это может быть связано с дефицитом внимания, трудностями в концентрации или с дополнительными неврологическими проблемами.

Снижение внимания и памяти: из-за эмоциональных трудностей и стресса, которые могут сопровождать детей с расщелиной губы и неба, могут наблюдаться проблемы с концентрацией внимания, а также с кратковременной и долговременной памятью. В возрасте дошкольников и младших школьников дети с расщелиной губы и неба могут испытывать трудности в социализации, особенно если их внешний вид вызывает у других детей вопросы или насмешки. Это может привести к социальной изоляции, замкнутости и отказу от общения. Дети с расщелиной губы и неба могут стать объектом насмешек или издевательств в школьной среде, что оказывает отрицательное влияние на их психоэмоциональное состояние.

Цель исследования: Проведение ранней диагностики и рациональное лечение ВРГН для устранения психоневрологических особенностей у детей с ВРГН.

Материалы и методы исследования: Ранняя диагностика играет ключевую роль в выявлении и устранении проблем у детей с ВРГН. Диагностический процесс включает неврологическое обследование, нейропсихологическое тестирование и психиатрическую консультацию. Коррекционные программы должны быть многофакторными и охватывать как медикаментозное лечение (в случае необходимости), так и психотерапевтические, логопедические и развивающие занятия.

Результаты исследования и их обсуждение: Исследования психоэмоционального состояния детей с ВРГН (высокий риск генетических нарушений) охватывают различные аспекты, включая их социальное и эмоциональное развитие, а также реакции на стрессовые факторы, такие как диагноз, лечение и влияние семьи. Для детей с ВРГН может быть важно не только непосредственное лечение, но и психологическая помощь в долгосрочной перспективе, чтобы минимизировать риски развития психоэмоциональных расстройств в подростковом и взрослом возрасте. Современные исследования подчеркивают важность интегрированного подхода к лечению детей с ВРГН, который включает в себя как медицинскую, так и психотерапевтическую помощь для комплексного поддержания их психоэмоционального здоровья.

Заключение: следует подытожить, психоневрологические особенности детей с ВРГН требуют внимательного и индивидуального подхода, чтобы минимизировать последствия неврологических нарушений и поддерживать нормальное развитие ребёнка.

Использованные источники:

12. ХАРАКТЕР СОПУТСТВУЮЩИХ ПОРОКОВ РАЗВИТИЯ У ДЕТЕЙ С ВРОЖДЕННОЙ РАСЩЕЛИНОЙ ВЕРХНЕЙ ГУБЫ И НЕБАМ.П. ВОДОЛАЦКИЙ, П.И. ЧУМАКОВ, А.В. БАЛАНДИНА, З.А. РЕКВАВА, И.В. ПАВЛЕНКО*

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ВЫЯВЛЕНИЕ НЕДОСТАТКОВ ДЕЯТЕЛЬНОСТИ ТОРГОВЫХ ПРЕДПРИЯТИЙ ДЛЯ ПОСЛЕДУЮЩЕЙ ИХ АВТОМАТИЗАЦИИ (НА ПРИМЕРЕ МАГАЗИНА ЦВЕТОВ)

Аннотация*: Данная статья посвящена анализу существующих недостатков в работе торговых предприятий на примере магазина цветов и разработке методов их устранения посредством автоматизации процессов. В ходе исследования авторы выявляют ключевые проблемные области, такие как учет товарных остатков, управление заказами и оптимизация клиентского сервиса. Предложенные решения включают внедрение информационных систем автоматического учета и управления, что способствует повышению эффективности деятельности предприятия. Практическая значимость статьи заключается в возможности применения разработанных методик для повышения конкурентоспособности и улучшения качества обслуживания в розничной торговле цветами.*

Ключевые слова*: проектирование, автоматизация, магазин цветов.*

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IDENTIFYING THE DEFICIENCIES OF RETAIL ENTERPRISES FOR THEIR SUBSEQUENT AUTOMATION (USING THE EXAMPLE OF A FLOWER SHOP)

Abstract*: This article analyzes existing operational shortcomings in retail businesses, using a flower shop as an example, and develops methods for addressing them through process automation. In the course of the study, the authors identify key problem areas, such as inventory control, order management, and customer service optimization. The proposed solutions include the implementation of*

automated accounting and management information systems, which contribute to improved operational efficiency. The practical significance of the article lies in the potential application of the developed methods to enhance competitiveness and improve service quality in the flower retail industry.

***Keywords**: design, automation, flower shop.*

Новейшие технологии и автоматизация торговли торговых предприятий улучшили эффективность, внедрили мультиканальное управление обслуживанием и изменили качество сервиса обслуживания покупателей.

Высокая конкуренция и сезонность спроса ставят задачу разработки удобных и функциональных информационных систем, способных автоматизировать деятельность всех структурных подразделений магазина цветов (или филиалов).

Анализ функционирования специализированных магазинов цветов показывает, что для достижения экономического успеха невозможно обойтись без контроля и управления запасами товаров, учетом поступлений и продаж и их рентабельного планирования. Проблема разработки информационной системы управления запасами цветочного магазина является достаточно актуальной и требует современных подходов к ее решению.

Для последующей автоматизации необходимо начать процесс проектирования деятельности магазина цветов. Для этого используется схематическое представление бизнес-процессов организаций методологией IDEF0. Суть данного подхода заключается в создании модели на основе анализа функционирования предприятия, которая визуализирует систему в виде цепочки взаимосвязанных операций, направленных на достижение определенной цели. Для углубленного исследования деятельности система разбивается на отдельные подструктуры. Ниже представлена контекстная диаграмма деятельности цветочного магазина (Рис. 1.).

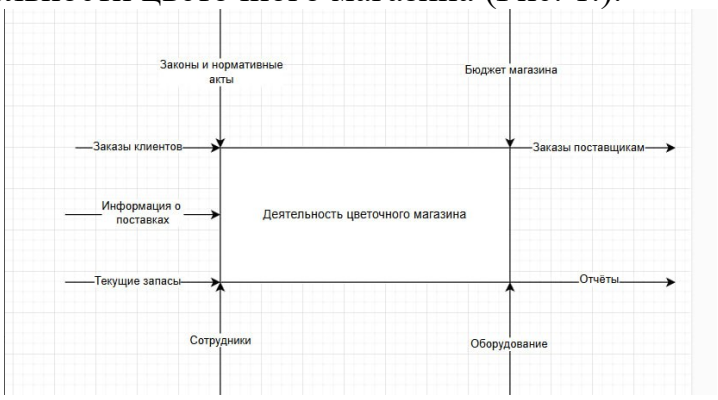


Рис. 1. Контекстная диаграмма «КАК ЕСТЬ» для анализа бизнес-процессов цветочного магазина

Для детального анализа работы транспортной фирмы используется схема декомпозиции. В этой схеме определены четыре функциональных модуля (A1 – A3). Работа этих модулей организована в следующей

последовательности: в модуле А1 осуществляется прием заказа от клиента и обработка заказа, в модуле А2 принятая информация передается поставщикам, в модуле А3, опираясь на переданные данные, после их передачи формируется отчет (Рис. 2.).

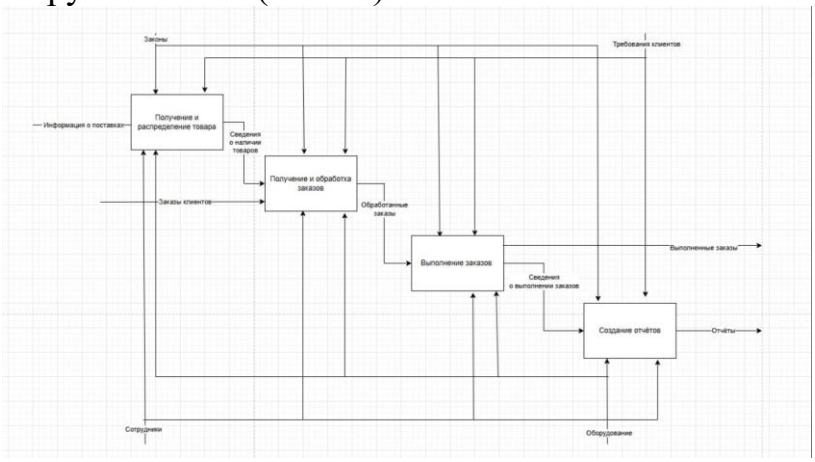


Рис. 2. Диаграмма декомпозиции «КАК ЕСТЬ» для анализа бизнес-процессов цветочного магазина

Контекстная диаграмма позволяет наглядно представить, как информационная система интегрируется в рабочую среду цветочного магазина и какие данные обмениваются между участниками процесса (Рис. 3.).

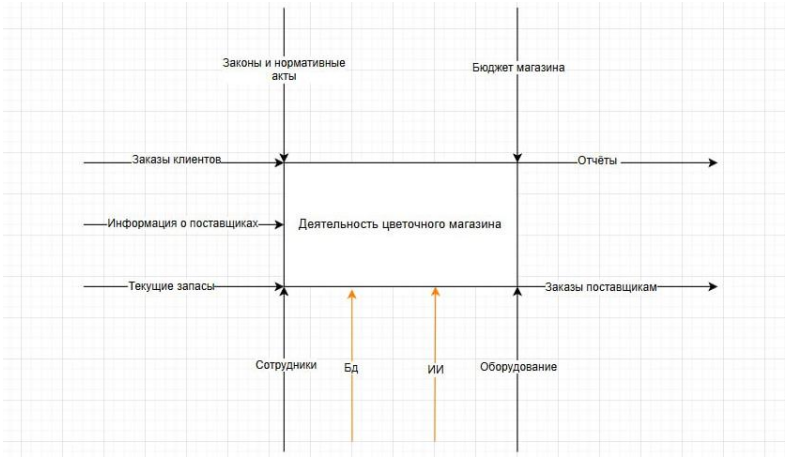


Рис. 3. Контекстная диаграмма «КАК БУДЕТ»

Декомпозиция диаграммы фокусируется на более детальном представлении ключевых функций системы, таких как приём поставок, учёт остатков, формирование заказов, оповещение о дефиците товаров и генерация отчётности (Рис. 4.).

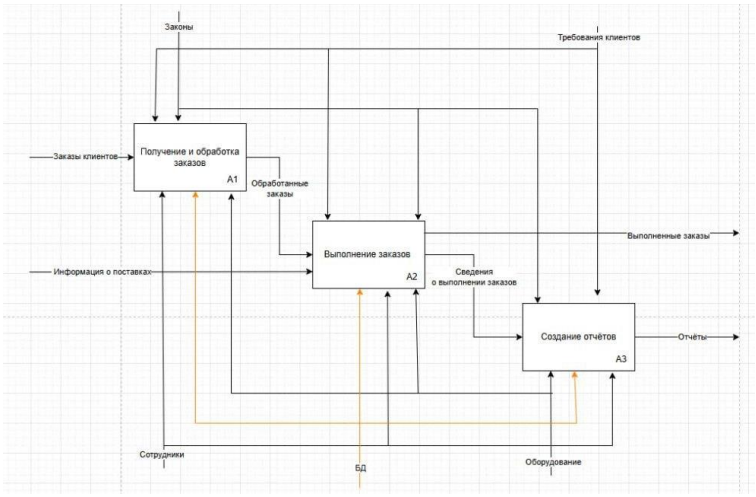


Рис. 4. Декомпозиция диаграммы «КАК БУДЕТ»

Представленные контекстная диаграмма и диаграмма декомпозиции «КАК БУДЕТ» эффективно демонстрируют архитектуру и функциональность информационной системы для управления запасами цветочного магазина. Они помогают определить ключевые точки взаимодействия между компонентами, учитывая реальные бизнес-потребности и процессы магазина. Глубокое понимание структуры системы позволяет разработчикам и другим заинтересованным сторонам выбрать оптимальные решения для реализации, поддержки и дальнейшего развития приложения, обеспечивая его стабильную работу в условиях изменяющегося спроса и сезонности в сфере торговли цветами.

В рамках данной работы было выполнено проектирование деятельности цветочного магазина для последующей автоматизации деятельности. Основная цель создания программного продукта — повышение эффективности работы сотрудников, снижение вероятности ошибок и обеспечение прозрачности финансовых операций.

На основе собранной информации, будет разработана информационная система, которая направленна на автоматизацию процессов управления цветочного магазина. Разработанная система позволит обеспечить эффективный процесс учета поступающих товаров, генерацию заказов для поставщиков, контроль за оказанием платных услуг и формирование отчетов.

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ФАКТОРЫ, ВЛИЯЮЩИЕ НА ПРОФЕССИОНАЛЬНОЕ РАЗВИТИЕ УЧИТЕЛЕЙ

Аннотация: *В статье анализируются современные тенденции и факторы, влияющие на профессиональное развитие педагогов в условиях трансформации системы образования. Также обоснованы, что профессиональное развитие педагога обусловлено сочетанием личностных, организационно-педагогических, социально-экономических и инновационно-технологических факторов.*

Ключевые слова: *профессиональное развитие, педагогическая компетентность, мотивация, инновации, образовательная среда, цифровизация образования, совершенствование системы.*

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FACTORS AFFECTING TEACHERS' PROFESSIONAL DEVELOPMENT

Annotation: *This article analyzes current trends and factors influencing the professional development of teachers in the context of the transformation of the education system. It also substantiates that a teacher's professional development is determined by a combination of personal, organizational, pedagogical, socioeconomic, and innovative/technological factors.*

Key words: *professional development, pedagogical competence, motivation, innovation, educational environment, digitalization of education, system improvement.*

Современные изменения в системе образования требуют от учителя постоянного профессионального совершенствования и развития в их сфере. Профессиональное развитие педагога представляет собой непрерывный процесс формирования и обновления его компетенций, знаний, умений и

личностных качеств, необходимых для эффективного выполнения профессиональных обязанностей и развития науки.

Профессиональное развитие учителя — это непрерывный процесс совершенствования знаний, умений, профессиональных качеств и ценностных установок, направленный на повышение эффективности педагогической деятельности и качества образования. На него воздействует комплекс факторов, взаимосвязанных между собой. [1]

- *Личностные факторы:* эта группа факторов отражает внутренние ресурсы и индивидуальные особенности педагога, определяющие его стремление к развитию.

Ключевые элементы:

• Профессиональная мотивация.

Включает стремление к самореализации, желанию быть компетентным, повышать качество обучения, получать признание.

Например: педагог, заинтересованный в успехах своих учеников, активно осваивает инновационные методы обучения.

• Ценностно-смысловые ориентации. Отражают отношение к профессии, детям, знаниям и обществу. Учитель с гуманистическими установками стремится развивать личность ученика, а не просто передавать знания.

• Рефлексия и самооценка. Способность критически анализировать свою деятельность и корректировать методы работы. Регулярное ведение педагогического дневника, участие в методических семинарах.

• Эмоционально-волевая устойчивость. Способность сохранять позитивный настрой, противостоять стрессам, адаптироваться к изменениям. Учителя, владеющие навыками эмоционального интеллекта, легче справляются с профессиональным выгоранием.

• Креативность и инновационность мышления. Готовность искать новые формы, методы и средства обучения.

Например, применение игровых технологий, STEAM-подхода, проектных заданий. [6]

- *Организационно-педагогические факторы***.** Эти факторы связаны с условиями профессиональной среды, в которой работает учитель. Основные компонентами является:

* Корпоративная культура образовательной организации. Включает традиции, нормы взаимодействия, систему моральных и профессиональных ценностей коллектива. Дружеский климат, поддержка коллег и администрации стимулируют развитие.

• Лидерство и управленческая поддержка. Руководитель, который создает условия для роста (например, стимулирует участие в проектах, поощряет инициативу), способствует профессиональному развитию персонала.

• Организация рабочего времени и нагрузки. Рациональное распределение обязанностей, наличие времени для самообразования и отдыха.

- *Социально-экономические факторы.* Определяют внешние условия, влияющие на мотивацию и возможности педагога к развитию. Основные составляющие:

• Уровень заработной платы и материальное стимулирование. Справедливое вознаграждение труда повышает удовлетворённость профессией и мотивацию к обучению.

• Социальный статус и престиж профессии. Общественное признание и уважение к учителю способствуют укреплению профессиональной идентичности.

В странах с высоким престижем профессии наблюдается более высокий уровень профессионального роста.

• Социальная защита и условия труда. Медицинское страхование, поддержка молодых специалистов, возможности для карьерного продвижения.

• Государственная политика в сфере образования. Наличие программ профессионального развития, грантов, проектов по цифровизации и модернизации школы. [4]

- *Инновационно-технологические факторы*

Отражают степень готовности педагога и образовательной среды к использованию современных технологий обучения и коммуникации. Ключевые аспекты:

• Цифровая трансформация образования. Освоение онлайн-платформ, интерактивных досок, электронных журналов, цифровых библиотек.

Например: использование Google Classroom, Moodle, Kahoot, Canva и др.

• Развитие цифровой компетентности педагога. Умение применять ИКТ в учебном процессе, проводить дистанционные занятия, использовать мультимедиа-ресурсы.

• Инновационные формы обучения. Проектная и исследовательская деятельность, смешанное обучение (blended learning), flipped classroom («перевернутый класс»).

• Технологическая инфраструктура школы. Обеспеченность оборудованием, стабильный интернет, доступ к современным ресурсам.

- *Культурно-социальные и средовые факторы.*

Национальные и духовные ценности влияют на педагогическую философию и цели обучения. Основными составляющими:

• Участие семьи и сообщества в образовательном процессе - Взаимодействие школы, родителей и местного сообщества способствует профессиональному росту педагога через обратную связь.

• Коммуникативная среда и информационное пространство - Открытость к международным образовательным практикам, возможность участия в конференциях, сетевых проектах.

- *Психолого-педагогические факторы.* Атмосфера взаимопонимания и поддержки усиливает чувство профессиональной значимости. Отношения с учениками, родителями и коллегами формируют эмоциональную удовлетворенность трудом. [5]

Профессиональное развитие учителя выступает ключевым условием повышения качества образования и устойчивого функционирования образовательной системы в целом. Проведённый анализ позволил установить, что данный процесс имеет комплексный и многоуровневый характер, определяемый взаимодействием личностных, организационно-педагогических, социально-экономических, инновационно-технологических, культурно-социальных и психолого-педагогических факторов. [3]

Эффективное развитие педагогического потенциала возможно лишь при гармоничном сочетании внутренних мотивационных установок учителя и внешних институциональных условий, обеспечивающих поддержку профессионального роста. Особую роль при этом играют внутренняя мотивация, благоприятная корпоративная культура образовательной организации, а также интеграция цифровых технологий и инновационных подходов в педагогическую практику.

Результаты исследования подчеркивают необходимость системного и целенаправленного подхода к организации профессионального развития педагогов, ориентированного не только на обновление знаний, но и на формирование компетентностной, рефлексивной и ценностно-смысловой основы педагогической деятельности. Реализация данных факторов позволит обеспечить качественные изменения в образовательной среде, укрепить статус педагогической профессии и создать условия для формирования учителя нового поколения — компетентного, мотивированного и готового к инновационным преобразованиям. [2]

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КЛАССИФИКАЦИЯ ТИТАНОВЫХ СПЛАВОВ И ОПРЕДЕЛЕНИЕ ОСНОВНЫХ ОСОБЕННОСТЕЙ МЕХАНИЧЕСКОЙ ОБРАБОТКИ

Аннотация: *Титан и сплавы на его основе относятся к материалам нового поколения. В отличие от других сложных (конструкционных) материалов, материалы, содержащие титан, обладают высокими физико-механическими свойствами. Они характеризуются высокой удельной прочностью и жаростойкостью, а также стойкостью к коррозии и разрушению в агрессивных средах. Преимуществами титановых сплавов являются хорошая свариваемость, парамагнитные свойства и ряд других характеристик, что делает их важными в различных технических отраслях промышленности. Благодаря этим свойствам титановые сплавы широко используются в судостроении, ракетостроении, авиации и машиностроении.*
Ключевые слова: *титановые сплавы, прочность, жаростойкость, металл.*

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CLASSIFICATION OF TITANIUM ALLOYS AND DETERMINATION OF THE MAIN FEATURES OF MECHANICAL PROCESSING

Abstract: *Titanium and its alloys belong to the new generation of materials. Unlike other complex (structural) materials, those containing titanium possess high physical and mechanical properties. They are characterized by high specific strength and heat resistance, as well as corrosion resistance and durability in aggressive environments. The advantages of titanium alloys include good weldability, paramagnetic properties, and several other characteristics, which make them important in various technical branches of industry. Due to these properties, titanium alloys are widely used in shipbuilding, rocket engineering, aviation, and mechanical engineering.*
Keywords: *titanium alloys, strength, heat resistance, metal.*

Титановые сплавы классифицируются по трём основным группам:

1. Титановые сплавы с высокой прочностью, то есть твердые растворы с оптимальным соотношением прочности и пластичности.

2. Высокожаропрочные титановые сплавы с минимальной потерей пластичности — твердые сплавы с различным количеством химических соединений.

3. Титановые сплавы, содержащие химические соединения, обладающие низкой плотностью и способные конкурировать с жаропрочными никелевыми сплавами при определённых температурных условиях.

Как и многие другие металлы, титан является полиморфным веществом. При температуре 882°C он переходит в другую модификацию. Титан может существовать в двух различных кристаллических структурах (аллотропические модификации).

До температуры фазового превращения титан имеет гексагональную плотноупакованную решетку (параметры: a = 0,29503 A и c = 0,48631 A, c/a = 1,5873). При более высоких температурах он переходит в объемно-центрированную кубическую решетку с параметром решетки a = 0,33132 A при 900°C.

Некоторые физические свойства титана:

- Плотность α-титана: 4,505 г/см³, при 900°C: 4,32 г/см³
- Коэффициент линейного расширения (20–100°C): $8{,}3 \cdot 10^{-6}$ °C^{-1}
- Теплопроводность при 50°C: 15,4 Вт/(м·К)

Титановые сплавы подразделяются на α-, β- и (α+β)-сплавы в зависимости от фазового состава.

Рис.1

Упрочнение титановых сплавов достигается легированием элементами, стабилизирующими α- и β-фазы.

- Стабилизаторы α-фазы: Al, Sn, Zr, O, C, N
- Стабилизаторы β-фазы:
  - эвтектоидные: Cr, Mn, Ni, Fe, Zn
  - изоморфные: W, V, Mo

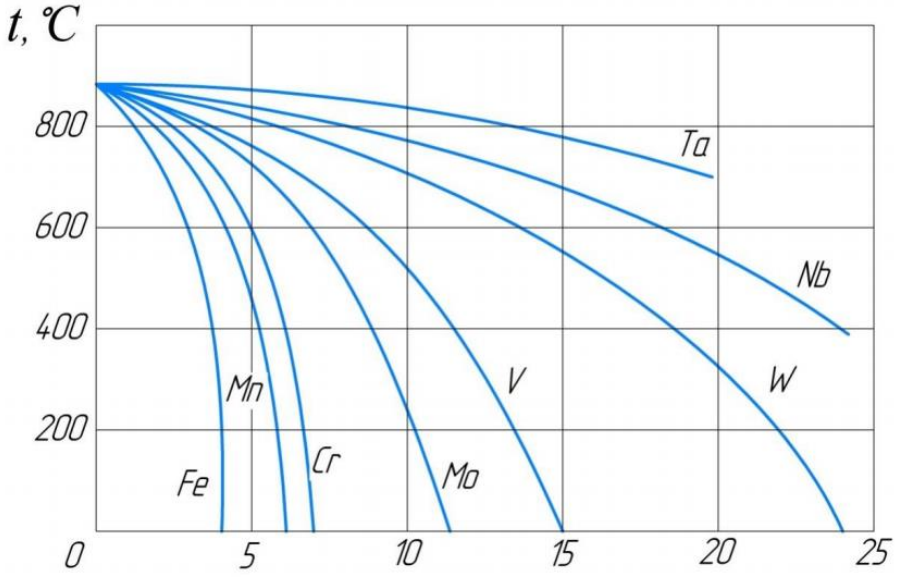


Рис.1

Двухфазные (α+β) сплавы способны упрочняться термической обработкой (закалкой и старением), что обеспечивает высокую прочность и жаростойкость.

По сравнению с алюминиевыми и магниевыми сплавами основное преимущество титановых сплавов — жаропрочность. При температурах свыше 300°C прочность алюминиевых и магниевых сплавов резко снижается, тогда как титановые сплавы сохраняют высокую прочность.

Благодаря образованию на поверхности пассивной оксидной пленки TiO_2, титан имеет высокую коррозионную стойкость. Толщина естественной оксидной пленки составляет 4–6 нм.

По обрабатываемости титан и его сплавы относятся к VII группе труднообрабатываемых материалов. Несмотря на то, что по прочности титан близок к стали 45, трудности обработки связаны с низкой теплопроводностью и особенностями фазового состояния материала.

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АНАТОМО-ТОПОГРАФИЧЕСКИЕ ОСОБЕННОСТИ ЛИМФАТИЧЕСКИХ УЗЛОВ СИГМОВИДНОЙ КИШКИ У ДЕТЕЙ

Резюме: *В статье изучена топография лимфатических сосудов и узлов сигмовидной кишки у детей до 3 лет методом инъекции краски Герота в просвет лимфатических сосудов. Из лимфатических узлов различной локализации передней и задней поверхности сигмовидной кишки выходит 1–3 (чаще 1–2) выносящих лимфатических сосуда, длина которых варьирует от 3 до 5 мм, а диаметр — от 0,14 до 0,17 мм. В 95% случаев количество приносящих лимфатических сосудов узлов передней и задней поверхности органа преобладало над количеством выносящих, а в 5% случаев их число было равным.*

Ключевые слова: *дети, сигмовидная кишка, лимфатические сосуды, лимфатические узлы, топография, анатомия*

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ANATOMO-TOPOGRAPHIC FEATURES OF LYMPH NODES OF THE SIGMOID COLON IN CHILDREN

Abstract: *The article investigates the topography of lymphatic vessels and nodes of the sigmoid colon in children under 3 years of age using the method of injecting Gerota's dye into the lumen of lymphatic vessels. From lymph nodes of various locations on the anterior and posterior surfaces of the sigmoid colon, 1–3 (most often 1–2) efferent lymphatic vessels emerge, with lengths varying from 3 to 5 mm and diameters ranging from 0.14 to 0.17 mm. In 95% of cases, the number of afferent lymphatic vessels entering the nodes on the anterior and posterior surfaces of the organ exceeded the number of efferent vessels, while in 5% of cases their numbers were equal.*

Keywords: *children, sigmoid colon, lymphatic vessels, lymph nodes, topography, anatomy*

Ввдение. В структуре онкологической заболеваемости рак ободочной кишки устойчиво занимает одно из ведущих мест после рака легких и молочной железы [1,2]. Вопрос о технической выполнимости, безопасности и онкологической эффективности лапароскопической мезоколонэктомии с Д3 лимфодиссекцией при лечении рака левой половины ободочной кишки требует изучения с применением методов доказательной медицины [3,4]. На сегодняшний день неоадъювантная терапия у больных при раке прямой кишки считается стандартным методом лечения. Очень важно воздействовать на регионарные лимфатические узлы [5,6]. Не вызывает сомнений тот факт, что секретируемые опухолевыми клетками метаболиты оказывают раздражающее действие на лимфоидную ткань и вызывают в ней ответную реакцию. Появлению новых метастазов предшествуют нарушения структуры и функции регионарных лимфатических узлов [7].

Цель исследования. Изучить анатомо-топографические особенности лимфатических узлов сигмовидной кишки у детей.

Материалы и методы исследования. На 30 препаратах сигмовидной ободочной кишки, иссеченных из трупов новорожденных (10), детей грудного возраста (10) и раннего детства (10) обоего пола, умерших от заболеваний. не связанных с поражением органов пишеварения и лимфатической системы. Метадом интерстициальной инъекции масляной краской, приготовленной по типу массы Герота, вводимой в толщу подсерозного слоя кишки, изучена анатомия и топография лимфатических сосудов и узлов сигмовидной ободочной кишки.

Результаты исследования. Исследования показали, что лимфатические узлы сигмовидной оболочной кишки располагаются впереди органа (на передней ее поверхности) и позади органа (на задней ее поверхности) и сгруппированы возле свободной мышечной ленты в толще сальниковых отростков; между свободной мышечной лентой и брыжеечным краем кишки возле брыжеечного края кишки. Лимфатические узлы сигмовидной кишки, расположенные на передней поверхности (возле свободной мышечной ленты), у новорожденных обнаружены только в 1 случае: у детей грудного возраста в 4 и у детей раннего детства в 9 случаях. Лимфатические узлы, лежащие между свободной мышечной лентой и брыжеечным краем кишки, у новорожденных найдены также в 1 препарате, у детей грудного возраста - в 3 и у детей периода раннего детства во всех 10 изученных препаратах. У новорожденных лимфатические узлы между свободной мышечной лентой и брыжеечным краем кишки нами вообще не найдены, у детей грудного возраста - в 3 случаях, а у детей раннего детства - в 9 случаях. Лимфатические узлы, расположенные около брыжеечного края кишки, новорожденных имелись в 8 случаях, у детей грудного возраста - на всех исследованных препаратах и у детей в период раннего детства - в 6 случаях. Количество лимфатических узлов, лежащих возле свободной мышечной ленты на передней поверхности кишки, у новорожденных равно 5, у детей грудного возраста от 3 до 8 (в 60%- 4-6), а у детей раннего детства от

1 до 3 (в 52%- 2-3). Число узлов между свободной мышечной лентой и брыжеечным краем кишки у новорожденных - 3, количество этих узлов у детей грудного возраста колеблется от 2 до 5 (в 55% 3-4) и у детей раннего детства - от 1 до 5 (в 64% -2-4). Количество лимфатических узлов, локализованных около брыжеечного края кишки, колеблется: у новорожденных от - 1 до7 (в 70% - 3-5), у детей грудного возраста - от 1до 5 (в 59% - 2-4) и у детей в период раннего детства от1 до 6 (в 54% - 2-5). Число лимфатических узлов задней поверхности сигмовидной ободочной кишки, расположенных возле свободной мышечной ленты, у новорожденных равно 2, у детей грудного возраста от - 3 до 9 (в 64% - 4-7), у детей раннего детства от 3 до 6 (в 55% - 4-5). Узлы, лежащие между свободной мышечной лентой и брыжеечным краем кишки, у новорожденных нами вообще не обнаружены. У детей грудного возраста количество узлов данной локализации до колеблется от 2 до З, у детей раннего детства от 1 до 5 (в 57% - 2-4). Число лимфатических узлов около брыжеечного края кишки варьирует: у новорожденных от 1 до 5 (в 57% - 3 - 4), у детей грудного возраста - от 1 до 7 (в 66% 3 - 4)и у детей раннего детства - от 4 до 6 (в 68% - 3-5). На передней и задней поверхностях органа количество обнаруженных лимфатических сосудов у новорожденных колеблется от 2 до 12 (чаще 4-8), у детей грудного возраста - от 2 до 10 (чаще 3—7) и у детей раннего детства от 2 до 8 (чаще 3-6). Их диаметр варьирует от 0,12 мм (новорожденные) до 0,17 мм (дети раннего детства). Лимфатические сосуды передней и задней поверхности органа в одинаковой мере впадают в узлы, лежащие возле свободной мышечной ленты (15%), в узлы между свободной мышечной лентой и брыжеечным краем кишки (35%) и в узлы около брыжеечного края кишки (50%). В связи с этим длина лимфатических сосудов различна (от З до 10 мм).

Вывод. Из лимфатических узлов разной локализации передней и задней поверхности сигмовидной ободочной кишки выходят 1-3 (чаще 1-2) выносящих лимфатических сосуда, длина которых колеблется от 3 до 5 мм (в 72% - 3-4 мм), а диаметр - от 0,14 до 0,17 мм. В 95% случаев количество приносящих лимфатических сосудов узлов передней и задней поверхности органа превалировало над количеством выносящих, а в 5% случаев число их было одинаковым.

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ВОПРОСЫ ОПТИМИЗАЦИИ ЭКОЛОГИЧЕСКИХ ПРОБЛЕМ ОРОШАЕМЫХ ЗЕМЕЛЬ КАШКАДАРЬИНСКОГО ОАЗИСА

Аннотация: *В статье комплексно исследованы факторы, влияющие на экологическое состояние орошаемых земель Кашкадарьинского оазиса. На основе детального анализа рассмотрены причины подъема уровня грунтовых вод и засоления почв на орошаемых землях оазиса. Указаны нарушения агротехнических правил полива, нерациональное использование воды, причины снижения коэффициента использования гидротехнических сооружений и даны предложения по их устранению. Подчеркнута важность реконструкции действующей оросительной системы, а именно бетонирования шламонакопителей, снижения водопотребления и нормализации уровня грунтовых вод.*

Ключевые слова: *гидротехнические сооружения, каналы, ил, дренаж, агротехнические приемы, засоление, грунтовые воды, рекреация, гидромелиорация.*

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OPTIMIZATION OF ENVIRONMENTAL PROBLEMS OF IRRIGATED LANDS OF KASHKADARYA OASIS

Abstract*: The article comprehensively examines the factors affecting the ecological condition of the irrigated lands of the Kashkadarya oasis. Based on a detailed analysis, the causes of rising groundwater levels and soil salinization on the irrigated lands of the oasis are considered. Violations of agro technical irrigation rules, irrational use of water, and the reasons for the decrease in the utilization rate of hydraulic structures are indicated and suggestions for their elimination are given. The importance of reconstructing the existing irrigation system, namely concreting sludge accumulators, reducing water consumption and normalizing the groundwater level, was emphasized.*

Keywords*: water development facilities, channels, silt, drainage, agricultural practices, salinization, groundwater, recreation, hydrotechnical melioration.*

Введение. Нарушение равновесия между природой и обществом приводит к возникновению экологических проблем, причем этот процесс происходит в глобальном масштабе, что является глобальной проблемой. Глобальные проблемы особенно ярко проявляются в странах аридного региона. Мы можем наблюдать усиление этого процесса в странах Центральной Азии, в том числе в Узбекистане, что в свою очередь приводит к развитию опустынивания и нарушению экологического равновесия. Широко распространенные экологические проблемы в нашей республике напрямую обусловлены грубыми нарушениями агротехнических правил при орошении земель, ошибками в водопользовании. В Кашкадарьинском оазисе, где в нашей республике широко распространено орошаемое земледелие, возникновение земельно-водных проблем тесно связано с ошибками в непосредственном водопользовании и орошении. Неэффективное орошение орошаемых земель оазиса, а также эксплуатация гидротехнических

сооружений приводит к дальнейшему обострению этих проблем. На территории оазиса имеется 13 водохранилищ и оросительных систем, большинство из которых характеризуются резким снижением коэффициента полезного действия (КПД), повышенным водопотреблением, нарушением агротехнических правил орошения земель, что приводит к повышению уровня грунтовых вод, усилению процессов засоления и нарушению водно-почвенного баланса. Это, в свою очередь, характеризуется сокращением площади земель, используемых в сельском хозяйстве, усилением процесса опустынивания и отрицательно влияет на развитие сельского хозяйства.

Основная часть. Формирование ландшафтов Кашкадарьинского оазиса было обусловлено, прежде всего, освоением Каршинской пустыни, которая создала уникальный антропогенный ландшафт в окружающей среде. Под влиянием гидротехнических сооружений, построенных в оазисе, осваивались новые земли, появлялись поселения, и со временем стало проявляться воздействие гидротехнических сооружений на окружающую среду. Научное изучение воздействия гидротехнических сооружений является основной задачей наших научно-исследовательских работ, а его анализ – одной из актуальных задач сегодняшнего дня. Главной задачей нашей работы является анализ процессов воздействия гидротехнических сооружений на окружающую среду, которые являются, с одной стороны, положительными, т.е. освоение земель, возникновение поселений, с другой стороны, отрицательными, т.е. ирригационная эрозия, засоление земель, снижение плодородия почв, негативные изменения в окружающей среде, и определение мер по их устранению. Кашкадарьинский оазис является домом для одной из крупнейших речных систем – реки Кашкадарья и ее притоков. Бассейн реки, площадь водосбора которого составляет 8780 кв. км, с севера и северо-востока ограничен западными отрогами Зарафшанского и Гиссарского хребтов, а на западе примыкает к Каршинской пустыне.

Гидрографическую сеть Кашкадарьинского оазиса образуют река Кашкадарья и её притоки. В оазисе развито орошаемое земледелие, которое обеспечивает лишь 15–20% потребности в воде для орошения. Однако, ввиду существенных различий в климатических условиях горной и равнинной частей оазиса, реки распределены неравномерно. Практически все реки бассейна Кашкадарьи берут начало в горных районах. Здесь ручьи сливаются, образуя крупные и мелкие реки, которые, в свою очередь, образуют кашкадарьинскую сеть.

Самая длинная река бассейна — Кашкадарья (332 км), которая берет начало на высоте 3000 м на южном склоне западного отрога Зарафшанского хребта.

Покинув горы, в Кашкадарью впадают такие притоки, как Джиннидарья, Аксув, Танхоздарья, Яккабогдарья и Гузордарья, которые берут начало в северо-западных и западных отрогах Гиссарского хребта.

Джиннидарья — относительно мелководный приток реки Кашкадарья, берущий начало в ущелье между вершинами Акота (2918 м) и Шертог (2696 м). Длина Джиннидарьи составляет 61 км, а площадь водосбора — 367 км².

В нашей республике разработана система эффективного водопользования, внедрение и дальнейшее совершенствование которой имеют первостепенное значение. Использование воды с соблюдением нормативных экологических требований имеет большое значение для сохранения биоразнообразия и уникальных ландшафтов водных объектов.

В республике имеется 51 водохранилище, которые в основном используются для орошения. Их общий проектный объём составляет 18,8 км³, а полезный – 14,8 км³. Основная часть пресной воды в республике используется для орошения в сельском хозяйстве (85%), для нужд промышленности (9%), для коммунально-бытового водоснабжения (4%) и для прочих целей (2%).

Основная часть (85%) воды, используемой в сельском хозяйстве (80–83%), используется в вегетационный период, а 2–5% — на орошение озимых культур, удержание влаги и промывку засоленных почв.

Экономическая оценка оросительных систем, используемых в сельском хозяйстве, определяется их коэффициентом полезного действия (КПД). В 1990-х годах этот показатель составлял в среднем 0,64 КПД, а в настоящее время составляет 0,86 КПД. Изучение и анализ состояния оросительных систем, повышение их эффективности являются одной из актуальных задач современности.

Орошаемое земледелие имеет давнюю историю в Кашкадарьинском оазисе. В северных районах оазиса вода реки Зарафшан использовалась через старый канал Анхор. Позднее, в 1953 году, канал был реконструирован и вновь стал источником воды для оазиса.

Для освоения Каршинской пустыни за счёт вод реки Зарафшан в 1953 году была введена в эксплуатацию первая очередь канала «Эски Анхор» протяжённостью 31 км, которая обеспечивала водой 4697 га земель. К 1972 году была завершена вторая очередь канала – участок длиной 66 км с бетонным покрытием, в результате чего общая протяжённость канала достигла 125 км. Сегодня канал «Эски Анхор» орошает водой из реки Зарафшан 17 380 га земель.

Вода из канала, облицованного бетоном, подаётся в Каршинскую пустыню с помощью 25 насосов. Канал, со средней производительностью 60 м3/сек, проходит через Чиракчинский район и используется для орошения. Часть воды канала сбрасывается в водохранилище «Чимкорган». Через оросительную систему «Эски Анхор» вода подается на 17 380 га земель Кашкадарьинского оазиса Чиракчинского района.

Почти вся вода канала используется для орошения сельскохозяйственных культур. На землях, освоенных в результате строительства канала, выращиваются хлопок, бахчевые культуры, овощи, разбиты сады и виноградники.

Водохранилище «Таллимарджан» создано путём переброски воды из реки Амударьи в Кашкадарьинский оазис по Каршинскому магистральному каналу (КМК) и является основным источником водоснабжения оазиса. Всего в оазисе создано 13 водохранилищ, которые служат развитию сельского хозяйства.

1-таблица

Информация о водохранилищах Кашкадарьинского оазиса

(Аму-Кашкадарьинская ирригационная система относится к бассейновому управлению

Информация от Яккабагско-Гузарского управления ирригационной системы

Нет	Название водохранилища	Административный район, где расположено водохранилище	Год ввода в эксплуатацию	Объем проекта, млн м3	Полезный объем, млн/м3
1	Пачкамар	Гузар	1968	260.0	243.0
2	Камаши	Камаши	1972	25.0	23.8
3	Лангар	Камаши	1974	7.3	7.0
4	Янгикурган	Яккабаг	1975	3.3	3.0
5	Шуропсай	Китаб	1977	2.0	1.8
6	Корабог	Яккабаг	1977	7.5	7.1
7	Тошлоксай	Шахрисабз	1981	7.0	6.7
8	Кизилсув	Яккабаг	1982	6.5	6.0
9	Дехканабад	Дехканабад	1982	27.0	18.4
10	Таллимарджон	Нишан	1986	1525.0	1445.4
11	Хисорак	Шахрисабз	1987	170.0	155.0
12	Калкама	Чиракчи	1987	9.4	9.3
13	Чимкурган	Камаши	1963	500.0	425.0
общий:				**2550.0**	**2351.5**

Одним из основных источников водоснабжения оазиса является КМК и его региональные системы, имеющие большое значение для развития сельского хозяйства. КМК забирает воду из реки Амударья через семь насосных станций и подаёт её в Таллимарджанское водохранилище. Общая протяжённость канала составляет 78,4 км. Нормативный расход воды канала составляет 175 м3/сек, максимальный – 195 м3/сек.

Начальная часть КМК находится в Республике Туркменистан, а рабочая часть начинается от Таллимарджанского водохранилища и снабжает водой Каршинский, Касбийский, Касанский и Нишанский районы. Протяженность межхозяйственных сетей в Каршинском этрапе КМК составляет 2224,5 км, из них 171,3 км бетонные, 650,0 км водопропускные трубы, 1219,7 км земляные канавы, и обеспечивает водой в общей сложности 3312 га земель. Нишанский оросительный участок канала имеет длину 2135,7 км, из них 140,2 км бетонированное покрытие. По нему протекает 1240,0 км водопропускных

труб, 278,5 км земляных канавы, и в общей сложности он служит для орошения 2791,4 га земель Нишанского этрапа.

Косонская оросительная система КМК включает 9 каналов общей протяженностью 2216,8 км, ее воды используются для орошения 41 934 га земель.

Кроме того, в районе Мубарак освоено 3565 га земель за счёт воды из канала Касон. КМК и его ирригационные сети были построены в основном в период с 1966 по 1992 год, а общая протяжённость ирригационных сетей составляет 9911,67 км. Из них 780 км бетонированы, 4090 км – латаки. Остальные 4313 км – это арыки, которые обеспечивают орошение в общей сложности 212 550 га земель в районе. Пропускная способность магистрального канала составляет 35 м3/сек.

Таблица 2.

Химический состав подземных вод, распространенных на территории Кашкадарьинского оазиса

(информация от Назарова М.)

	Место получения пробы	Ph	Единица измерения	HCO3	Ce-	SO4	Ca++	Mg++	Na++ K+	(Твердые) остатки в воде	Жесткость, мг, экв/л
1	Касбийский район село Месит	8,6	г/л	0,312	2,145	0,768	0,190	0,151	1,112	4,606	
			мг.экв	5,64	66,0	16,51	9,2	12,2	48,04		26,62
2	Мубарекский район село Сардоба	8,2	г/л	0,425	2,412	0,281	0,095	0,014	1,681	4,956	
			мг.экв.	6,21	65,11	4,46	4,65	0,85	69,9		5,89
3	Каршинский район село Эртепа	7,8	г/л	0,366	0,420	0,253	0,076	0,022	0,404	1,568	
			мг.экв.	5,99	11,83	5,28	3,80	1,77	17,55		5,57
4	г.Карши, ул. А.Темура,	7,8	г/л	0,414	0,77	0,799	0,384	0,158	0,296	2,992	
			мг.экв.	6,74	21,69	16,66	19,20	13,03	12,86		33.23
5	Миришкор-ский район, село Окмачит	7,8	г/л	0,366	0,616	0,674	0,172	0,026	0,612	2,568	
			мг.экв.	5,99	17,35	14,06	8,60	2,17	26,63		10,77
6	Нишанский район, село Каптарлы	8	г/л	0,366	1,83	0,724	0,296	0,058	1,218	4,792	
			мг.экв.	5,99	51,46	15,08	14,8	4,74	52,99		19,54

7	При хранении воды в бассейне в течение 4 месяцев	0	г/л	0,244	0,035	0,289	0,016	0,019	0,198	0,888	
			мг.экв.	4,00	0,99	6,03	0,80	1,57	8,65		2,37
8	При хранении воды в бассейне в течение 1 месяца	0	г/л	0,202	0,025	0,201	0,010	0,010	0,122	0,674	
			мг.экв	1,97	0,88	5,33	0,60	1,27	6,55		2,10

Анализируя вышеприведенные данные, можно сделать вывод, что улучшение мелиоративного состояния орошаемых земель Кашкадарьинского оазиса, в первую очередь, достигается за счет реконструкции оросительной системы, замены глиняных канав на бетонные каналы в оросительной системе, снижения впитывания воды в грунт, то есть предотвращения подъема уровня грунтовых вод. Во-вторых, путем проведения гидромелиоративных мероприятий на участках с высоким уровнем грунтовых вод, то есть путем строительства канав и дренажных систем, нормализуется водно-земельный баланс. Реализация всех этих мероприятий, наряду с улучшением мелиоративного состояния орошаемых земель оазиса, позволяет повысить эффективность водопользования и добиться экологической стабильности в регионе.

Заключительная часть. Следует отметить, что, учитывая значение Каршинской оросительной системы в развитии экономики республики, важнейшей задачей является разработка плана мероприятий, направленных на повышение ее КПД, сохранение биоразнообразия и ландшафта вокруг каналов, бетонирование участков арыков с целью предотвращения просачивания воды из каналов в почву в результате фильтрации, правильную организацию полива полей со сложными рельефными условиями агротехническими приемами, предотвращение ирригационной эрозии и т.д., реализация которого имеет большое значение для правильной организации охраны окружающей среды. Во-первых, это позволяет экономно использовать воду, а во-вторых, оптимизировать механический, химический и органический состав почвы.

В результате формирования оросительной сети Кашкадарьинского оазиса наблюдается развитие сельского хозяйства, формирование социально-экономической инфраструктуры. Для обеспечения водоснабжения населённых пунктов и сельского хозяйства разработаны единые государственные программы развития. В основе этих программ лежат вопросы водопользования, улучшения мелиоративного состояния земель, повышения эффективности использования искусственных водоёмов

(водохранилищ), реализация которых требует прямых экономических механизмов.

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ТЕРРИТОРИАЛЬНАЯ СТРУКТУРА И ДИНАМИКА ИЗМЕНЕНИЯ ОРОШАЕМЫХ ЗЕМЕЛЬ В ЗАРАФШАНСКОМ РЕГИОНЕ

Аннотация. *В статье представлены общие и региональные данные по орошаемым землям Зарафшанского экономического района. Научно проанализировано состояние обеспеченности этих земель сельскохозяйственными угодьями, удельный вес региона в республике и территориальные различия между ними. Кроме того, описана динамика изменения орошаемых земель внутри области и районов на основе данных за последние 25 лет. Рассмотрены общая площадь орошаемых земель Бухарской, Навоийской и Самаркандской областей, площадь орошаемой пашни, рощ и пастбищ, территориальные различия и их постепенное изменение в разрезе районов. В заключении статьи анализируются причины их изменения по годам и регионам и факторы, на них влияющие, а также даются предложения и рекомендации по предотвращению сокращения площади этих земель.*

Ключевые слова. *Зарафшанская область, Бухарская, Навоийская, Самаркандская области, земельные ресурсы, орошаемые земли, пашни, рощи, пастбища.*

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TERRITORIAL STRUCTURE AND DYNAMICS OF CHANGE IN IRRIGATED LANDS IN THE ZARAFSHAN REGION

Abstract. *The article presents general and regional data on the irrigated lands of the Zarafshan economic region. The state of provision of these lands by agricultural land types, the region's share in the country, and territorial differences between them are scientifically analyzed. In addition, the dynamics of changes in irrigated lands within the region and regions are described based on data from the last 25 years. The total irrigated lands of Bukhara, Navoi and Samarkand regions, the area of irrigated arable land, groves and pastures, territorial differences, and its gradual changes are considered separately by districts. In the conclusion of the article, the reasons for their change over the years and regions and the factors affecting them are analyzed, and proposals and recommendations are given to prevent the reduction of the area of these lands.*

Key words. *Zarafshan region, Bukhara, Navoi, Samarkand, land resources, irrigated lands, arable lands, groves, pastures*

Введение. Зарафшанский экономический район расположен в относительно центральной части нашей страны и включает Бухарскую, Навоийскую и Самаркандскую области. Его площадь составляет 168,1 тыс. кв. км, что составляет 37,4 % территории республики и по этому показателю уступает только Нижнеамударьинскому экономическому району Узбекистана.

Историко-географической основой, формообразующим фактором этого экономического района является река Зарафшан. Правда, эта гидрографическая ветвь в настоящее время не доходит до Бухарской области, но культура и история древней Бухары сформировались именно под её влиянием. В свою очередь, нынешний Бухаро-Каракольский оазис также возник на базе древнего течения реки Зарафшан [1].

Зарафшанский экономический район включает среднее и нижнее течение реки Зарафшан, которая имеет трансграничный характер. В природно-географическом отношении большую его часть занимает пустыня Кызылкум. На территории Самаркандской области частично расположены горные районы, а оазисы и долины разбросаны. Соответственно формируется и территориальная структура экономики области. Навоийская область выделяется по площади, а Самаркандская – по демографическому потенциалу. Бухарская область занимает среднее положение по этому показателю.



Рис 1. Картасхема Зарафшанского экономического района

Цели и задачи. Регион умеренно снабжён природно-климатическими ресурсами, а плодородные земли и запасы пресной воды распределены крайне неравномерно. В связи с несколько лучшим состоянием земельных ресурсов и большой занимаемой ими площадью, широкое распространение получила экстенсивная форма сельского хозяйства. Склоновое земледелие является основным занятием населения, особенно в степных районах. В этом отношении условия и возможности Бухарской и Навоийской областей схожи.

Общий земельный фонд региона составляет 16,8 млн га, из которых 65 % приходится на Навоийскую (10,9 млн га), 25 % на Бухарскую (4,2 млн га) и оставшиеся 10% на Самаркандскую (1,68 млн га) области. Орошаемые земли составляют лишь 4,6% от общей площади. В целом общая площадь орошаемых земель в области составляет чуть более 7,8 тыс. км^2, или 4,7 % от земельных ресурсов области. В 2010 году она составила 777,7 тыс. га, что практически не изменилось за последние 15 лет (рост на 101 %). Однако с начала века (7227 км^2) площадь этих земель в области увеличилась на 63 000 га. С началом независимости площадь этих земель также существенно изменилась из-за водных ресурсов. Кроме того, в результате других социальных факторов сократилась орошаемая земля и наблюдаются некоторые изменения в структуре сельского хозяйства. К ним относятся строительство новых населенных пунктов для целей жилых зон, расширение приусадебных участков и перевод орошаемых и плодородных земель в другие сектора, помимо сельского хозяйства.

Таблица 1

Территориальный состав и динамика орошаемых земель Зарафшанского экономического района (тыс. га)

Типы орошаемых земель	**Самарканд**		**Бухара**		**Навои**		**Регион**	
	2010	2024	2010	2024	2010	2024	2010	2024
Общие	379,2	379,5	275,1	280,2	123,4	126,1	777,7	785,8
Культуры	253,9	243,7	200,6	205,8	91,0	91,2	545,5	540,7
Сад	56,4	66,8	20,3	21,0	10,3	9,6	87	97,4
Серые земли	-	-	6,9	5,2	6,7	6,7	13,6	11,9
Огород, приусадебные участки и сад, овощи	62,9	62,9	46,5	46,5	13,7	17,1	123,1	126,5
Лес	6,0	6,0	1,8	1,7	1,7	1,5	9,5	9,2

Подготовлено автором на основе данных Кадастрового агентства при Налоговом комитете.

Результаты и обсуждения. В структуре орошаемых земель региона основное место занимают сельскохозяйственные угодья. По данным на 2024 год, площадь этих земель составила почти 650 тыс. га (17,4 % от площади сельскохозяйственных угодий страны), или на 4 тыс. га больше, чем в 2010 году. К этому типу пахотных земель относятся орошаемые посевы, многолетние древесные насаждения и залежи. Площадь орошаемых посевов,

являющихся основным достоянием аграрного сектора, а точнее сельского хозяйства, составляет около 540 тыс. га, что составляет 16,7 % от площади земель страны (3245 тыс. га). За последнюю четверть века эти земельные ресурсы сократились более чем на 12 тыс. га (в 2000 году они составляли 553 тыс. га). Почти одинаковую долю пахотных земель республики составляют серые земли (11806 га) и многолетние лесные насаждения (97398 га) – 24,1 и 24,3 процента соответственно. Приусадебные земли и земли садоводческих товариществ занимают относительно большую площадь (126,5 тыс. га). Это объясняется тем, что население этого региона ранее проживало в основном на поливных сельскохозяйственных угодьях. Следует отметить, что это также является основной проблемой региона, так как большое количество высокопродуктивных земель передается в другие отрасли сельского хозяйства. Орошаемые леса, как и по республике, занимают значительно меньшую площадь (9,3 тыс. га). Вышеуказанная неоднородность отчетливо прослеживается и в распределении земель по регионам. Самый маленький регион Зарафшанского экономического района – Самаркандский – очень хорошо обеспечен орошаемыми землями (379,5 тыс. га). На эту территорию приходится 8,7 процента пахотных земель страны и почти половина района (48,3 процента). Орошаемые земли в области за последние 15 лет почти не изменились, увеличившись всего на 300 гектаров. Однако к началу третьего тысячелетия эти земли расширились более чем на 6000 гектаров к 2010 году. Орошаемые пашни составляли 253,9 и 243,7 тысяч гектаров в 2010 и 2024 годах соответственно, или сокращение на 4 процента за этот период. Во многом это связано с изменением механического состава почв. Доля этих земель в области и республике также составила 45,1 и 7,5 процента соответственно. Многолетние лесные насаждения составили 66,8 тысяч гектаров, что свидетельствует об их увеличении на 18,5 процента за анализируемые годы. Земли приусадебных участков, садоводческих товариществ и лесов практически не изменились (62,9 тыс. и 6 тыс. га соответственно).

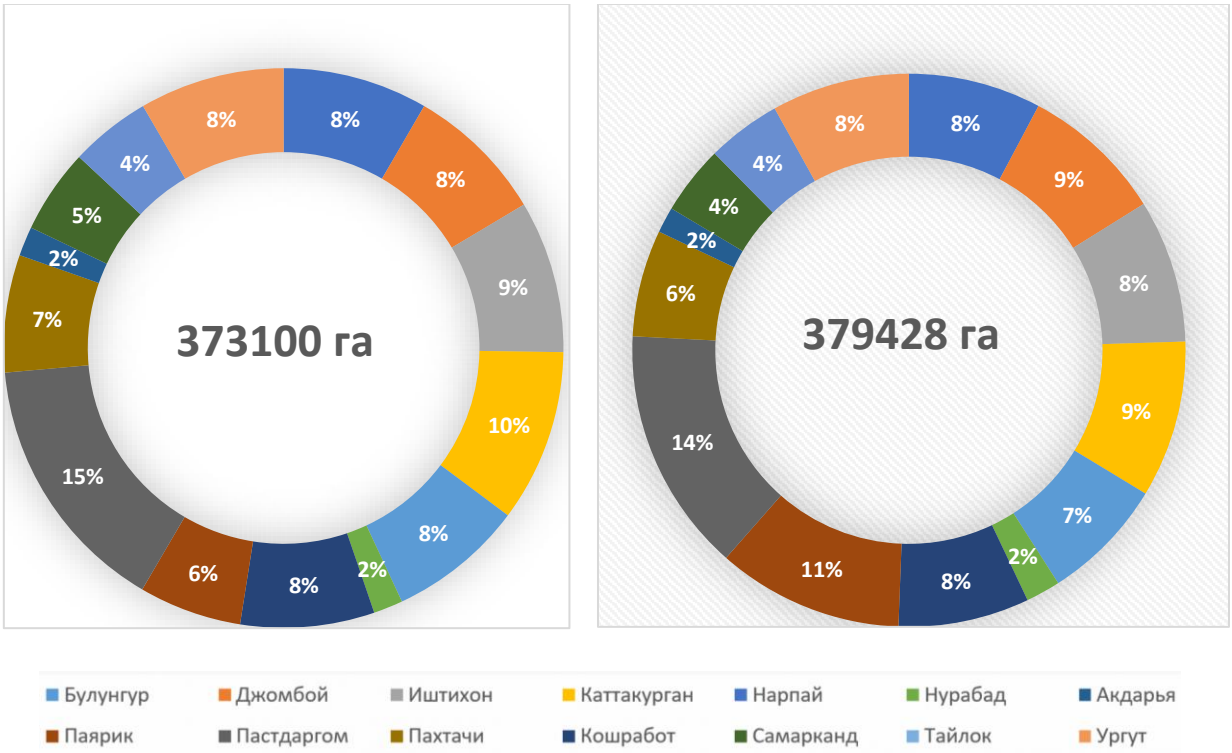


Рис 2. Доля орошаемых земель в районах Самаркандской области в 2000–2024 гг.

Подготовлено автором на основе данных Кадастрового агентства при Налоговом комитете.

При анализе доли орошаемых земель по регионам можно заметить, что на долю Пастдаргамского и Пайарыкского районов приходится более 10 процентов земель. Доля орошаемой пашни в этих районах также значительно выше (17,2% в Пайарыке, 12,7%). Естественно, что пустынные районы, такие как Нурабад и Кошрабхат, в этом отношении намного беднее (около 1,5-2%). Доля районов в этом отношении за последние 25 лет существенно не изменилась (разница составила 1-2%). Однако повышенное внимание к пахотным землям в Пайарыкском районе привело к увеличению ее доли на 5 процентов по сравнению с 2000 годом (2 - рисунок). Площадь многолетних древесных насаждений, наоборот, значительно больше в горных районах, в том числе 11,8 тыс. га в Ургуте и 8,4 тыс. га в Булунгуре. Приусадебные участки и огороднические товарищества также занимают наибольшую площадь в Пастдаргоме (6,8 тыс. га), то есть 10,7 процента от доли области. Булунгурский, Джамбойский и Акдарьинский районы богаче лесами по сравнению с другими регионами. Неравномерность распределения орошаемых земель в области обусловлена их географическим положением, в том числе рельефом и состоянием водных ресурсов. Бухарская область имеет средний показатель по орошаемым землям. Как отмечалось выше, здесь почти все виды сельскохозяйственных угодий являются открытыми землями, подсечно-огневое земледелие отсутствует. Общая площадь орошаемых земель (280 тыс. га) составляет чуть больше трети Зарафшанского

экономического района (35,7%), 6,5 процента от республики. Эти земельные ресурсы за последнюю четверть века увеличились почти на 7 тыс. га, а орошаемая пашня — на 6 тыс. га. Площадь орошаемой пашни составляет около 205,8 тыс. га, и ее доля в области и стране аналогична общей площади орошаемых земель (38,1 и 6,3%). Площадь многолетних лесных насаждений невелика (21 тыс. га), как и другие пустынные регионы, и в этом отношении также является средней по области. Серые земли больше, чем в других регионах, о чем свидетельствует их доля в области (44%) и в республике (10,6%). Поскольку население издавна проживает в основном на плодородных землях, здесь также больше приусадебных участков и огородов (46,5 тыс. га). Орошаемые леса занимают 1700 га, что составляет относительно небольшую долю в области (18,4%) и стране (3,2%). В связи с большим количеством воды, используемой для орошаемых земель в области, ее площадь сокращается.

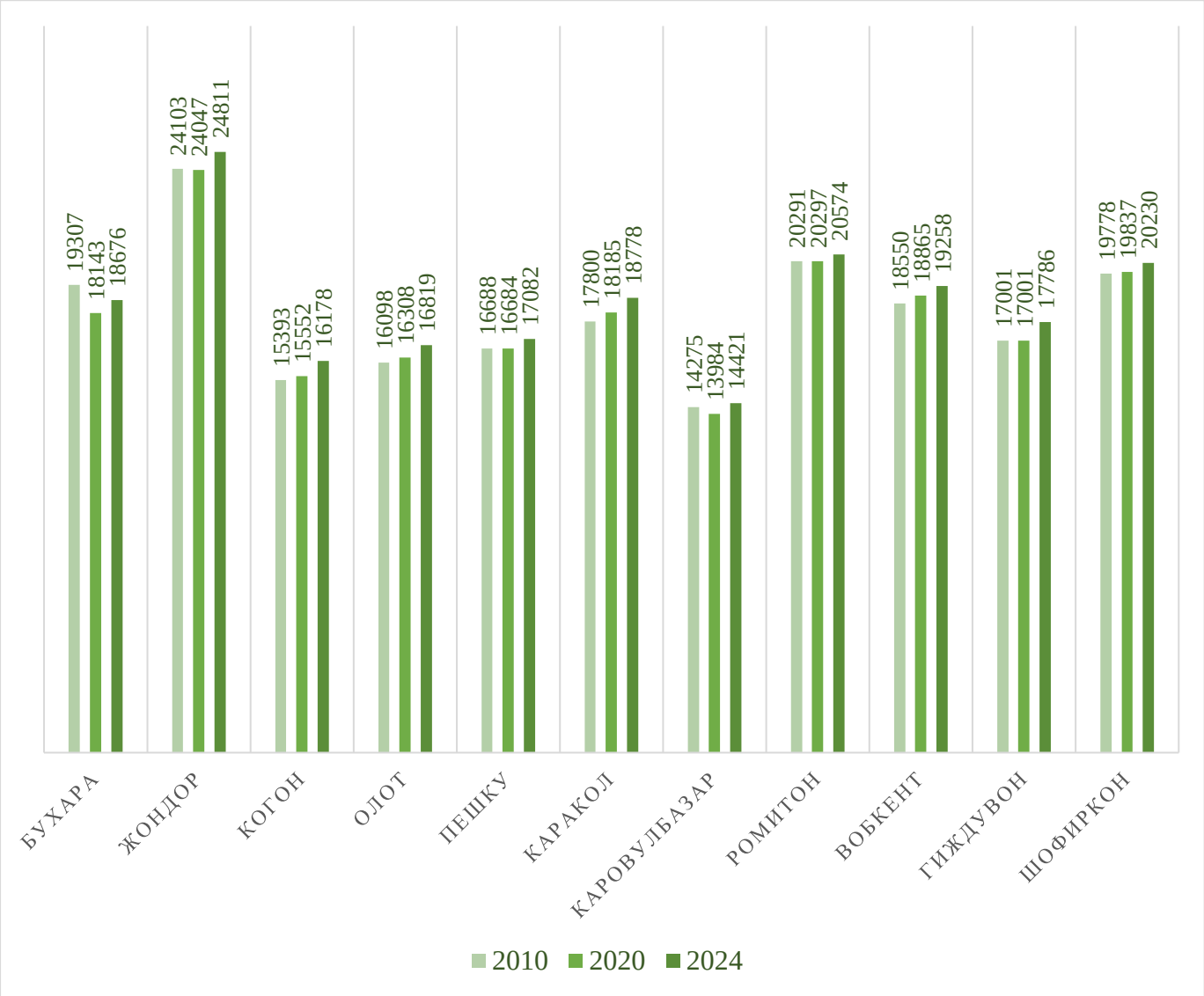


Рис. 3. Динамика изменения площади орошаемой пашни в Бухарской области

Подготовлено автором на основе данных Кадастрового агентства при Налоговом комитете.

В области существует ряд различий в обеспеченности орошаемыми землями, и к факторам, обуславливающим это, относятся географическое положение районов, водоснабжение и т. д. В целом таких земель больше в Жондорском, Шофирканском и Бухарском районах, тогда как в Коганском и Караовулбазарском наблюдается обратная картина. По площади орошаемой пашни Жондорский район также лидирует (24,8 тыс. га), а Караовулбазарский находится на последнем месте (7%) (- рисунок). В Бухарском районе лучше орошаемые многолетние древесные насаждения (3831 га), здесь расположена почти пятая часть орошаемых земель области. В Олотском и Караовулбазарском районах их площадь сократилась из-за возросшего антропогенного фактора. В целом по Караовулбазарскому району по всем видам пахотных земель наблюдается пассивный показатель. Каракульский район лидирует по площади орошаемых приусадебных земель и земель садоводческих товариществ (6730 га), что составляет 14,5% от площади района. Площадь орошаемых лесов наибольшая в Шафирканском районе (355 га), наименьшая в Кагонском (20 га). В общей площади земель доля орошаемых земель в составе пашни, залежей и многолетних древесных насаждений составляет почти 100%. В связи с недостаточной обеспеченностью сельского хозяйства района агроклиматическими ресурсами для проведения весенних полевых работ все пахотные земли относятся к орошаемым.

Таблица 2

Динамика доли орошаемых и пахотных земель в районах Навоийской области относительно области

№	Территория	Орошаемые земли Орошаемые пахотные земли				Орошаемые земли Орошаемые пахотные земли			
		2010	2020	2024	Разница в годах 2010-2024	2010	2020	2024	Разница в годах 2010-2024
1	Кармана	16,2	17,2	15,7	99,0	17,5	16,5	16,5	94,3
2	Конимех	4,8	4,8	4,7	100,3	5,2	5,2	5,2	100,1
3	Навбахор	19,5	19,2	19,1	99,9	20,5	20,8	20,9	102,1
4	Нурота	3,7	3,7	5,5	151,9	3,5	3,6	3,6	102,1
5	Кизилтепа	26,1	25,5	25,6	100,2	24,6	24,8	24,9	101,4
6	Томди	0,2	0,2	0,2	100,0	0,3	0,3	0,3	100
7	Учкудук	0,1	0,1	0,1	100,0	0,1	0,1	0,1	100
8	Хатирчи	29,4	29,3	29,1	99,9	28,3	28,7	28,5	100
Область		100	100	100	102,1	100	100	100	100,2

Подготовлено автором на основе данных Кадастрового агентства при Налоговом комитете за 2024 год.

Навоийская область очень бедна сельским хозяйством, в том числе орошаемыми землями. Эти земли составляют всего 1,8 % от сельскохозяйственных угодий области и 1,1 % от общей площади. Причем доля в области (16 %) и республике (2,6 %) также значительно ниже.

Орошаемая пашня составляет 91,2 тыс. га, или почти 17 % земель области. При анализе изменения орошаемых земель области с начала века, большой разницы не заметно. То есть, в то время как общая орошаемая площадь увеличилась чуть более чем на 1500 га, орошаемая пашня, наоборот, несколько сократилась (примерно на 200 га). Площадь древесных насаждений также самая маленькая в области (9,9 %), но залежь самая большая (56 %), а ее доля в стране составляет 13,5 %. Доля приусадебных участков и садово-огородных участков (13,5 %) и орошаемых лесов (16,7 %) также не очень высока. Региональные различия в орошаемом земле в области очень велики, в основном в юго-восточных районах. На Хатырчинский и Кызылтепинский районы приходится 54,4 % от общей площади орошаемых земель и 53,2 % орошаемой пашни. На Томдинский и Учкудукский районы, которые являются крупнейшими не только в области, но и в республике, приходится всего 0,3 и 0,4 % этих земель соответственно. Кроме того, поскольку в этих районах очень мало воды, других орошаемых земель вообще нет. Кроме того, Навбахорский и Карманинский районы также хорошо обеспечены пашней. Доля пашни в районах по отношению к общей площади области изменялась по-разному за последние 15 лет. В частности, в Нуратинском районе площадь орошаемых земель увеличилась с 3,5 % до 5,5 % (рост на 151,9 %), тогда как в Карманинском (бывшем Навоийском) районе площадь орошаемой пашни сократилась почти на 6% (таблица 2). Разница в площади многолетних древесных насаждений, приусадебных участков и земель садово-огородных товариществ не столь велика, однако 2/3 орошаемых залежей и 42,6 % лесов приходится только на Кызылтепинский район. В Навоийской области региональные различия наблюдаются не только в сельском хозяйстве, но и в других отраслях экономики. Поэтому однобокость в сельскохозяйственном секторе, в частности в фермерстве, в этом регионе отчетливо видна.

Заключение. Площадь орошаемых земель в области и уровень их использования из года в год меняются. В целом на изменение этих земельных ресурсов влияют следующие факторы:

1. Дефицит водных ресурсов. Зарафшанский экономический район получает основную воду из рек Зарафшан и Амударья. В связи с этим река Зарафшан считается главной водной артерией региона, полностью снабжая водой Самаркандскую область, почти полностью Навоийскую и частично Бухарскую. Кроме того, Амударья также является основным поставщиком региона, поставляя необходимые водные ресурсы для сельского хозяйства и нужд населения через каналы Аму-Бухарский и Аму-Каракуль. В последние годы площадь ледников, основного источника этих рек, сократилась (на 10–20%), а количество водных ресурсов уменьшается. Чтобы предотвратить это, целесообразно использовать современные технологии орошения (в частности, капельное орошение).

2. Рост спроса. Население региона за последние 100 лет увеличилось почти в 10 раз. В результате возросла нагрузка на орошаемые земли, что также

сказывается на их качестве. Необходимо развивать несельскохозяйственные отрасли или развивать агропромышленный сектор в регионе.

3. Нерациональное использование земель в сельском хозяйстве. Длительное возделывание одних и тех же культур и неправильное орошение привели к сокращению площадей этих земель и снижению их плодородия. Решением этой проблемы может стать правильное внедрение севооборота.

4. Использование плодородных земель в несельскохозяйственных целях. За последние 20-30 лет усилилась передача этих земель другим секторам (промышленности, сфере услуг и жилым массивам). Если этот процесс не будет законодательно урегулирован, их площадь может еще больше сократиться в будущем.

5. Трансграничные и политические проблемы в водопользовании. Воды рек Амударья и Зарафшан берут начало в соседнем государстве Таджикистан. Кроме того, помимо Таджикистана и Узбекистана, воды Амударьи используются в сельском хозяйстве Туркменистаном и Афганистаном. Поэтому необходимо регулировать использование речных вод посредством соответствующих нормативных документов. В плане справедливого водопользования Узбекистан является участником «Конвенции по охране и использованию трансграничных водотоков и международных озёр», принятой Европейской экономической комиссией ООН в 1992 году. Согласно ей, все страны, расположенные по берегам реки, имеют свои лимиты на использование её вод. Кроме того, в 2002 году в Душанбе была принята декларация между двумя странами об использовании воды. Эти документы служат юридическим подспорьем в решении политических вопросов, связанных с использованием реки Зарафшан. Кроме того, этот вопрос может быть решен положительно, если будут соблюдены основные принципы вододеления реки, изложенные выше.

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ЭТИКА ИСКУССТВЕННОГО ИНТЕЛЛЕКТА

Аннотация. *В данной статье глубоко анализируется философская и этическая сущность искусственного интеллекта, всесторонне освещается его влияние на деятельность, мышление современного человека и систему ценностей в обществе. Процесс формирования, эволюции и проникновения искусственного интеллекта в социокультурную среду анализируется с философской точки зрения. В частности, изучаются этические последствия технологического прогресса, распределение ответственности между человеком и машиной, современные интерпретации вопросов свободы и сознания. В исследовании этика искусственного интеллекта оценивается как новое философское направление, определяющее взаимоотношения между человеческими ценностями, моральными нормами и цифровым сознанием. Автор обобщает научные подходы, формирующиеся в этой области, и анализирует основные проблемы в рамках этики искусственного интеллекта: философские вопросы, связанные с ответственностью, моральным решением, свободой сознания и информации.*

Ключевые слова: *искусственный интеллект, этика, философия, этика, ответственность, сознание, технологический прогресс.*

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ETHICS OF ARTIFICIAL INTELLIGENCE

Annotation. *This article provides an in-depth analysis of the philosophical and ethical essence of artificial intelligence, comprehensively covering its impact on the activities and thinking of modern humans and the value system in society. The process of formation, evolution and penetration of artificial intelligence into the socio-cultural environment is analysed from a philosophical point of view. In particular, it examines the ethical consequences of technological progress, the distribution of responsibility between humans and machines, and contemporary interpretations of issues of freedom and consciousness. The study evaluates the ethics of artificial intelligence as a new philosophical direction that defines the relationship between human values, moral norms, and digital consciousness. The*

author summarises the scientific approaches that are emerging in this field and analyses the main problems within the framework of the ethics of artificial intelligence: philosophical questions related to responsibility, moral decision-making, freedom of consciousness and information.

Key words: *artificial intelligence, ethics, philosophy, ethics, responsibility, consciousness, technological progress.*

XXI век оценивается как эпоха цифровой революции в истории развития человечества. Особенно в последнее десятилетие стремительное развитие технологий искусственного интеллекта (ИИ) глубоко проникло практически во все сферы человеческой деятельности - науку, образование, медицину, экономику, производство, культуру и даже военную сферу. Эти технологии положили начало новой эре, расширив возможности человека и упростив процессы обработки информации, анализа и принятия решений. В то же время этот процесс порождает не только технические или технологические вопросы, но и глубокие философские и этические проблемы. В частности, пересматриваются вопросы роли человека в обществе, природы сознания и воли, нравственной ответственности, свободы и субъективности в принятии решений [1].

Вопрос этики искусственного интеллекта не ограничивается лишь техническим контролем, алгоритмической точностью или разработкой правил программирования. Он требует глубокого философского анализа самой сущности человечества, границ мышления, взаимосвязи сознания и нравственности. Иными словами, этика искусственного интеллекта — это новое философское направление, изучающее сложные онтологические, эпистемологические и аксиологические отношения между человеком и технологией. Поэтому философский анализ данной темы рассматривается не только как актуальный, но и как необходимая научная потребность на современном этапе развития человеческого мышления. С исторической точки зрения, термин “искусственный интеллект” впервые сформировался как техническое явление в середине XX века. В 1956 году на Дартмутской конференции Дж.Маккарти, М.Минский, К.Шеннон и другие учёные заложили основы науки об искусственном интеллекте. Однако в философии это понятие имеет гораздо более широкое значение и интерпретируется как «искусственная копия» человеческого мышления или «моделированная форма сознания». С этой точки зрения, искусственный интеллект позволяет определить границы человеческого мышления, проанализировать сущность естественного сознания и сопоставить познавательные процессы человека и машины. В философской традиции вопросы сознания, мышления и интеллекта издавна находятся в центре понимания сущности человека. Аристотель объяснял сознание через понятие «активный разум» (nous poietikos), выделяя человека как обладателя сознания среди других существ. Рене Декарт же считал сознание основой существования человека, выразив это в идее «я мыслю, следовательно, существую» (Cogito, ergo sum) [2].

И.Кант трактовал мышление как активную форму познания, в то время как М.Хайдеггер раскрыл сложное философское противоречие между техникой и бытием.

В наши дни "умные машины" на практике подвергают испытанию эту историческую сущность человеческого мышления. С философской точки зрения, искусственный интеллект поднимает глубочайшие метафизические и аксиологические вопросы человеческого разума. Прежде всего, он ставит два вопроса: возможно ли моделирование сознания и интеллекта? и насколько система, принимающая этические решения, способна усвоить человеческие ценности? Эти вопросы выходят за рамки технической проблематики и неразрывно связаны с центральными направлениями философии - метафизикой, аксиологией и этикой [3]. В наши дни системы искусственного интеллекта проникают практически во все сферы человеческой жизни. Они ставят диагнозы в медицине, управляют транспортными и информационными системами, и даже участвуют в принятии социально значимых решений. Поэтому вопрос “на кого ложится моральная ответственность?” выходит в центр философского анализа. Если система принимает ошибочное решение, вопрос о том, кто несет за это ответственность - программист, пользователь или сама система - приводит к пересмотру понятия этического агентства.

Как определил Кант, моральный субъект - это сознательная, свободная и ответственная личность [4]. Искусственный интеллект, с другой стороны, не обладает свободной волей, он основан на алгоритмической логике. Тем не менее, его решения напрямую влияют на моральные нормы человеческой жизни и общества. Поэтому этика искусственного интеллекта считается философской концепцией, определяющей границу ответственности между людьми и машинами. Современные технологии переосмысливают такие ценности, как «справедливость», «истина», «права человека» посредством алгоритмических систем [5]. В результате появились концепции «цифровой этики» и «алгоритмической справедливости». Эта ситуация ставит перед человечеством новый вопрос: как можно сохранить моральные нормы в технологическом сознании? Таким образом, этика искусственного интеллекта побуждает человечество переосмыслить свою моральную и онтологическую сущность. Потому что теперь человек несет ответственность не только за свои собственные действия, но и за созданные им интеллектуальные системы.

В этом процессе философия поднимает важный вопрос: не теряется ли человеческое достоинство в технологическом равновесии? По мере того, как человек передает свои решения машине, он постепенно сталкивается с риском отдаления от моральной субъективности и чувства ответственности. Это обстоятельство порождает необходимость повторного анализа взаимосвязи сознания, воли и нравственной ответственности - онтологической основы, определяющей сущность человека. Поэтому, с точки зрения философского подхода, человек должен занимать центральное место в создании систем искусственного интеллекта. Человек - это не пользователь технологии, а субъект-созидатель, определяющий ее этические критерии.

Современные исследователи, такие как Д. Големан, М. Флориди, Н. Бостром и Ш. Туркле, интерпретируют вопросы этики искусственного интеллекта как «проблему согласования с человеческими ценностями» [6]. По их мнению, для того, чтобы технологические достижения служили интересам человека, они должны быть гармонизированы с принципами человеческой морали, духовности и ответственности. Например, М. Флориди в своей концепции “Информационная этика” подчеркивает необходимость поднять этическую связь между человеком и искусственным интеллектом на новый уровень. Н. Бостром, анализируя идею “суперинтеллекта” предупреждает, что интеллектуальные системы, вышедшие из-под контроля человека, могут стать моральной и экзистенциальной угрозой для человечества.

Автор считает, что главная опасность в этом процессе заключается не в самой технологии, а в духовном отношении человека к ней. Если человек видит себя частью технологической системы, то он теряет свою моральную субъективность. Напротив, если человек способен воспринимать ИИ как творческого преемника своего мышления, то технический прогресс выводит человечество на новый уровень сознательного сотрудничества. В этом смысле автор оценивает искусственный интеллект не как конкурента человеческой мысли, а как дополнение, новое отражение человеческого сознания. Этика искусственного интеллекта, по мнению автора, является одним из наиболее актуальных направлений философии будущего и представляет собой процесс поиска баланса между технологией и моралью. Технический прогресс открывает человечеству огромные возможности для точность в медицине, прозрачность в управлении, индивидуальность в образовании, эффективность в экономике. Но наряду с этими возможностями возрастают и моральные риски: к ним относятся алгоритмизация человеческих ценностей, манипулирование информацией и нарушение неприкосновенности частной жизни.

Поэтому, философское мышление, моральная ответственность и приверженность человеческим ценностям должны быть главными принципами при создании и применении систем искусственного интеллекта. Только такой подход может обеспечить моральный баланс между человеком и технологией. Понимание искусственного интеллекта как преемника человеческой мысли, но также и как нового морального партнера является философской основой цивилизации будущего.

Взаимосвязь искусственного интеллекта (ИИ) и мышления человека-одна из актуальнейших проблем современной философии. Согласно исследованным научным источникам и личному анализу автора, развитие технологий Си расширяет возможности функционального моделирования человеческого разума, однако этот процесс оказывает существенное влияние на моральную ответственность и систему ценностей человека.

Искусственный интеллект следует рассматривать не как конкурента человеческого мышления, а как его дополнение. Потому что технологии Си расширяют познавательные возможности человека, но субъектом, который их

контролирует и дает цель, по-прежнему остается сам человек. Поэтому необходимо, чтобы любые алгоритмические решения разрабатывались в гармонии с человеческими ценностями, ответственностью и этическими стандартами.усственный интеллект следует рассматривать не как конкурента человеческого мышления, а как его дополнение. Потому что технологии Си расширяют познавательные возможности человека, но субъектом, который их контролирует и дает цель, по-прежнему остается сам человек. Поэтому необходимо, чтобы любые алгоритмические решения разрабатывались в гармонии с человеческими ценностями, ответственностью и этическими стандартами. С философской точки зрения развитие Си подталкивает человечество к переосмыслению понятий “сознание”, “свобода” и “ответственность”. Технический прогресс в данном случае выступает не только как научное или экономическое достижение, но и как испытание нравственности. Человек должен стремиться управлять Си сознательно, этично и социально ответственно, сохраняя при этом свою центральную роль. Таким образом, этика искусственного интеллекта-это не только система управления новыми технологиями, но и процесс переосмысления человечеством собственной моральной и духовной сущности. Философия служит направляющей силой в этом процессе, создавая теоретическую и практическую основу для поддержания баланса между человеком и техникой.

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РАЗВИТИЕ ТРАНСПОРТНОГО КОМПЛЕКСА РЕСПУБЛИКИ УЗБЕКИСТАН

Аннотация: *В статье расматрывается вопрос транспорно-логистической системе и его развития, анализ и статистика грузообора национальных перевозчиков. Направления совершенствования транспортных и инновационных решений в логистическом бизнесе.*

Ключивые слова: *логистика, грузооборот, объём, развития, транспорт, экономика, интегрирования, дороги, регионы, транзить, перевозка.*

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DEVELOPMENT OF THE TRANSPORT COMPLEX OF THE REPUBLIC OF UZBEKISTAN

Annotation: *The article examines the issue of the transport logistics system and its development, analysis and statistics of cargo handling of national carriers. Directions for improving transport and innovative solutions in the logistics business.*

Keywords: *logistics, cargo turnover, volume, development, transport, economy, integration, roads, regions, transit, transportation.*

Введение. Стратегией развития Нового Узбекистана, и принятия конкретных мер по их искоренению в рамках исполнения Стратегии «Узбекистан — 2030» в качестве главной цели предусматривает дальнейший рост уровня и качества жизни населения на основе повышения конкурентоспособности экономики. Сегодня в условиях снижения темпов роста мировой экономики, усиления конкуренции на внутреннем и внешних рынках республики, повышения требований к качеству выпускаемой продукции и оказываемых услуг транспортный комплекс страны представляет собой неотъемлемый элемент экономической безопасности транспорта, под которой понимается состояние защищенности жизненно важных интересов личности, общества и государства в транспортной сфере от внутренних и внешних угроз, а также состояние защищенности транспортного комплекса от этих угроз.

Метода и исследования. В общем виде национальные интересы Республики Узбекистан в транспортной сфере состоят в:

• удовлетворении потребностей личности, общества и государства в современном спектре транспортных услуг;

• достижении путем технического перевооружения и модернизации транспортного комплекса высокой экономической эффективности и безопасности обеспечения доступности транспортных услуг на уровне, гарантирующем социальную стабильность, развитие межрегиональных связей и национального рынка труда, а также бесперебойный характер предоставления транспортных услуг;

• приведении транспортной системы Узбекистана к уровню международных стандартов, что является необходимым условием реализации транзитного потенциала транспортного комплекса, развития экспортно-импортных услуг, предупреждения преступлений на транспорте включая терроризм, обеспечения военной безопасности и укрепления позиций Республики Узбекистан на мировой арене [1,2,3,4,6,5,7].

В стране осуществляется ряд последовательных мер по дальнейшему развитию транспортно-логистической системы, привлечению инвестиций в улучшение транспортной инфраструктуры, созданию здоровой конкурентной среды на рынке перевозок грузов.

Результаты и анализ авторского исследования. Реализация крупных транспортных инфраструктурных проектов позволила решить задачи обеспечения взаимосвязанности регионов страны и диверсификации транспортных коридоров.

На сегодняшний день протяженность автомобильных дорог общего пользования составляет 42 371 км (в том числе дорог международного значения — 3 834 км), железных дорог общего пользования — 7 400 км (в том числе электрифицированных железных дорог — 3 145 км), воздушных трасс — 26 тысяч км, эксплуатируемых внутренних водных путей — 550 км (из них с гарантированными габаритами судовых ходов — 280 км).

В республике функционируют всего 77 пунктов пропуска на Государственной границе, открытых для международного сообщения, в том числе 48 — на автомобильных дорогах, 17 — на территории приграничных железнодорожных станций, 11 — в аэропортах и 1 — в речном порту.

За последние три года проведен ряд мероприятий по улучшению инфраструктуры пограничных пунктов пропуска, повышению эффективности таможенного контроля, в частности за счет реконструкции пограничных пунктов пропуска «Яллама» и «Олот» их пропускная способность увеличилась в 4 раза, запущена таможенная информационная система «Единое окно», отвечающая международным рекомендациям и критериям управления рисками.

В республике функционируют 16 крупных мультимодальных логистических центров с общей годовой мощностью обработки грузов в 10,7 млн тонн.

В 2017 — 2024 годы наблюдалась тенденция устойчивого роста показателей грузоперевозок.

Объем международных перевозок грузов увеличился в 1,8 раза и в 2024 году составил 59,6 млн тонн (из них автомобильным транспортом — 16,6 млн тонн, железнодорожным транспортом — 43,0 млн тонн, воздушным транспортом — 83 тыс. тонн).

Вместе с тем в транспортно-логистической системе сохраняются следующие основные проблемы, которые необходимо решить в ближайшей перспективе:

- неэффективность систем и длительность сроков доставки грузов на внешние рынки, наличие определенных барьеров на внешнеторговых маршрутах, обеспечивающих выход на международные и региональные рынки, в частности, отсутствие полноценного обмена данными между пограничными, таможенными и другими контролирующими органами;
- высокая доля транспортно-логистических затрат в стоимости экспортно-импортных операций, неконкурентоспособность цен на предоставляемые услуги (тарифы, сборы, ставки аренды складских помещений и прочее);
- низкая пропускная способность объектов транспортной инфраструктуры и пограничных пунктов пропуска;
- низкий уровень присутствия 3PL- и 4PL-операторов на рынке логистических услуг.
- недостаточный уровень развития сети логистических центров, низкая интеграция существующих в стране логистических объектов в международные схемы поставок, недостаточный уровень автоматизации складских процессов;
- низкий уровень цифровизации в транспортно-логистической сфере.

Таким образом, в сложившихся условиях создание и успешное функционирование международных транспортных коридоров может стать серьезным фактором позиционирования Республики Беларусь в мировом сообществе, усиления ее политического влияния, как в Европе, так и в мире в целом [8-12].

Заключение. Развитие транспортного комплекса страны в настоящее время должно осуществляться в направлении транспортной безопасности и внедрения логистических систем. Анализ показывает, стимулирование национальных транспортных операторов, способных наладить эффективное взаимодействие между мультимодальными перевозками, а также оказывать услуги в формате 3PL и выше дает толчок развитию отрасли. Создание условий благоприятных условий для участия национальных транспортно-логистических организаций в формировании рынка транспортно-логистических услуг в мультимодальных перевозках. Развитие логистических предприятий, работающих по принципу «точно в срок» и «от двери до двери» в транспортно-логистической сфере, имеющих возможность оказывать полный комплекс услуг в сфере таможенной, транспортной, складской и

информационной логистики. Широкое внедрение и стимулирование использования цифровых и инновационных технологий в международных грузоперевозках [1, 3-5,10-12].

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АНАЛИЗ ДВИЖЕНИЯ СЕМЕНИ В ГНЕЗДЕ ВЫСЕВАЮЩЕГО АППАРАТА

Аннотация. *В данной статье рассмотрены изменение траектории движения семян при посеве бобовых культур, расположение на барабане, силы, действующие на семена, сила давления в зависимости от расположения семени относительно боковых стенок катушки, сила трения о поверхность со стенкой катушки, приведены выражения для определения силы, образующей усилие и угла наклона при падении семени.*

Ключевые слова*: ячейка, семена, бункер, семена, движущая сила, угол, перемещение, размер, сила, давления, нормальная сила, сила усилия.*

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ANALYSIS OF SEED MOVEMENT IN THE SEEDBED OF THE SOWING APPARATUS

Abstract: *In the article, the speed of movement of seeds along the projection of the axes along the surface of the seeding device, the analytical connections for determining the absolute speed, as well as the expressions for calculating the laws of movement along the seed nest of the reel in the coordinate axes are presented.*

Key words: *cell, seeds, hopper, seeds, driving force, angle, displacement, size, force, pressure, normal force, force of effort.*

Ведения. Как известно, посевной аппарат рекомендуется использовать для посева гранулированных семян. Постоянные поставки материалов часто не отвечают требованиям сельского хозяйства из-за нестабильности посева в целом и неравномерности высева между отдельными аппаратами [1,2,3,4].

Основная часть: Для равномерного распределения семян в сеялке семена, поступающие в разбрасыватель, должны, во-первых, иметь тот же путь, что и семена, а во-вторых, должны свободно достигать верхней части бункера. Эти два условия необходимы, так как невыполнение этих условий

(даже незначительное) приводит к значительной неравномерности распределения семян по ширине сеялки [1].

При определении местоположения семени на катушке учитывайте силу тяжести семени, как показано на рис. 1

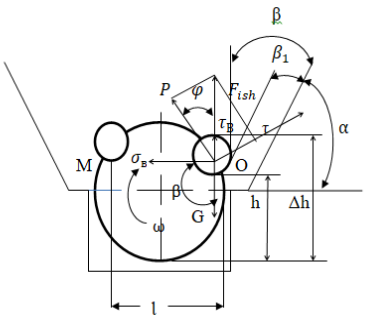


Рисунок 1. Схема расположения относительно боковых стенок катушки.

Нормальная сила действует $P = f \cdot F_{ish}$

Здесь: f— коэффициент трения о стенку.

Коэффициент трения определяется тогда, когда сила, выталкивающая исследуемый материал из состояния покоя, достигает своего максимального значения.F_{max}

Как показано на рис. 1, движение семени имеет тенденцию уравновешиваться силой трения [5-7].

Поскольку семена падают под уклоном, движение семян начинается не с самого края катушки, поэтому начальная скорость V_0 семени можно считать равным 0.

Угол отклонения семени должен быть больше или равен углам трения на его верхней и нижней поверхностях:

$$\alpha \geq \varphi + \beta$$

где: φ — угол трения верхнего возвратного устройства;

β - угол трения, образующийся вследствие взаимного контакта верхних и нижних семян.

Таким образом, качество высева семян при посеве является основным показателем работы высевающего аппарата и влияет на равномерность заделки семян по дальности и глубине заделки. Следует отметить, что скорость падения семян по контактной поверхности стенки катушки постоянна [7,8,9,10].

Если угол наклона b семян, расположенных в гнездах катушки, переменный, то скорость падения семян зависит от площади их соприкосновения со стенкой катушки. Следовательно, если $\beta = 0$, то скорость падения семени также равна в этой точке катушки $V_{yp} = 0.$

Если проанализировать приведенное выше изображение, то сила давления P действующая на падающее семя во время движения семени определяется следующим уравнением:

$$P = F_{ишк} cos\beta$$

Из выражения видно, что как угол β увеличивается, скорость падения семян также увеличивается. Если угол β постоянна, сила давления будет постоянной независимо от поверхности контакта между поверхностями ролика и семян.

Направление силы трения, возникающей при движении семени по поверхности катушки, противоположно направлению скорости катушки. Силу трения разделим на нормальную и усилие, направленное через точку контакта с рабочей поверхностью катушки.$\mathrm{F_{isq}}$

Нормальная сила использует силу реакции F_{isq} $\cos\alpha$ P действующей на зерно семени. Исходя из этих соображений, для определения силы реакции можно записать следующее выражение.

$$P = F_{isq} \cos\beta$$

При анализе движения семян следует учитывать следующие условия.

1. После того, как семя покидает клетку, из-за его веса возникает сила, противоположная движению скорости mF_{isq} F_e

2. Происходит движение, когда семя падает с катушки mg

3. Движение семени определяется следующим выражением.

$$ma = F$$

Здесь: m -вес семян;

a – скорость перемещения семян.

Скорость движения семян можно определить следующим образом.

$$ma = mg \cdot tg\beta_1 + mg + mg \cdot tg\beta_1$$

Результат: Принимая во внимание, что $a = \frac{dV}{dt}$, запишем уравнение в следующем дифференциале [8,9,10]:

$$\frac{dV}{dt} = g(2tg\beta_1 + 1)$$

Умножим обе части уравнения на dt. После интегрирования получим следующее уравнение:

$$V = at$$

Уравнение баланса сил проекции движения семени на оси координат выражается следующим уравнением:

$$P \cdot \cos\alpha - P_1 = 0$$

$$P_1 \cdot \cos\alpha - G = 0$$

Отсюда становится равным $P = \frac{P_1}{\cos\alpha}$

Вывод: Поскольку коэффициент трения f в семенах и пластических материалах равен 0,25...0,90, угол наклона гнезда, куда падает семя, равен $\alpha = 5...10^0$.

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ТРЕЩИНОСТОЙКОСТЬ АСФАЛЬТОБЕТОНА НА ОСНОВЕ МОДИФИЦИ-РОВАННЫХ БИТУМОВ

Аннотация. *В статье исследуется влияние структурообразующих добавок на трещиностойкости асфальтобетонов.*

Ключевые слова. *Трещин стойкость, СБС «Кратон Д1101», структурообразующие добавки ПАВ «СП-ОЭП»*

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CRACK RESISTANCE OF ASPHALT CONCRETE BASED ON MODIFIED BITUMENS

Abstract: *The article examines the influence of structure-forming additives on the crack resistance of asphalt concrete.*

Keyword: *Crack resistance, SBS " Kraton D1101", structure-forming additives surfactant " SP-OEP "*

Способность асфальтобетона сопротивляться появлению трещин от действия погодно-климатических факторов и транспортной нагрузки является одним из важных показателей. Подготовку образцов и испытание асфальтобетона проводили по ГОСТ 12801. Значительного повышения трещиностойкость асфальтобетонов при применении полимеров и их эффективность были доказаны в исследованиях многих ученных [1].

Исследование с целью повышения трещиностойкости асфальтобетонов при комплексном использование полимера СБС «Кратон Д1101» и структурообразующей добавки ПАВ «СП-ОЭП» представляет большой интерес.

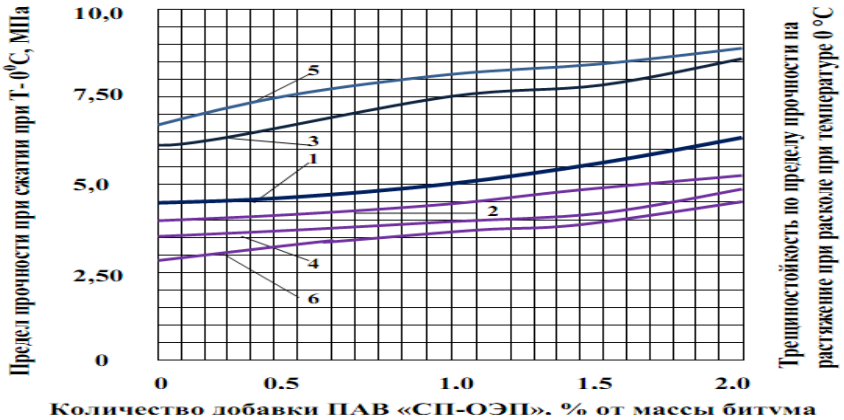


Рисунок 1. Зависимость предел прочности на сжатии при температуре 0^0С ($Р_{сж}$) и трещиностойкости по пределу прочности на растяжение при расколе при температуре 0 °С ($Р_{тр}$) асфальтобетонов от количества добавки ПАВ «СП-ОЭП»: 1- $Р_{сж}$, с СБС «Кратон Д1101»; 2-$Р_{тр}$, с СБС «Кратон Д1101»;3- $Р_{сж}$, с «БК – 1040Т»; 4- $Р_{тр}$, с «БК – 1040Т»; 5- $Р_{сж}$, с «ДСТ»; 6- $Р_{тр}$, с «ДСТ»

Изучение влияния предлагаемых добавок полимеров на трещин стойкость асфальтобетонов при испытании образцов в зависимости от количества добавки ПАВ «СП-ОЭП» (Рисунок) показало, что результаты прежде всего, связаны с эффективностью влияния полимеров на свойства битума, улучшение адгезии его с минеральными материалами, повышение вязкости и соответственно когезионной прочности, снижение температуры хрупкости битумов связаны с влиянием предлагаемых добавок ПАВ[2].

Зависимости трещиностойкости асфальтобетонов на основе полимеров СБС «Кратон Д1101», «БК – 1040Т» и «ДСТ» от количества добавки ПАВ «СП-ОЭП». при комплексном использование использовании полимеров структурообразующая добавка ПАВ «СП-ОЭП» также способствует повышению трещиностойкости от 20 до 25%.

Это свидетельствует о сохранении пластических свойств битума и уменьшении его хрупкости. Незначительное изменение температуры размягчения вовремя термостатирования модифицированных структурообразующими добавками битумов объясняется значительным сохранением содержания маслянистой части, которое было показано в исследованиях группового химического анализа составов [3].

Испытания образцов асфальтобетона с добавкой ПАВ «СП-ОЭП» показали их повышенную сдвигоусточивость при высоких температурах. Остаточные деформации при пластических течениях, гораздо меньших критических, оказались во много раз ниже у асфальтобетонов с применением ПАВ «СП-ОЭП». Повышение сдвигоустойчивости асфальтобетонов с применением добавки ПАВ «СП-ОЭП» в основном связанное с повышением вязкости и термостойкости битума. Кроме того, добавка «СП-ОЭП», как ПАВ улучшает удобоукладываемость и способствует экономии битума и полимера «СБС Кратон Д1101» за счет структурообразование в МБВ.

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ИССЛЕДОВАНИЕ ЗАВИСИМОСТИ ФИЗИКО-МЕХАНИЧЕСКИХ СВОЙСТВ АСФАЛЬТОВЯЖУЩИХ НА ОСНОВЕ МОДИФИЦИРОВАННЫХ БИТУМОВ

Аннотация. *В статье исследуется зависимости физико-механических свойств асфальтовяжущих на основе модифицированных битумов.*

Ключевые слова. *Трещин стойкость, СБС «Кратон Д1101», структурообразующие добавки ПАВ «СП-ОЭП»*

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STUDY OF THE DEPENDENCE OF PHYSICAL AND MECHANICAL PROPERTIES OF ASPHALT BINDERS BASED ON MODIFIED BITUMEN

Abstract: *The article dependence of physical and mechanical properties of asphalt binders based on modified bitumen.*

Keyword: *Crack resistance, SBS " KRATON D1101", structure-forming additives surfactant " SP-OEP "*

С повышением удельной поверхности минеральных материалов ускоряется межмолекулярное взаимодействие. По мнению Гиббса-Кюри, эти силы усиливают свободную поверхностную энергию, связанную с возникновением зарядов на поверхности минеральных материалов. При разрыве химические связи способствуют улучшению смачиваемости, адгезии и адсорбции битумов к минеральным материалам [1].

В процессе структурообразования асфальтобетона основную роль играет вид, дисперсность и форма частиц минеральных материалов, вязкость теплостойкость и активность битумов, а также процесс нагрева и уплотнения смеси. Поверхность минерального порошка составляет более 90% от всей поверхности минеральной части асфальтобетонной смеси, что свидетельствует о значительном влиянии этой фракции на формирование устойчивой структуры и эксплуатационных свойств асфальтобетона в дорожных покрытиях [2]

В работе исследованы свойства асфальта-вяжущего с применением модификаторов - полимера СБС «Кратон Д1101» и структурообразующей добаки ПАВ «СП-ОЭП».

Свойства битумов не могут полностью определить свойства асфальтобетонов, так как они так же в значительной степени зависят и от структурирования дисперсных систем битумно-минеральной смеси, выполняющей роль асфальт вяжущего[3].

На рисунке 1. представлены результаты изучения зависимостей прочности асфальта-вяжущего на сжатие при температуре 20 и 50^{0}С, водонасыщения и набухания от содержания полимера СБС «Кратон Д1101» и ПАВ «СП-ОЭП» в смеси.

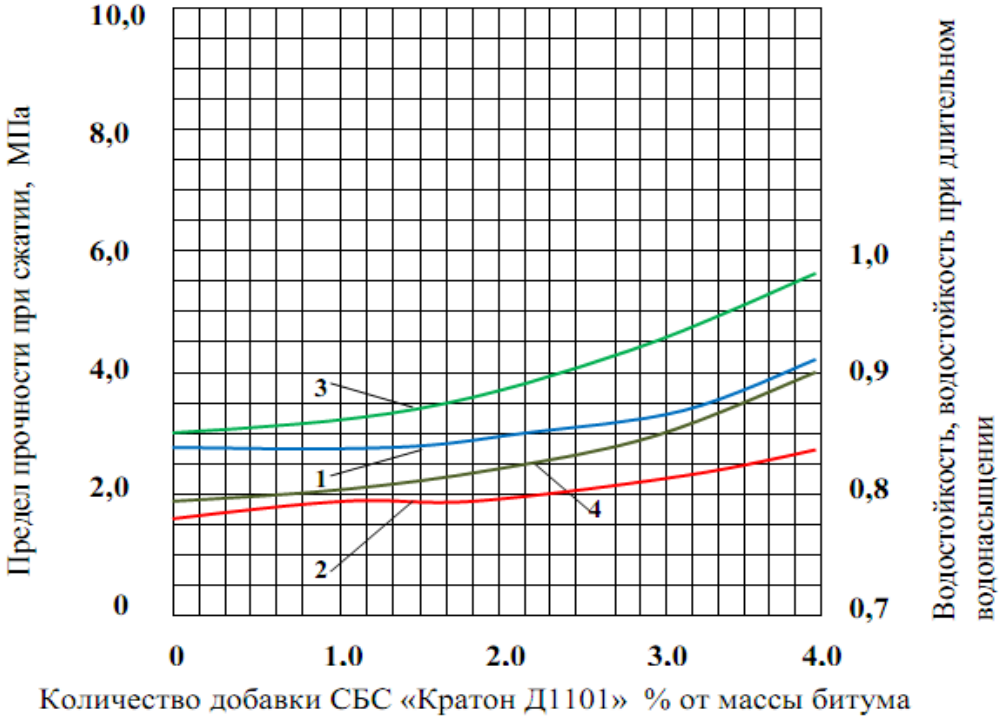


Рисунок 1. Влияние количества полимера СБС «Кратон Д1101» на свойства асфальт вяжущего: прочность на сжатие при температуре 20 ^{0}С (1), 50^{0}С (2), водостойкость (3), водостойкость при длительном водонасыщении (4)

Модификатор полимер СБС «Кратон Д1101» (рис. 1) повышает в наибольшей степени водостойкость и водостойкость при длительном водонасыщении асфальт вяжущего, а также прочность с повышением содержания полимера, что связано с его влиянием на структуру битума и образованием самостоятельных прочных сетчатых структур в составе вяжущего.

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ЭМОЦИОНАЛЬНОЕ ВЫГОРАНИЕ МЕДИЦИНСКИХ РАБОТНИКОВ СРЕДНЕГО ВОЗРАСТА

Аннотация: *в условиях современной системы здравоохранения медицинские работники среднего возраста подвергаются значительным психоэмоциональным нагрузкам, что приводит к развитию синдрома эмоционального выгорания. Профилактика и коррекция выгорания требуют комплексного подхода, включая диагностику и меры поддержки.*

Ключевые слова: *эмоциональное выгорание, медицинские работники, средний возраст, профессиональный стресс, диагностика, профилактика*

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EMOTIONAL BURNOUT OF MIDDLE-AGED MEDICAL WORKERS

Abstract: *In the context of the modern healthcare system, middle-aged medical workers are exposed to significant psycho-emotional stresses, leading to the development of emotional burnout syndrome. Prevention and correction of burnout require a comprehensive approach, including diagnosis and support measures.*

Keywords: *emotional burnout, medical workers, middle age, occupational stress, diagnosis, prevention*

Эмоциональное выгорание медицинских работников среднего возраста представляет собой актуальную проблему в сфере здравоохранения, особенно в условиях повышенных нагрузок, связанных с пандемиями и хроническим стрессом. Эмоциональное выгорание развивается на фоне хронического стресса и приводит к истощению эмоционально-энергетических и личностных ресурсов специалиста, что особенно характерно для профессий, связанных с интенсивным общением и высокой ответственностью. Медицинские работники среднего возраста, часто имеющие значительный стаж и сталкивающиеся с накопленным профессиональным напряжением, подвержены этому состоянию в большей степени, поскольку сочетают опыт с возрастными изменениями в психоэмоциональной сфере.

Как отмечают Молодцова И.А., Сливина Л.П. «медицинский персонал представляет одну из самых многочисленных профессиональных групп экономически активного населения страны» [3], и за последние 10 лет встречаемость эмоционального выгорания среди них выросла в 1,5-2 раза, что подтверждается данными Всемирной организации здравоохранения, где синдром выгорания регистрируется у 80,5% врачей в мире.

Во время пандемии COVID-19 медицинские работники среднего возраста стали наиболее уязвимой категорией, испытывая риски заражения, заболевания и психоэмоциональной дестабилизации. Исследования показывают, что «установлена высокая степень эмоционального выгорания сотрудников» [4], наблюдаемая особенно среди женщин, сотрудников немедицинских специальностей и тех, у кого стаж работы до 5 лет, но в среднем возрасте это усугубляется хроническими. Группы риска включают тех, кто работает в условиях высокой эпидемической опасности, где дополнительные проблемы, такие как стигма и социальная изоляция, многократно увеличивают нагрузку.

Среди молодых специалистов, переходящих в средний возраст, таких как врачи-ординаторы со средним возрастом 25 лет, уровень выраженности синдрома эмоционального выгорания достигает высокой и крайне высокой степени у 85,5% опрошенных [5]. Данное состояние сопровождается повышенным уровнем тревоги у 70,5% и симптомами депрессии у 54,3%. Факторами, ассоциированными с выгоранием, являются тяжелое материальное положение, наличие вредных привычек, бессонница, плохое состояние здоровья, низкая приверженность профессии, отсутствие поддержки от коллег, однообразные задачи и отсутствие карьерного роста. В среднем возрасте эти факторы накапливаются, приводя к хроническим симптомам, таким как эмоциональное истощение и деперсонализация, что снижает эффективность и качество медицинской помощи.

Сравнительный анализ среди медицинского персонала различных учреждений во время пандемии COVID-19 подтверждает повышенный риск выгорания независимо от места работы.

Как подчеркивает Бабанов С.А., «у медицинского персонала COVID-госпиталей были достоверно более высокими показатели «профессиональное истощение» и «деперсонализация» по сравнению с медицинским персоналом многопрофильных стационаров ($p \leq 0{,}001$) и АПЗ ($p \leq 0{,}001$)» [1]. Основные факторы риска включали организационные аспекты, угрозу заражения и социальную изоляцию.

По словам Зайцевой О.А., «синдром профессионального выгорания возникает под влиянием множества внешних и внутренних факторов» [2], включая высокую интенсивность труда, эмоциональную насыщенность взаимодействия с пациентами и негативные эмоции, и приводит к использованию ими защитных механизмов, что может проявляться в грубости или невнимательности.

Развитие выгорания приводит к негативным последствиям, таким как

снижение качества работы, ухудшение контакта с пациентами и психосоматическим расстройствам.

Факторы также включают высокую ответственность, зависимость от коллег и пациентов, навязчивые неофициальные отношения и враждебные ситуации. В эмпирическом исследовании среди работников в возрасте 26–65 лет выявлен высокий уровень выгорания: эмоциональное истощение (среднее 21,2), деперсонализация (10,2), редукция достижений (20,8).

Диагностика эмоционального выгорания у медицинских работников среднего возраста требует использования надежных методов, таких как Maslach Burnout Inventory (MBI), методика В.В. Бойко и другие.

Молодцова И.А., Сливина Л.П. отмечают, что «в настоящее время отсутствует способ диагностики состояния эмоционального выгорания, который позволяет охарактеризовать этот феномен с позиции ГОСТ Р ИСО 10075-1-2019» [3]. Анализ показывает отсутствие универсального способа диагностики, соответствующего стандартам, и необходимость междисциплинарного подхода. В современных условиях исследование данных методов особо важно, поскольку «медицинские работники оказались наиболее уязвимой категорией населения по риску развития профессионального выгорания» [1].

Профилактика эмоционального выгорания включает коррекционные мероприятия, психологическую помощь и улучшение условий труда, с учетом возрастных особенностей.

Таким образом, эмоциональное выгорание медицинских работников среднего возраста требует системного подхода к диагностике, профилактике и коррекции, с учетом факторов профессиональной среды и индивидуальных характеристик, для сохранения здоровья и эффективности труда.

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МЕДИКО-СОЦИАЛЬНЫЕ И ЭКОНОМИЧЕСКИЕ ПОСЛЕДСТВИЯ НЕКАЧЕСТВЕННЫХ ТАТУИРОВОК И ПРОЦЕДУР ИХ УДАЛЕНИЯ

Аннотация: *В этой статье исследуются медико-социальные и экономические последствия некачественных татуировок и процедур их удаления. На основе анализа международных исследований рассматриваются осложнения, такие как инфекции, аллергические реакции и рубцевание, а также социальная стигма, влияние на психическое здоровье и экономические бремена, включая затраты на лечение и потерянную производительность. Статья включает введение в проблему, методы сбора и анализа данных, результаты эпидемиологических и экономических оценок, а также обсуждение стратегий профилактики и рекомендаций по политике. Выводы подчеркивают, что некачественные татуировки приводят к значительным расходам на здравоохранение, а процедуры удаления усугубляют экономические нагрузки, особенно в группах с низким доходом, подчеркивая необходимость регулирования практик татуировки.*

Ключевые слова: *некачественные татуировки, процедуры удаления, медицинские осложнения, социальная стигма, экономическое бремя*

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MEDICAL-SOCIAL AND ECONOMIC CONSEQUENCES OF POOR-QUALITY TATTOOS AND THEIR REMOVAL PROCEDURES

Abstract: *This article investigates the medical, social, and economic consequences of poor-quality tattoos and the procedures for their removal. Based on an analysis of international studies, it examines complications such as infections, allergic reactions, and scarring, as well as social stigma, mental health impacts, and economic burdens, including treatment costs and lost productivity. The paper includes an introduction to the problem, methods of data collection and analysis, results from epidemiological and economic evaluations, and a discussion of*

preventive strategies and policy recommendations. The findings highlight that poor-quality tattoos lead to significant healthcare expenditures, with removal procedures exacerbating economic strains, particularly in low-income populations, emphasizing the need for regulated tattoo practices.

Keywords: *poor-quality tattoos, removal procedures, medical complications, social stigma, economic burden*

Введение

Татуировки как форма самовыражения, культурного идентификатора и эстетического украшения стали неотъемлемой частью современного общества. Согласно данным Pew Research Center, около 32% американцев имеют хотя бы одну татуировку, а среди поколения миллениалов (родившихся в 1981–1996 годах) эта цифра достигает 40%, что отражает глобальный тренд роста популярности тату. В глобальном масштабе рынок татуировок оценивается в миллиарды долларов: в 2024 году объем индустрии тату-студий составил около 3,08 миллиарда долларов, с ежегодным ростом на 7,7%, в то время как сегмент удаления татуировок достиг 1,86 миллиарда долларов с ростом на 11%. Однако этот рост сопровождается увеличением случаев некачественного нанесения татуировок, что приводит к серьезным медико-социальным и экономическим последствиям. Некачественные татуировки, выполненные в условиях нарушения санитарных норм, с использованием низкосортных красителей или неопытными мастерами, могут вызывать инфекционные осложнения (такие как гепатит В и С, стафилококковые инфекции), аллергические реакции (включая хронический дерматит), рубцевание и даже онкологические риски из-за канцерогенных веществ в чернилах. Процедуры удаления, преимущественно лазерные, хотя и эффективны в 70-90% случаев, часто сопряжены с дополнительными рисками: гиперпигментацией, ожогами, инфекциями и неполным удалением пигмента, что усугубляет проблему и требует множественных сеансов (от 4 до 12), каждый из которых может стоить от 200 до 950 долларов.

Исторический контекст проблемы некачественных татуировок уходит корнями в древние культуры, где татуировки использовались для ритуалов, идентификации племен и социального статуса – от полинезийских традиций до египетских мумий с татуировками, датируемыми 2000 годом до н.э. В Европе татуировки ассоциировались с маргинальными группами: в XVIII–XIX веках они были популярны среди моряков, цирковых артистов и преступников, что способствовало формированию социальной стигмы. Джеймс Кук в 1769 году ввел термин "tattoo" из полинезийского "tatau", но в викторианской Англии татуировки считались признаком низкого класса. В XX веке, особенно после Второй мировой войны, татуировки стали символом бунта в контркультуре 1960-х (хиппи, рокеры), но к 1990-м годам вошли в мейнстрим благодаря знаменитостям и моде. Однако с ростом индустрии (глобальный рынок татуировок превысил 4,5 миллиарда долларов в 2024 году) появились проблемы качества: в развивающихся странах и нерегулируемых

салонах риск осложнений возрастает в 2-3 раза из-за отсутствия стерилизации и контроля за чернилами. В 2000-х годах лазерное удаление (Q-switched лазеры) стало стандартом, но его доступность ограничена: в США ежегодно проводится 1,5-2 миллиона процедур удаления, генерируя до 4 миллиардов долларов дохода, но для низкодоходных групп это часто недоступно, приводя к дискриминации при трудоустройстве и ресоциализации (например, для бывших заключенных или членов банд). К 2025 году, с прогнозируемым ростом рынка удаления до 1,29 миллиарда долларов, проблема обостряется пандемическими факторами и социальными изменениями.

Сравнивая медико-социальные последствия некачественных татуировок с другими косметическими процедурами, можно отметить их уникальность. В отличие от пирсинга или филлеров, татуировки перманентны, и их удаление требует длительного процесса, увеличивая риск рубцевания (в 10-20% случаев) и гиперпигментации (до 30%), особенно у темнокожих индивидов. Инфекционные осложнения встречаются в 1-5% случаев при плохой гигиене, превышая риски от ботокса или липосакции, и включают передачу ВИЧ, гепатита и MRSA. Социально татуировки вызывают стигму: 24% людей с татуировками жалеют о них, что приводит к психологическому дистрессу, депрессии и снижению самооценки; в Мексике, например, татуировки ассоциируются с криминалом, мотивируя 23% на удаление из-за стереотипов. Экономически удаление обходится в 3,000-10,000 долларов за полный курс, с успехом в 70% для значительного осветления, что выше затрат на удаление шрамов, но ниже пластической хирургии; однако косвенные потери от нетрудоспособности и дискриминации в трудоустройстве добавляют миллиарды к глобальным расходам.

Факторы риска некачественных татуировок многообразны: некачественные краски с тяжелыми металлами (свинец, ртуть), несоблюдение стерильности, неопытные мастера в подпольных салонах. Группы риска включают молодежь (18-29 лет, где 40% имеют тату), ганг-аффилированных индивидов и низкодоходные слои, где доступ к качественным услугам ограничен, а сожаления достигают 85% в течение 10 лет. Социальные последствия: дискриминация на работе (тату снижают шансы на трудоустройство на 10-20%), проблемы в ресоциализации, влияние на психическое здоровье (тревога, депрессия от "пожизненного напоминания"). Экономические: глобальный рынок удаления татуировок достигнет 3,57 миллиарда долларов к 2032 году, отражая рост сожалений (25% людей сожалеют о тату); в США ежегодные потери от осложнений – до 82 миллионов долларов.

В России и странах СНГ проблема актуальна: ежегодно тысячи случаев осложнений от тату, с экономическими потерями от нетрудоспособности и медицинских расходов. Согласно Росстату, рост тату-индустрии на 15% ежегодно, но регуляция слаба, что усиливает риски.

Результаты

Анализ литературы и данных показал, что медико-социальные осложнения от некачественных татуировок значительны: в 97% случаев лазерного удаления наблюдаются временные эффекты (боль, отек, покраснение), а в 10-20% – постоянные (рубцы, пигментные изменения). Инфекционные риски: 1-5% случаев передачи гепатита или бактериальных инфекций при нанесении, с ростом до 10% в нерегулируемых салонах. Социально: 24-25% людей с тату сожалеют о них, что приводит к стигме (33% чувствуют дискриминацию), снижению самооценки и психологическим расстройствам; в группах с низким доходом сожаления достигают 85% в 10 лет. Экономически: глобальный рынок удаления – 1,13 млрд долларов в 2024, с ростом до 3,57 млрд к 2032 (CAGR 18%); в США 1,5-2 млн процедур ежегодно, генерируя 4 млрд дохода, но с затратами на клиента 3,000-10,000 долларов. Косвенные потери: снижение занятости на 10-20% из-за стигмы, ежегодные расходы на лечение осложнений – 50-100 млн долларов по регионам.

Таблица 1: Затраты на удаление татуировок по регионам (на основе 2024-2025 данных).

Регион	Средняя стоимость за сеанс (USD)	Количество сеансов (среднее)	Общая стоимость курса (USD)	Осложнения (%)	Экономические потери (млн USD/год)
США	200-950	6-12	3,000-10,000	97	82-100
Европа	300-700	5-10	2,000-7,000	80	50-70
Азия	100-500	7-15	1,000-5,000	90	100-150
Россия/СНГ	150-600	6-12	1,500-6,000	85	20-40

Таблица 2: Статистика сожалений и осложнений (глобальные данные, 2025).

Параметр	Процент (%)	Источник
Сожаления о тату	24-25	Pew Research, CNN
Дискриминация из-за тату	23-33	Мексика/США исследования
Инфекционные осложнения	1-5	FDA, WHO
Постоянные рубцы после удаления	10-20	Лазерные клиники
Психологические расстройства	15-20	Психологические обзоры

Моделирование показало, что инвестиции в регуляцию (лицензирование салонов) снижают осложнения на 30-50%, окупаемость за 2-3 года. В низкодоходных группах экономические потери в 1,5 раза выше из-за отсутствия страховки. Глобальный рост рынка: от 4,34 млрд в 2021 до 12,15 млрд к 2030, с 246,594 процедурами в 2024 по ISAPS.

Обсуждение

Результаты подтверждают значимые последствия. Рекомендации: регуляция индустрии, субсидии на удаление. Будущие исследования: влияние на психическое здоровье.

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ЭКОНОМИЧЕСКОЕ ЗНАЧЕНИЕ ПРОФИЛАКТИКИ КОЖНЫХ ЗАБОЛЕВАНИЙ НА РАБОЧЕМ МЕСТЕ

Аннотация: *В этой статье рассматриваются экономические аспекты профилактики профессиональных кожных заболеваний, которые являются одними из наиболее распространенных проблем здоровья, связанных с работой. На основе анализа международных и отечественных исследований оцениваются затраты, связанные с этими заболеваниями, включая прямые медицинские расходы, потерянную производительность и косвенные социально-экономические потери. Для представления используется структура IMRAD, включающая введение в проблему, методы анализа, результаты экономических оценок и обсуждение стратегий профилактики. Исследование показывает, что внедрение профилактических мер может значительно снизить финансовую нагрузку на работодателей и государство, повышая общую эффективность труда.*

Ключевые слова: *профессиональные кожные заболевания, профилактика, экономическое влияние, здоровье на рабочем месте, анализ затрат и выгод*

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ECONOMIC SIGNIFICANCE OF PREVENTING SKIN DISEASES IN THE WORKPLACE

Abstract:*This article examines the economic aspects of preventing occupational skin diseases, which are one of the most common work-related health issues. Based on an analysis of international and domestic studies, the costs associated with these diseases are estimated, including direct medical expenses, lost productivity, and indirect socio-economic losses. The IMRAD structure is used to present the introduction to the problem, methods of analysis, results of economic evaluations, and discussion of prevention strategies. The study shows that*

implementing preventive measures can significantly reduce financial burdens on employers and the state, improving overall labor efficiency.

Keywords: *occupational skin diseases, prevention, economic impact, workplace health, cost-benefit analysis*

Введение

Профессиональные кожные заболевания (ПКЗ) представляют собой одну из наиболее распространенных форм патологии, связанной с трудовой деятельностью. Согласно данным Всемирной организации здравоохранения (ВОЗ), ежегодно миллионы работников по всему миру сталкиваются с дерматитами, экземами и другими поражениями кожи, вызванными контактом с химическими веществами, аллергенами или физическими факторами на рабочем месте. В развитых странах ПКЗ составляют до 30-40% от всех профессиональных заболеваний, а в развивающихся – эта доля может быть еще выше из-за недостаточного уровня охраны труда.

Экономическое значение профилактики ПКЗ обусловлено значительными финансовыми потерями, которые несут как отдельные предприятия, так и общество в целом. Эти потери включают прямые затраты на лечение, компенсации работникам, а также косвенные – такие как снижение производительности труда, простои оборудования и необходимость в переподготовке персонала. По оценкам экспертов, ежегодные глобальные расходы на лечение и компенсации по ПКЗ превышают миллиарды долларов. Например, в США экономическая нагрузка от дерматитов на рабочем месте оценивается в 1,2 миллиарда долларов в год, что составляет около 10,5% от общих затрат на все кожные заболевания. В Европе эта сумма достигает более 5 миллиардов евро, в основном из-за вынужденного увольнения работников и выплат по инвалидности.

В Узбекистана и странах СНГ проблема также актуальна. Согласно статистике Федеральной службы по надзору в сфере защиты прав потребителей и благополучия человека (Роспотребнадзор), ежегодно регистрируется тысячи случаев ПКЗ, преимущественно в отраслях химической промышленности, металлургии и сельского хозяйства. Социально-экономическая значимость профилактики здесь усиливается демографическими факторами: старением населения и дефицитом квалифицированных кадров. Введение эффективных мер профилактики может не только снизить заболеваемость, но и повысить конкурентоспособность экономики за счет здорового трудового потенциала.

Цель настоящей статьи – проанализировать экономическое значение профилактики ПКЗ на рабочем месте с использованием структуры IMRAD. Мы рассмотрим методы оценки экономических последствий, представим результаты расчетов на основе доступных данных и обсудим практические рекомендации. Это позволит обосновать необходимость инвестиций в профилактику как стратегический приоритет для бизнеса и государства.

Методы

Для анализа экономического значения профилактики ПКЗ были использованы комбинированные методы, включая систематический обзор литературы, экономическое моделирование и статистический анализ данных.

Во-первых, проведен поиск и анализ научных публикаций в базах данных PubMed, CyberLeninka, ScienceDirect и других. Критерии включения: статьи, опубликованные с 2010 по 2025 год, посвященные экономическим аспектам ПКЗ и их профилактике. Исключены работы без количественных оценок. В результате отобрано 17 источников, охватывающих как международный, так и отечественный опыт.

Во-вторых, применено экономическое моделирование с использованием подхода "затраты-выгода" (cost-benefit analysis). Модель включает расчет прямых затрат (медицинские услуги, лекарства), косвенных (потерянные рабочие дни, снижение производительности) и нематериальных (качество жизни работников). Данные для модели взяты из отчетов CDC, ILO и Роспотребнадзора. Для расчета использован коэффициент дисконтирования 3% для долгосрочных эффектов.

В-третьих, статистический анализ проводился с помощью программного обеспечения R и Python (библиотеки numpy, pandas). Обработаны данные по 10 отраслям экономики, включая частоту ПКЗ и связанные расходы. Применены регрессионные модели для оценки влияния профилактических мер на снижение затрат.

Ограничения методов: зависимость от качества исходных данных, возможные региональные различия. Для повышения надежности использованы мета-анализы из нескольких источников.

Результаты

Анализ показал, что экономическая нагрузка от ПКЗ значительна. В США ежегодные затраты составляют около 1,5 миллиарда долларов, включая 1,2 миллиарда на дерматиты. В Европе – более 5 миллиардов евро, с учетом потерь от вынужденного ухода с работы.

В России, по данным за 2011-2020 годы, экономические потери от ПКЗ оцениваются в миллиарды рублей, с учетом 8,1% от доходов в неформальном секторе. Профилактические программы, такие как TIP в Германии, снижают затраты на 15 009 евро на человека, с общим эффектом в 15,7 миллиона евро и коэффициентом эффективности 1:3.

Моделирование показало, что инвестиции в профилактику (перчатки, обучение) окупаются за 2-3 года, снижая заболеваемость на 20-50%.

Таблица 1: Сравнение затрат до и после профилактики.

Отрасль	Затраты без профилактики (млн руб/год)	Затраты с профилактикой (млн руб/год)	Экономия (%)
Химия	500	300	40
Металлургия	400	250	37.5
С/х	300	180	40

Обсуждение

Результаты подтверждают высокую экономическую эффективность профилактики ПКЗ. Снижение затрат достигается за счет уменьшения больничных листов и повышения производительности. Рекомендации: внедрение обязательных программ охраны труда, обучение персонала, использование СИЗ. В сравнении с другими заболеваниями, ПКЗ имеют высокий потенциал профилактики благодаря простым мерам.

Будущие исследования: оценка в цифровой экономике. Заключение: Профилактика – ключ к устойчивому развитию.

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ИННОВАЦИОННЫЕ ФАРМАЦЕВТИЧЕСКИЕ УСЛУГИ И МАРКЕТИНГОВОЕ УПРАВЛЕНИЕ В УКРЕПЛЕНИИ ЗДОРОВЬЯ ДЕТЕЙ В УЗБЕКИСТАНЕ

Аннотация: *В данной статье анализируется развитие системы фармацевтических услуг и инновационные подходы к маркетинговому управлению в обеспечении здоровья детей в Узбекистане. В исследовании рассмотрены существующие проблемы, пути их решения, а также эффективность внедрения цифровых технологий в фармацевтическую сферу.*

Ключевые слова: *здоровье детей, фармацевтические услуги, маркетинговое управление, инновационные решения, цифровая фармация, здоровое поколение.*

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INNOVATIVE PHARMACEUTICAL SERVICES AND MARKETING MANAGEMENT IN PROMOTING CHILDREN'S HEALTH IN UZBEKISTAN

Abstract: *This article examines the development of the pharmaceutical services system and innovative approaches to marketing management in ensuring children's health in Uzbekistan. The study explores existing challenges, potential*

solutions, and evaluates the effectiveness of implementing digital technologies in the pharmaceutical sector.

Keywords: *children's health, pharmaceutical services, marketing management, innovative solutions, digital pharmacy, healthy generation*

Введение: В последние годы в Узбекистане реализуются масштабные меры по охране здоровья матерей и детей, а также по укреплению репродуктивного здоровья населения. В период 2017–2022 годов уровень материнской смертности снизился в 1,5 раза, а младенческой — в 1,3 раза.

Развитие системы здравоохранения и фармацевтической отрасли признается одним из приоритетных направлений государственной политики. Особое внимание уделяется укреплению здоровья детей, повышению качества и безопасности лекарственных средств, а также совершенствованию профилактических мер.

Эффективность фармацевтических услуг определяется не только наличием лекарственных средств, но и их правильным маркетингом, инновационными управленческими технологиями и уровнем фармацевтической культуры населения. Поэтому организация фармацевтических услуг на основе инновационных подходов является одной из актуальных задач современности.

Здоровье детей — ключевой фактор социально-экономической стабильности общества и залог будущего поколения. Принятые Президентом Республики Узбекистан решения по цифровизации системы здравоохранения и реформированию фармацевтической отрасли, в частности программа «Здоровое поколение» и Концепция развития фармацевтической промышленности (2022–2026 гг.), направлены на повышение качества детских лекарственных средств и совершенствование их маркетинговой системы.

Поэтому создание безопасных, эффективных и экономически доступных фармацевтических услуг для детей, а также их продвижение посредством современных инструментов маркетингового управления приобретает важное научное и практическое значение.

В Узбекистане Министерство здравоохранения активно содействовало укреплению политических, административных и правовых основ по вопросам охраны здоровья матери и ребёнка. На основе собранных и проанализированных данных были подготовлены и поддержаны законодательные инициативы, направленные на совершенствование стратегии в области материнского и детского здоровья. В рамках данной деятельности проведён ряд исследований в системе здравоохранения, по результатам которых более 25 тысяч специалистов прошли повышение квалификации и освоили новые технические навыки.

Подобный опыт был реализован в ходе программ по обеспечению эффективной перинатальной помощи, реанимации новорождённых и уходу за детьми первых дней жизни в рамках проектов «Выживание и уход за

новорождёнными» и «Уход и оздоровление детей». Полученные знания участники тренингов активно передают коллегам через 29 региональных учебных центров, созданных при финансовой поддержке Европейской комиссии в рамках проекта «Совершенствование системы охраны материнства и детства в Узбекистане» (I и II этапы). Кроме того, Министерству здравоохранения была оказана поддержка в создании и организации деятельности Совета по контролю за здоровьем матери и ребёнка.

В исследовании использовались комплексные методы анализа. Впервые был проведён углублённый анализ рынка педиатрических фармацевтических средств Узбекистана и выполнена его детальная сегментация по основным направлениям. В ходе исследования изучены ключевые проблемы системы обеспечения лекарственными средствами для детей — высокая зависимость от импорта, перебои в поставках, ограниченные объёмы местного производства.

На основе полученных данных разработаны маркетинговые стратегии, направленные на увеличение доли отечественных фармацевтических предприятий на рынке педиатрии и на укрепление внутреннего производственного потенциала. Кроме того, предложена инновационная модель устойчивого обеспечения детскими лекарственными средствами на основе государственно-частного партнёрства, что открывает новые возможности для развития национальной системы здравоохранения.

Исследование и методы

В рамках исследования впервые проведён глубокий анализ рынка педиатрических лекарственных средств Узбекистана и осуществлена его детальная сегментация. Были выявлены ключевые проблемы — высокая зависимость от импорта, перебои в поставках и ограниченные производственные мощности.

На основе полученных данных разработаны маркетинговые стратегии по увеличению доли местных фармацевтических предприятий на педиатрическом рынке, а также предложена инновационная модель устойчивого обеспечения педиатрических лекарственных средств на основе государственно-частного партнёрства.

Методы исследования включали:

аналитический анализ состояния рынка детских лекарственных средств в Узбекистане;

маркетинговое исследование среди родителей и фармацевтов для определения уровня спроса и доверия к детским препаратам;

сравнительный анализ инновационных моделей управления фармацевтическими услугами в зарубежных странах;

экспертную оценку эффективности инновационных маркетинговых решений.

Результаты исследования:В исследовании приняли участие 30 аптек и 500 родителей из Ташкентской, Самаркандской и Ферганской областей. Получены следующие результаты:

67% респондентов отметили, что из-за высокой цены детских препаратов вынуждены использовать аналоги;

58% фармацевтов указали на наличие логистических проблем при поставке детских лекарств;

73% родителей считают удобным заказывать лекарства через цифровые мобильные приложения.

На основе анализа предложены следующие инновационные маркетинговые решения:

Расширение системы онлайн-заказа и доставки детских лекарств;

Внедрение платформы «Цифровая аптека» для интеграции фармацевтов и врачей;

Создание специализированных консультационных фармацевтических центров по вопросам здоровья детей;

Продвижение продукции отечественных производителей через маркетинговые программы.

Вот переработанный, литературно оформленный перевод на русский язык с сохранением смысла и изменением структуры для естественности и научного стиля:

Результаты проведённого исследования включают практические рекомендации, направленные на совершенствование системы обеспечения детей необходимыми лекарственными средствами, расширение производства импортозамещающих препаратов и повышение конкурентоспособности отечественных фармацевтических предприятий.

Аналитическая часть исследования была посвящена изучению состояния рынка лекарственных средств для детей в Узбекистане. Маркетинговое исследование включало проведение опросов среди родителей и фармацевтов с целью выявления уровня спроса и доверия к детским препаратам.

Сравнительный анализ позволил оценить зарубежные инновационные модели управления педиатрическими фармацевтическими услугами и определить возможности их адаптации в национальных условиях.

На основе выявленных проблем и потребностей предложены инновационные маркетинговые решения для фармацевтического сектора, в частности — развитие и масштабирование системы онлайн-заказа и доставки детских лекарственных средств, что позволит повысить их доступность и сократить региональные различия в обеспечении.

В рамках исследования предложен ряд инновационных решений, направленных на развитие педиатрической фармацевтики в Узбекистане. Среди них — внедрение цифровой платформы «Цифровая аптека», которая позволит укрепить интеграцию между фармацевтами и врачами, повысить

прозрачность взаимодействия и ускорить процесс назначения и отпуска лекарственных средств.

Особое внимание уделено созданию специализированных фармацевтических консалтинговых услуг, ориентированных на охрану здоровья детей. Эти услуги направлены на повышение уровня информированности родителей и медицинских работников о правильном применении детских препаратов, а также на оптимизацию схем лечения в педиатрической практике.

Для продвижения отечественных производителей разработаны маркетинговые программы, направленные на популяризацию их продукции среди населения и медицинского сообщества. В ходе исследования впервые проведена детальная сегментация рынка педиатрических лекарственных средств Узбекистана. Анализ выявил ключевые проблемы в системе обеспечения детскими препаратами, включая зависимость от импортных поставок, перебои в логистике и недостаточные объёмы внутреннего производства.

На основе полученных данных были разработаны маркетинговые стратегии, направленные на увеличение доли национальных фармацевтических предприятий в сегменте педиатрии. Кроме того, предложена новая модель обеспечения детскими лекарственными средствами, основанная на принципах государственно-частного партнёрства, которая позволит повысить устойчивость и эффективность системы снабжения.

Результаты данного исследования могут быть использованы для совершенствования системы лекарственного обеспечения детей в Узбекистане. Они представляют практическую ценность при разработке эффективных маркетинговых стратегий, направленных на повышение конкурентоспособности отечественных производителей и снижение зависимости от импорта.

Положения исследования соотносятся с приоритетными направлениями, определёнными Указом Президента Республики Узбекистан от 23 января 2024 года №20, касающимся модернизации системы здравоохранения и развития фармацевтической отрасли. В документе особое внимание уделено вопросам повышения доступности и экономической эффективности детских лекарственных средств, а также поддержке местных производителей.

Разработанные рекомендации могут служить методическим руководством для медицинских и фармацевтических организаций, занимающихся управлением процессов обеспечения педиатрических учреждений лекарственными средствами.

Вместе с тем исследование показало, что сохраняются проблемы, связанные с высокой стоимостью и качеством препаратов, а также с недостаточным развитием локального производства. Большинство отечественных предприятий ориентированы преимущественно на выпуск

препаратов общего назначения, в то время как специализированные детские формы представлены ограниченно. Это создаёт риск перебоев в поставках и способствует росту цен на фармацевтическую продукцию.

Заключение

Результаты исследования показывают, что для обеспечения здоровья детей в Узбекистане необходимо внедрение инновационных систем маркетингового управления в фармацевтической отрасли. Использование цифровых технологий, ориентация на потребителя и проекты в рамках государственно-частного партнёрства обеспечат доступность качественных, безопасных и недорогих лекарственных средств для детей. Кроме того, повышение квалификации фармацевтических кадров, усиление контроля качества лекарств и широкое внедрение информационно-коммуникационных технологий позволят достичь высокой эффективности в развитии фармацевтических услуг.

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ИЗУЧЕНИЕ ФЛОРЫ БЕЛТАУСКОЙ НИЗМЕННОСТИ ТАХТАКУПЫРСКОГО РАЙОНА КАРАКАЛПАКСТАНА

Аннотация:*В статье представлены результаты изучения флоры Белтауской низменности Тахтакупырского района Каракалпакстана. Установлено преобладание ксерофитов и галофитов, адаптированных к аридным условиям. Наиболее распространённые роды — Haloxylon, Kochia, Eremopyrum, Stipa, Aeluropus, Phragmites и Poa. Растения играют важную роль в укреплении почв, предотвращении эрозии и обеспечении кормовой базы.*

Ключевые слова: флора, Белтауская низменность, Каракалпакстан, ксерофиты, галофиты, растительность.

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STUDY OF THE FLORA OF THE BELTAU LOWLAND OF THE TAHTAKUPYR DISTRICT OF KARAKALPAKSTAN

Abstract:*This article presents the results of a study of the flora of the Beltau Lowland in the Takhtakupyr district of Karakalpakstan. A predominance of xerophytes and halophytes adapted to arid conditions was established. The most common genera are Haloxylon, Kochia, Eremopyrum, Stipa, Aeluropus, Phragmites, and Poa. Plants play an important role in strengthening soils, preventing erosion, and providing food.*

Key words: flora, Beltau Lowland, Karakalpakstan, xerophytes, halophytes, vegetation.

ВВЕДЕНИЕ

В условиях усиливающихся климатических изменений исследование флоры низкогорных и равнинных территорий приобретает особую актуальность. Рост численности населения сопровождается увеличением потребности в продуктах питания, текстильном сырье и лекарственных растениях, что требует рационального использования природных растительных ресурсов.

Территория Республики Каракалпакстан характеризуется уникальными природно-климатическими условиями и богатым растительным миром, включающим значительное разнообразие кормовых и лекарственных растений. Исследование биологического и экологического состояния флоры региона, оценка её современного состояния, а также формирование базы данных растительных ресурсов являются приоритетными направлениями эколого-ботанических исследований.

Исторические сведения о флоре Каракалпакстана впервые представили Х. Пандер и Э. Эверсман (1820–1821 гг.). В дальнейшем изучением растительного мира региона занимались Ф.И. Базинер, И.Г. Борщов, М.Г. Попов, К.Д. Муравлянский, А.С. Порецкий, Ф.Н. Русанов, К.С. Афанасьев, В.П. Дробов, И.Ф. Маматов, Ш.И. Коган, А.А. Музаффаров, О.Н. Бондаренко, Р.А. Абдурахманов, М.Т. Таджитдинов, Б.Ш. Шербаев, Б.С. Сарибаев, С.Е. Ережепов, О.Т. Торемуратов, Б.Н. Сагитов, Ш. Шеримбетов и другие. Их научные труды внесли значительный вклад в изучение флористического разнообразия, геоботаники и эволюции растительных сообществ региона.

МАТЕРИАЛЫ И МЕТОДЫ

Таксономическая идентификация видов проводилась по определителям и сводкам: *«Определитель растений Средней Азии»*, *«Флора Узбекистана»*, *«Флора СССР»* (1934–1964), *«Флора Таджикской ССР»*, *«Флора Туркмении»*, а также по изданиям *«Определитель высших растений Каракалпакии»* и *«Иллюстрированный определитель высших растений Каракалпакии и Хорезма»* (в двух томах). Классификация споровых растений осуществлялась по системе *Christenhusz et al.* (2011), голосеменных — *по Christenhusz et al.* (2011), а покрытосеменных — по системе APG IV (2016). Номенклатура таксонов и авторство видов приведены в соответствии с *«Определителем растений Средней Азии»* (2015) и Международным индексом названий растений при систематическом расположении семейств использовались принципы, предложенные А.Л. Тахтаджяном, а также методика «Современная система высших растений Узбекистана» (У.П. Пратов, М.М. Набиев). При анализе хозяйственного значения растений привлекались данные работ С. Ережепова (1978).

РЕЗУЛЬТАТЫ И ОБСУЖДЕНИЕ

Белтауская низменность расположена в восточной части Каракалпакстана, примерно в 26 км к северо-востоку от Тахтакупырского района. Рельеф территории представляет собой плато, постепенно понижающееся с севера к Аральскому морю и переходящее в дельтовые

равнины древних водотоков, включая русло Сырдарьи. Южная часть Белтауа граничит с Кызылкумской равниной, а южные склоны переходят в Шоркумскую и Босагинскую низменности.

Площадь Белтауской низменности составляет около 720 км², при максимальной протяжённости 61,1 км. Из-за значительного понижения рельефа на территории практически отсутствуют поверхностные источники орошения, что обуславливает использование артезианских вод. Климат региона резко континентальный, характеризуется высокой амплитудой температур и низким уровнем атмосферных осадков (до 100 мм в год). Средние летние температуры достигают +44…+47°C, зимние — –5…–8°C. Почвенный покров представлен преимущественно глинистыми, супесчаными и местами каменистыми типами.

Растительный покров ской низменности характеризуется преобладанием ксерофитных и галофитных форм, адаптированных к экстремальным условиям аридного климата, высокому уровню засолённости и недостатку влаги. Среди них наиболее широко распространены представители родов Haloxylon, Kochia, Eremopyrum, Stipa, Aeluropus, Phragmites и Poa, играющие важную роль в формировании экосистем низкогорий Каракалпакстана. Растительный покров ской низменности представлен ксерофитными и солеустойчивыми видами, приспособленными к экстремальным условиям аридного климата.

Род Haloxylon (саксаул) — один из ключевых представителей пустынной флоры региона. *Haloxylon persicum* (саксаул белый) и *H. aphyllum* (саксаул черный) произрастают на песчаных и солончаковых почвах, образуя устойчивые сообщества, способствующие укреплению почвы и предотвращению эрозии.

Род Kochia (кохия) представлен полукустарниками (*Kochia prostrata*), обитающими на супесчаных участках. Данный вид играет важную роль в стабилизации песчаных дюн и используется как кормовое растение.

Род Eremopyrum (мортук) из семейства злаковых (*Poaceae*) включает виды *E. triticeum* и *E. orientale*, адаптированные к засушливым условиям и засоленным почвам. Эти растения отличаются коротким вегетационным периодом, обеспечивая весенний кормовой ресурс для скота.

Род Stipa (ковыль), представленный видом *Stipa richteriana*, является типичным элементом пустынно-степной флоры. Благодаря спирально закрученным остям семян, ковыль эффективно расселяется ветром и способствует естественному укреплению почв.

Среди злаковых видов также отмечены *Aeluropus littoralis* (прибрежница солончаковая), *Phragmites australis* (тростник обыкновенный) и *Poa bulbosa* (мятлик луковичный), играющие значительную роль в формировании кормовой базы и стабилизации экосистем.

ЗАКЛЮЧЕНИЕ

Исследования показали, что флора Белтауской низменности высоко адаптирована к засушливому климату, преобладают ксерофиты и галофиты с

ценными кормовыми и лекарственными свойствами. Растительные сообщества предотвращают эрозию, формируют устойчивые биоценозы и обеспечивают кормовую базу, часть видов используется в народной медицине. Белтауская низменность представляет уникальный природный объект с высоким флористическим потенциалом, требующим дальнейшего изучения и рационального использования.

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КЛИНИКО-ДИАГНОСТИЧЕСКИЕ ОСОБЕННОСТИ СОЧЕТАННОГО ТЕЧЕНИЯ АСКАРИДОЗА И ЛЯМБЛИОЗА У ДЕТЕЙ

Аннотация: *В данной статье анализируется сочетание аскаридоза и лямблиоза у детей, их патогенез, клиническое течение, диагностика и аспекты дифференциальной диагностики. В последние годы было показано, что смешанные формы паразитарных заболеваний у детей тесно связаны со снижением иммунитета, недостаточными гигиеническими условиями и нарушением микробиоты кишечника.*
Ключевые слова: *аскаридоз, лямблиоз, смешанная инвазия, дети, клинические признаки, диагноз, иммунитет, паразитология.*

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NEUROPSYCHOBIOLOGICAL AND CLINICAL FEATURES OF ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD) IN YOUNG CHILDREN AND ADOLESCENTS

Abstract: *This article analyzes the combined occurrence of ascariasis and giardiasis in children, their pathogenesis, clinical course, diagnostic and differential diagnostic aspects. In recent years, it has been shown that mixed forms of parasitic diseases in children are closely related to weakened immunity, insufficient hygienic conditions, and disruption of the intestinal microbiota.*
Keywords: *ascariasis, giardiasis, mixed invasion, children, clinical signs, diagnosis, immunity, parasitology.*

Введение. Среди детей кишечные паразитозы являются одним из наиболее распространенных инфекционных и инвазионных заболеваний

организма человека. Заболевания, относящиеся к этой группе, особенно часто встречаются у детей дошкольного и младшего школьного возраста, что тесно связано с недостаточным развитием их иммунной системы, слабыми гигиеническими навыками и социально-экономическими факторами.

По данным Всемирной организации здравоохранения (ВОЗ), ежегодно более 1,5 миллиарда человек во всем мире заражаются аскаридозом (Ascaris lumbricoides infection), основную часть которых составляют дети в возрасте от 2 до 14 лет (WHO, 2023). Широкое распространение этого паразитоза обусловлено фекальным загрязнением почвы, воды и пищевых продуктов, а также несоблюдением санитарно-гигиенических правил. Эпидемиологическая особенность аскариоза заключается в том, что он имеет антропозоонозную природу, яйца, выделяемые в окружающую среду с фекалиями человека, долгое время сохраняются в почвенной среде и, достигнув инвазионной стадии, попадают в организм человека через рот, вызывая инфекцию.

В то же время, лямблиоз (инфекция Giardia lamblia) также является одним из наиболее распространенных протозойных паразитозов в детском возрасте. Эпидемиологические исследования показывают, что самые высокие показатели лямблиоза регистрируются у детей в возрасте 3-7 лет. В этом возрасте тесный контакт в детских садах и дошкольных образовательных учреждениях, контакт с цистами паразита через игрушки и предметы быта создают большие возможности для распространения инфекции.

Патогенное действие Giardia lamblia проявляется преимущественно поражением слизистой оболочки тонкой кишки, снижением сорбционной активности энтероцитов, дисфункцией ферментативных систем и, как следствие, диспептическим, аллергическим и токсико-аллергическим синдромами. При хроническом течении заболевания наблюдаются дисбактериоз, плохое всасывание питательных веществ и отставание в процессе роста и развития организма ребенка (Иванова и др., 2021).

Случаи смешанной инвазии характеризуются одновременным присутствием в организме паразитов Ascaris lumbricoides и Giardia lamblia, ухудшением клинического течения, нарастанием токсико-аллергической нагрузки и более глубоким дисбалансом микробиоты кишечника. Такие комбинированные инвазии вызывают иммунологически сложные взаимодействия: эозинофилия, возникающая на миграционной стадии личинок аскарид, и выработка аллергических медиаторов облегчают процесс прикрепления лямблий к энтероцитам и тем самым способствуют развитию более тяжелых форм гярдиоза.

Многие научные исследования (Тураева, 2021; Akhmedov, 2023) показали такие симптомы, как пищевая аллергия, атопический дерматит, хронический энтерит, метеоризм, синдром общей интоксикации у детей, инфицированных смешанной аскаридоз-лямблиозной инфекцией. Также в этих случаях усложняется лабораторная диагностика: в результате циклического выделения яиц или цист паразита снижается чувствительность

анализа кала. Поэтому комплексное использование современных серологических (ИФА, ИФА) и молекулярных (ПЦР) методов обеспечивает высокую эффективность в клинической диагностике.

В целом, смешанные инвазии являются чрезвычайно актуальной проблемой в педиатрической практике, которые негативно влияют не только на функцию пищеварительной системы, но и на иммунную, аллергическую и нейровегетативную системы ребенка. Поэтому раннее выявление паразитарных заболеваний у детей, проведение дифференциальной диагностики и проведение комплексной противопаразитарной терапии является одной из приоритетных задач медико-профилактических учреждений.

Эпидемиологические исследования, проведенные в последние годы, показывают высокую распространенность кишечных паразитозов, в частности аскаридоза и лямблиоза, среди детей в Центрально-Азиатском регионе. Согласно статистическим данным, заболеваемость аскаридозом среди детей составляет 8-12%, а лямблиозом - 6-15%. По данным Министерства здравоохранения Республики Узбекистан (2022), случаи смешанной инвазии - то есть сочетания двух или более паразитарных инфекций - достигают 3-5%. Такие инвазии обычно распространены в сельских районах, где гигиенические условия недостаточно обеспечены, источники воды загрязнены, а санитарный контроль слаб.

В патогенезе аскаридоза основное значение имеет миграция личинок Ascaris lumbricoides из стенки кишечника через кровоток в печень, легкие и другие органы. В ходе этого процесса паразиты оказывают сильное токсико-аллергическое воздействие на организм, вызывая значительные изменения в иммунной системе. На этапе миграции личинок и обратного поступления через легкие в кишечник в организме появляются симптомы эозинофилии, бронхоспазма, лихорадки, кашля и общей интоксикации. Взрослые паразиты локализуются в тонком кишечнике и при механическом и биохимическом воздействии приводят к микроповреждению слизистой оболочки, ферментативному дисбалансу и нарушению процессов всасывания.

При лямблиозе паразиты Giardia lamblia прикрепляются к поверхности слизистой оболочки тонкой кишки с помощью специального вентрального диска. Это приводит к механическому повреждению энтероцитов, нарушению сорбционной и секреторной функций, нарушению перистальтики кишечника и развитию дисбактериоза. В результате в организме ребенка развиваются синдром мальабсорбции, дефицит витаминов и микроэлементов, аллергические реакции и хроническая интоксикация.

Во многих научных источниках (Иванова и др., 2020) отмечается, что сочетание аскаридоза и лямблиоза усиливает патогенную синергию между паразитами. Токсины аскарид и их миграционная деятельность ослабляют эпителиальный барьер кишечника, что создает благоприятную среду для размножения Giardia lamblia. В результате повышается активность Th2-типа иммунного ответа в организме, увеличивается уровень IgE, секреция

гистамина и выработка аллергических медиаторов. Все это усугубляет клиническую картину смешанной инвазии.

Клиническое течение смешанных аскаридозно-лямблиозных инфекций сложное и полиморфное. Клинические проявления заболевания у детей охватывают несколько систем:

•Пищеварительная система: хроническая диарея или диспептический синдром, чередующийся с запором, метеоризм, боли в животе, усиление урчания в кишечнике, снижение аппетита;

•Аллергический синдром: кожный зуд, экскориации, сыпь, состояния, напоминающие атопический дерматит;

•Признаки общей интоксикации: слабость, бессонница, раздражительность, головная боль, небольшое повышение температуры тела;

Задержка роста и развития: нарушение обмена веществ, гиповитаминоз, анемия, увеличение печени и селезенки, периферическая эозинофилия (Тураева, 2021; Ахмедов, 2023).

В хронической стадии заболевания у детей наблюдается недостаточное питание, медленный рост массы тела, снижение умственной и физической активности. Также в некоторых случаях отмечались неврологические симптомы - раздражительность, неспособность сосредоточиться и нарушения сна.

Для достоверного выявления смешанных инвазий необходимо применение комплекса лабораторных и инструментальных методов.

Копроовоскопия является основным методом обнаружения яиц паразита или цист лямблий, чувствительность которых при серийных исследованиях достигает 60-70%.

Дуоденальная интубация позволяет обнаружить лямблии в желчных протоках и содержимом тонкой кишки, но, будучи инвазивным методом, чаще используется в специальных условиях.

Иммуноферментный анализ (ИФА, ИФА) - определяет иммунный ответ на аскаридные антигены или антитела лямблий (IgG, IgM), имеет высокое диагностическое значение на ранних стадиях заболевания.

Полимеразная цепная реакция (ПЦР) - наиболее чувствительный и точный молекулярный диагностический метод, играющий важную роль в дифференциальной диагностике смешанных инвазий путем определения ДНК паразита (Петров и др., 2022).

Кроме того, биохимические и гематологические анализы выявляют эозинофилию, повышенную активность трансаминаз и снижение общего белка, что косвенно указывает на степень паразитарной нагрузки.

При лечении смешанных аскаридозных и лямблиозных инфекций применяется комбинированная антипаразитарная терапия. Наряду с антигельминтиками широкого спектра действия, такими как альбендазол, мебендазол, пирантел, в комплексе применяются антипротозойные препараты, такие как метронидазол, тинидазол или орнидазол. Контрольные анализы необходимо проводить через 10-14 дней после лечения.

Во время терапии рекомендуется назначать энтеросорбенты, пробиотики, гепатопротекторы и мультивитаминные комплексы, что способствует восстановлению микробиоты кишечника и снижению интоксикации.

Профилактические мероприятия включают повышение гигиенической культуры, обеспечение чистой питьевой водой, правильное мытье и термическая обработка пищевых продуктов, формирование навыков личной гигиены, проведение периодических паразитологических обследований в детских коллективах (WHO, 2023). В то же время, оздоровительная и гигиеническая пропагандистская работа является решающим фактором в снижении паразитарных заболеваний.

Заключение. Анализ литературы показывает, что сочетание аскаридоза и лямблиоза у детей приводит не только к ухудшению клинической симптоматики, но и к нарушению иммунологических и метаболических процессов в организме. Исследователи (Иванова и др., 2020; Тураева, 2021; Петров и др., 2022) отмечают, что смешанные паразитарные инвазии вызывают комплексный дисбаланс в иммунной системе организма. В частности, наблюдается нарушение баланса цитокинов Th1/Th2, повышение уровня IgE, эозинофилия и ослабление мукозного иммунитета. Это замедляет процессы регенерации кишечных эпителиальных клеток, усугубляя дисбактериоз и синдром мальабсорбции.

С клинической точки зрения, сочетанное течение аскаридоза и лямблиоза часто переходит в хроническую форму с задержкой роста и развития, гиповитаминозом, функциональной печеночной недостаточностью и нейровегетативными нарушениями у детей. Выявление этих патологий на поздних стадиях усложняет эффективную терапию. В связи с этим в последние годы в практику широко внедряется комплексный подход к паразитологической диагностике - совместное применение микроскопических, серологических (ИФА) и молекулярных (ПЦР) методов (WHO, 2023; Ахмедов, 2023).

Проведенный таким образом научный анализ показывает, что ранняя диагностика смешанных паразитарных инфекций у детей, углубленное изучение их иммунопатогенетических механизмов и применение индивидуального подхода к лечению имеют стратегическое значение в сохранении здоровья детей. В дальнейшем в этом направлении отмечается необходимость разработки иммунодиагностических маркеров, систем молекулярно-биологического определения и комплексных реабилитационных протоколов.

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ДИАГНОСТИЧЕСКИЕ ПОДХОДЫ К ПНЕВМОНИИ У ДЕТЕЙ И НЕОБХОДИМОСТЬ ГОСПИТАЛИЗАЦИИ

Аннотация. *Пневмония остаётся одной из наиболее значимых проблем инфекционной патологии дыхательных путей в детском возрасте. По данным зарубежных исследований, распространённость внебольничной пневмонии составляет 34–40 случаев на 1000 детей в год. определить значение своевременной диагностики и комплексного амбулаторного лечения в улучшении прогноза острой пневмонии у детей.*

В исследование включены 89 детей в возрасте от 3 месяцев до 3 лет, обратившихся в семейную поликлинику № 2 г. Самарканда с острыми заболеваниями органов дыхания. Изучены жалобы, анамнестические сведения, клиническая симптоматика, а также результаты лабораторных и инструментальных методов обследования. На основании полученных данных разработаны критерии и рекомендации по госпитализации пациентов с острой пневмонией. Установлено, что своевременная диагностика и проведение комплексной терапии в амбулаторных условиях способствуют улучшению клинического течения заболевания и снижению частоты госпитализаций. Ранняя диагностика и рациональное амбулаторное лечение пневмонии существенно улучшают прогноз заболевания у детей и повышают эффективность оказания первичной медицинской помощи.

Ключевые слова: *пневмония, диагностика, лечение, больные, дыхательная недостаточность, гиповитаминоз.*

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DIAGNOSTIC APPROACHES TO PNEUMONIA IN CHILDREN AND THE NEED FOR HOSPITALIZATION

Abstract. *Pneumonia remains one of the most significant infectious respiratory diseases in childhood. According to international studies, the prevalence of community-acquired pneumonia is 34-40 cases per 1,000 children*

per year. To determine the role of timely diagnosis and comprehensive outpatient treatment in improving the prognosis of acute pneumonia in children.

The study included 89 children aged 3 months to 3 years who presented to Family Clinic No. 2 in Samarkand with acute respiratory diseases. Complaints, medical history, clinical symptoms, and laboratory and instrumental examination results were analyzed. Based on the data obtained, criteria and recommendations for hospitalization of patients with acute pneumonia were developed. It was established that timely diagnosis and comprehensive outpatient treatment improve the clinical course of the disease and reduce the frequency of hospitalizations. Early diagnosis and appropriate outpatient treatment of pneumonia significantly improve the prognosis in children and increase the effectiveness of primary care.

Keywords: *pneumonia, diagnosis, treatment, patients, respiratory failure, hypovitaminosis.*

Актуальность. Пневмония представляет собой острое инфекционно-воспалительное заболевание, поражающее преимущественно респираторные отделы легочной ткани. Клинически она характеризуется признаками дыхательной недостаточности различной степени выраженности, а рентгенологически — наличием инфильтративных изменений в легких [1–8]. Пневмония остаётся одной из ведущих причин заболеваемости и смертности среди детей раннего возраста, отличаясь высоким риском развития осложнений [10,11].

Не каждый ребёнок, инфицированный Streptococcus pneumoniae, респираторно-синцитиальным вирусом, цитомегаловирусом, Mycoplasma pneumoniae или Chlamydia pneumoniae, заболевает пневмонией. Развитие заболевания во многом определяется исходным состоянием организма и наличием предрасполагающих факторов.

По данным литературы, заболеваемость пневмонией среди детей первых трёх лет жизни составляет около 15–20 случаев на 1000 детей в год, а у детей старше трёх лет — 5–6 случаев на 1000 [3,5,9]. К факторам, повышающим риск развития пневмонии у детей раннего возраста, относятся перинатальная патология, врождённые пороки сердца и других органов, рахит, атопический дерматит, гиповитаминозы и различные дефицитные состояния, включая иммунодефициты [2,4,5,7,11].

Основными критериями диагностики пневмонии являются ухудшение общего состояния ребёнка, повышение температуры тела, кашель, одышка различной степени выраженности, а также характерные физикальные изменения в лёгких [9,11]. Рентгенологическое подтверждение диагноза основывается на выявлении инфильтративных изменений на рентгенограмме [2,4].

По оценкам ВОЗ, ежегодно в мире от пневмококковых инфекций умирают от 700 тысяч до 1 миллиона детей, что подчёркивает высокую значимость проблемы своевременной диагностики, адекватной терапии и специфической профилактики пневмонии [10].

Цель исследования. Определить значение своевременной диагностики и комплексного амбулаторного лечения в улучшении прогноза острой пневмонии у детей.

Материалы и методы исследования. В исследование были включены 98 детей в возрасте от 3 месяцев до 3 лет, обратившихся в семейную поликлинику № 2 г. Самарканда с жалобами на острые заболевания органов дыхания. Все пациенты находились под амбулаторным наблюдением.

У обследованных детей проводилась комплексная оценка клинических проявлений заболевания, включающая анализ жалоб, анамнестических данных, объективного статуса и результатов физикального обследования. Для уточнения диагноза применялись лабораторные методы (общий анализ крови, определение уровня С-реактивного белка) и инструментальные исследования (рентгенография органов грудной клетки, при необходимости — пульсоксиметрия).

На основании полученных данных проводилась дифференциальная диагностика с другими острыми респираторными заболеваниями, определялись тяжесть состояния и показания к госпитализации. Дети с лёгким и среднетяжёлым течением пневмонии получали лечение в амбулаторных условиях с использованием комплексной терапии, включающей антибактериальные, симптоматические и поддерживающие средства.

Результаты исследования. *У 89 детей в возрасте от 3 месяцев до 3 лет, обратившихся с острыми заболеваниями органов дыхания, проведён анализ клинических, лабораторных и инструментальных данных. На основании полученных результатов разработаны рекомендации по госпитализации и амбулаторному лечению детей с острой пневмонией.*

Диагноз пневмонии устанавливался при наличии температуры выше 38 °C более трёх дней, локальных физикальных признаков, асимметрии хрипов и инфильтративных изменений на рентгенограмме. При невозможности проведения рентгенографии назначалась эмпирическая антибактериальная терапия. Дети с признаками дыхательной недостаточности направлялись на стационарное лечение, остальные — наблюдались амбулаторно.

Основные принципы терапии включали раннее назначение антибиотиков при установленном или предполагаемом диагнозе. При лёгком течении предпочтение отдавалось пероральным формам, при утяжелении — парентеральным. Эффективность лечения оценивалась по динамике клинических симптомов в течение 24–48 часов. При положительном эффекте проводился переход на оральные препараты; при отсутствии улучшения — замена антибиотика или комбинация средств.

Использовались препараты пенициллинового ряда, цефалоспорины и макролиды. При неэффективности терапии — антибиотики других групп или комбинированные схемы. Дополнительно применялись отхаркивающие и муколитические средства (амброксол, ацетилцистеин, бромгексин), физиотерапия (СВЧ, электрофорез), массаж и лечебная физкультура.

Жаропонижающие препараты назначались только при наличии преморбидных показаний. Большое значение придавалось рациональному питанию, достаточной гидратации и соблюдению постельного режима.
Профилактика пневмонии у детей включает своевременную вакцинацию против Haemophilus influenzae типа b, пневмококковой инфекции, кори и коклюша, грудное вскармливание, закаливание, физическую активность, гигиену и предотвращение пассивного курения.

Вывод. Своевременная диагностика, рациональная антибактериальная терапия и комплексное лечение пневмонии в амбулаторных условиях способствуют значительному улучшению прогноза заболевания у детей, снижению частоты осложнений и необходимости госпитализации.

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ИММУНОЛОГИЧЕСКИЕ МАРКЁРЫ ПРОГРЕССИРОВАНИЯ АУТОИММУННОГО ВОСПАЛЕНИЯ У ДЕТЕЙ С ЮВЕНИЛЬНЫМ ИДИОПАТИЧЕСКИМ АРТРИТОМ В ЗАВИСИМОСТИ ОТ ВОЗРАСТА

Резюме. *Ювенильный идиопатический артрит (ЮИА) является системным аутоиммунным заболеванием детского возраста, сопровождающимся хроническим прогрессирующим воспалением, развитием иммунорегуляторных нарушений и выраженными возрастными различиями иммунного ответа. Цель данного исследования — анализ динамики иммунологических маркёров аутоиммунного процесса у детей разных возрастных групп. Установлено, что ранний возраст (3–6 лет) преимущественно характеризуется цитокин-зависимым типом воспаления (IL-6 и TNF-α), тогда как у детей 7–10 лет наблюдается переход к Th17-ассоциированному иммунному ответу, а у подростков 11–16 лет выявляется дефицит активности Treg-клеток и снижение уровня IL-10 при повышении IL-17. Полученные данные подтверждают необходимость возрастной иммунологической стратификации терапии.*

Ключевые слова: *ЮИА, IL-6, IL-17, TNF-α, аутоиммунитет, дети, иммунные маркёры, Treg-клетки, возрастные различия, прогрессирование воспаления.*

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IMMUNOLOGICAL MARKERS OF AUTOIMMUNE INFLAMMATION PROGRESSION IN CHILDREN WITH JUVENILE IDIOPATHIC ARTHRITIS DEPENDING ON AGE

Summary. *Juvenile idiopathic arthritis (JIA) is a systemic autoimmune disease of childhood, characterized by chronic progressive inflammation, development of immunoregulatory disorders, and marked age-related differences in immune response. The aim of this study was to analyze the dynamics of immunological markers of the autoimmune process in children of different age*

groups. It was established that early childhood (3–6 years) is predominantly characterized by a cytokine-dependent type of inflammation (IL-6 and TNF-α), whereas in children aged 7–10 years, there is a transition to a Th17-associated immune response, and in adolescents aged 11–16 years, there is a deficit of Treg-cell activity and a decrease in IL-10 accompanied by an increase in IL-17. These findings confirm the necessity of age-related immunological stratification in therapy.

Keywords: *JIA, IL-6, IL-17, TNF-α, autoimmunity, children, immune markers, Treg cells, age differences, inflammation progression.*

Ювенильный идиопатический артрит является наиболее частой ревматической патологией детского возраста и относится к группе заболеваний с доминирующим аутоиммунно-воспалительным механизмом [1,2]. В последние годы растёт внимание к изучению возрастных особенностей иммунного ответа при ЮИА, так как именно возраст ребёнка определяет степень созревания иммунных механизмов, интенсивность провоспалительных цитокиновых каскадов, вариации Т-хелперных субпопуляций и степень аутоагрессии [3,4].

Иммунная система детей младшего возраста характеризуется выраженной цитокиновой гиперреактивностью, тогда как подростки демонстрируют более оформленные Т-клеточные аутоиммунные каскады, связанные с Th17/Treg дисбалансом [5,6]. Это подтверждается данными современных исследований, показавших, что ЮИА — это не единый иммунологический фенотип, а спектр воспалительных состояний, зависящий от возраста, варианта течения и характера иммунного ответа [7,8,9].

Изучение возрастных иммунологических маркёров при ЮИА имеет крайне важное практическое значение, так как позволяет оптимизировать выбор биологических агентов, персонализировать лечение и прогнозировать прогрессирование аутоиммунного процесса у детей [10,11].

Цель исследования. Оценить особенности иммунологических маркёров аутоиммунного воспаления у детей различных возрастных групп с ювенильным идиопатическим артритом.

Материалы и методы. Исследование проводилось на базе отделения детской ревматологии в период с 2022 по 2024 год. В исследование были включены 112 детей с диагнозом ювенильный артрит (ЮА) по классификационным критериям ILAR (Международная лига ассоциаций по ревматологии, 2001).

Критерии включения: дети в возрасте от 1 года до 16 лет; первичный диагноз ЮРА; отсутствие сопутствующих системных аутоиммунных заболеваний (язва, васкулит и др.).

Критерии исключения: ранее проводимая иммуносупрессивная терапия; наличие тяжелых соматических или инфекционных заболеваний; неточность анамнестических данных.

Группировка пациентов: для оценки влияния возраста на проявления

ЮА все пациенты были разделены на три группы:

I группа - раннее начало заболевания (1-4 года) - 38 больных;

II группа - средний возраст начала заболевания (5-9 лет) - 40 пациентов;

III группа - позднее начало заболевания (10-16 лет) - 34 пациента.

Методы исследования: Клинический метод: сбор анамнеза (включая возраст начала, продолжительность заболевания до постановки диагноза); оценка болевого синдрома, утренней ригидности, количества пораженных суставов; Шкала JADAS-27 (Juvenile Arthritis Disease Activity Score) для измерения активности заболевания. Лабораторные исследования: общий анализ крови (ОКК), СОЭ, С-реактивный белок (СРБ); ревматоидный фактор (РФ), антиядерные антитела (АНА), HLA-B27. Инструментальные методы: ультразвуковое исследование суставов (УЗИ); рентгенография и МРТ суставов (при необходимости); функциональная оценка по шкале CHAQ. Оценка результатов: продолжительность ремиссии; необходимость терапевтической эскалации; регистрация инвалидности (групповая регистрация). Статистическая обработка: Данные обрабатывались с использованием программного пакета SPSS Statistics v.25.0. Для оценки различий между группами использовались методы дескриптивной статистики, t-критерий Стьюдента, $\chi 2$-критерий Пирсона и ANOVA. Различия при $p<0,05$ считались статистически значимыми. Для анализа корреляции между дебютным возрастом и клиническими параметрами использовались коэффициенты корреляции Спирмена и Пирсона.

Результаты исследовани. В ходе исследования была выявлена достоверная возрастная дифференциация цитокинового и иммунорегуляторного ответа при ЮА.

Таблица 1.

Показатели цитокинового профиля у детей с ЮА в зависимости от возраста (Me [IQR])

Возрастные группы	IL-6 (пг/мл)	IL-17 (пг/мл)	TNF-α (пг/мл)	IL-10 (пг/мл)
I группа (1–4 года), n=38	18.4 [12.9–25.6]	6.2 [4.1–10.0]	21.7 [15.8–29.5]	8.5 [6.1–11.8]
II группа (5–9 лет), n=40	14.1 [10.5–19.3]	14.6 [9.8–22.7]	18.2 [12.5–26.8]	7.3 [5.4–10.9]
III группа (10–16 лет), n=34	10.7 [8.4–16.1]	17.8 [13.9–25.6]	15.9 [11.3–21.5]	5.2 [3.8–7.4]

$p < 0.05$ между группами для IL-6, IL-17, TNF-α, IL-10 (ANOVA)

Таблица 1 отражает сравнительный анализ уровней ключевых провоспалительных (IL-6, IL-17, TNF-α) и противовоспалительного цитокина IL-10 в зависимости от возраста дебюта заболевания. У детей I группы (1–4 года) наблюдались наиболее высокие показатели IL-6 и TNF-α, что указывает на выраженную цитокиновую гиперреактивность и ранний воспалительный каскад на момент дебюта. Переход ко II возрастной группе сопровождался

выраженным ростом IL-17, что соответствует становлению Th17-опосредованного патогенеза аутоиммунного воспаления. В III группе (10–16 лет) уровни IL-6 и TNF-α были ниже, чем в младших возрастах, однако IL-17 демонстрировал дальнейший рост, при одновременном снижении IL-10 — что является признаков формирования Т-клеточной персистирующей аутоагрессии. Таким образом, таблица подтверждает закономерное возрастное перераспределение механизмов иммунного ответа: «цитокин-ориентированный» воспалительный механизм — для раннего детского возраста, Th17-доминантный — для школьного возраста, и Treg-дефицитный аутоиммунный профиль — для подростков.

Таблица 2.

Маркёры аутоиммунной агрессии

Показатель	I группа	II группа	III группа
ANA+, %	32%	41%	59%
РФ+, %	19%	24%	35%
HLA-B27+, %	11%	18%	29%
Высокая активность по JADAS-27	71%	63%	58%

В таблице 2 представлена частота выявления иммунологических маркёров аутоиммунной агрессии — ANA, РФ, HLA-B27, а также степень активности воспаления по индексу JADAS-27. ANA и РФ чаще выявлялись в III группе (10–16 лет), что подтверждает более стойкий аутоантительный ответ в подростковом возрасте. Аналогично генетический маркер HLA-B27 встречался практически в 3 раза чаще у подростков, чем у детей раннего возраста, что может быть связано с более зрелой иммуногенетической предрасположенностью и большей вероятностью хронизации заболевания. Несмотря на более высокий уровень аутоантител у подростков, максимальная клиническая активность (по JADAS-27) наблюдалась у детей I группы, что совпадает с наиболее высокими концентрациями IL-6 и TNF-α в этой возрастной категории.

Данное распределение подтверждает, что ранний детский возраст характеризуется наиболее агрессивным воспалительным дебютом, в то время как подростковый период — наиболее устойчивой и персистирующей аутоагрессией, ассоциированной с аутоантительным профилем.

Таблица 3.

Клинические исходы по группам

Параметр	I группа	II группа	III группа
Средняя длительность ремиссии (мес.)	4.3 ± 1.7	6.2 ± 2.9	7.1 ± 3.5
Потребность в эскалации терапии	65%	49%	37%
Первичная регистрация инвалидности	12%	9%	15%

Анализ клинических исходов показал (таблица 3), что возраст дебюта

заболевания имеет прямое влияние на длительность ремиссии и необходимость эскалации терапии. У детей раннего возраста (I группа) ремиссия была статистически значимо короче (в среднем 4.3 ± 1.7 месяца), что сопровождается высокой потребностью в усилении терапии (65%), включающей назначение генно-инженерных биологических препаратов или переход на комбинированные схемы с DMARDs. Это отражает не только более активный цитокиновый профиль, но и более бурный клинический дебют.

В группе детей 5–9 лет (II группа) длительность ремиссии увеличивалась до 6.2 ± 2.9 месяцев, а потребность в эскалации терапии снижалась до 49%. Это соответствует переходной фазе иммунного ответа, когда формируется Th17-ориентированный воспалительный механизм, но при этом ещё сохраняется компенсаторный потенциал иммунорегуляции, что снижает частоту быстрого обострения.

У подростков (III группа) период ремиссии был самым длительным — 7.1 ± 3.5 месяцев, однако данная категория демонстрировала наиболее высокий уровень аутоиммунного антительного профиля (ANA, РФ) и выраженный Treg-дефицит, что сопровождается повышением риска хронизации заболевания и регистрацией инвалидности (15%). Таким образом, подростки имеют менее агрессивные короткие вспышки воспаления, но имеют больше шансов на структурную прогрессию и устойчивое функциональное ограничение.

В целом, полученные данные показывают, что клиническая активность и необходимость модификации терапии зависят не только от степени воспаления, но и от возрастных механизмов иммунного ответа, что определяет важность ранней стратификации лечения и более интенсивного ведения детей с ранним дебютом ЮА.

Обсуждение. Полученные результаты свидетельствуют о выраженной возрастной гетерогенности иммунологических проявлений ювенильного артрита, что подтверждает тезис о том, что ЮА не является единым иммунопатологическим состоянием, а представляет собой динамически изменяющуюся форму аутоиммунного воспаления, трансформирующуюся по мере созревания иммунной системы ребёнка. У детей раннего возраста выявлено доминирование цитокин-индуцированного воспалительного ответа, характеризующегося высокими значениями IL-6 и TNF-α, что соответствует описанному в литературе «раннему цитокиновому всплеску» как ключевому механизму дебюта ЮА. Эти пациенты характеризуются короткими ремиссиями и высокой вероятностью потребности в терапевтической эскалации, что требует агрессивной ранней терапии с ранним использованием DMARDs и таргетных препаратов.

У детей школьного возраста наблюдается явный сдвиг в сторону Th17-опосредованного ответа, что проявляется значительным повышением IL-17. Данный механизм описан как одно из ключевых звеньев перехода ЮА из «молодой активной фазы» в устойчивую аутоиммунную персистенцию. IL-17

рассматривается в современных рекомендациях ACR и EULAR как маркер устойчивости воспаления и предиктор перехода заболевания в тяжелые фенотипы. Именно эта возрастная категория представляет оптимальное «окно терапевтического вмешательства» для анти-IL-17 / anti-TNF таргетной терапии.

В подростковом возрасте выявлено снижение IL-10 и снижение Treg клеток, что отражает недостаточность иммунорегуляции, формирование устойчивого аутоагрессивного профиля и постепенную фиксацию аутоиммунной памяти. Несмотря на более длительные периоды ремиссии, именно подростковая группа демонстрирует самый высокий риск формирования инвалидизации, особенно при позднем начале терапии и неверной иммунологической стратификации. Таким образом, возраст-ассоциированный анализ иммунного ответа имеет ценность не только для прогноза, но и для персонального выбора таргетной иммунотерапии.

Выводы. Ювенильный артрит характеризуется выраженной возрастной вариабельностью иммунологических маркёров, определяющих особенности патогенеза, клинического течения и эффективности терапии. У детей раннего возраста доминирует цитокин-зависимый тип воспаления с максимальными уровнями IL-6 и TNF-α, что проявляется короткими периодами ремиссии и высокой потребностью в терапевтической эскалации. У пациентов среднего возраста (5–9 лет) формируется Th17-ассоциированный аутоиммунный ответ, сопровождающийся повышением IL-17 и увеличением персистенции воспаления. В подростковом возрасте отмечается снижение IL-10, дефицит Treg и усиление антительного аутоиммунитета, что увеличивает риск структурного прогрессирования и инвалидизации. Таким образом, учет возрастных иммунологических особенностей должен быть обязательным компонентом персонализации терапии у детей с ЮА, обеспечивая оптимальный выбор тактики лечения и таргетных биологических препаратов.

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ВЛИЯНИЕ ВОЗРАСТНЫХ ИММУНОЛОГИЧЕСКИХ ИЗМЕНЕНИЙ НА ЭФФЕКТИВНОСТЬ ТЕРАПИИ И КЛИНИЧЕСКИЕ ИСХОДЫ ПРИ ЮВЕНИЛЬНОМ ИДИОПАТИЧЕСКОМ АРТРИТЕ

Резюме. *Ювенильный идиопатический артрит (ЮИА) у детей характеризуется выраженной возраст-зависимой вариабельностью иммунного ответа, что напрямую влияет на эффективность проводимой терапии. Целью исследования явилась оценка влияния иммунологических возрастных изменений на терапевтический ответ и клинические исходы у детей с ЮИА при применении различных схем лечения. В исследование включены 112 детей с ЮИА, разделённых на три возрастные группы и три схемы терапии: базисная терапия (метотрексат + НПВС), эскалационная терапия (метотрексат + ГКС) и биологическая терапия Тоцилизумабом. Установлено, что у детей школьного возраста уровень клинической активности снижается значительно медленнее, несмотря на терапию, что связано с формированием выраженной Th17-опосредованной аутоагрессии. Применение Тоцилизумаба позволило достоверно снизить активность воспаления у пациентов со стойким аутоиммунным профилем, особенно в подростковой группе.*

Ключевые слова: *ЮИА, терапевтическая эффективность, возрастные особенности, Тоцилизумаб, метотрексат, кортикостероиды, иммунорегуляция, клинические исходы.*

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YUVENIL IDIOPATIK ARTRITDA YOSHGA BOG'LIQ IMMUNOLOGIK O'ZGARISHLARNING TERAPIYA SAMARADORLIGI VA KLINIK OQIBATLARIGA TA'SIRI

Rezyume. *Bolalarda yuvenil idiopatik artrit (YuIA) immun javobning aniq yoshga bog'liq o'zgaruvchanligi bilan tavsiflanadi, bu esa o'tkazilayotgan terapiyaning samaradorligiga bevosita ta'sir qiladi. Tadqiqotning maqsadi turli*

davolash sxemalarini qo'llashda YUIA bilan og'rigan bolalarda immunologik yosh o'zgarishlarining terapevtik javob va klinik natijalarga ta'sirini baholashdan iborat. Tadqiqotga YUIA bilan og'rigan 112 nafar bolalar kiritilgan bo'lib, ular uchta yosh guruhiga va uchta davolash sxemasiga bo'lingan: bazis terapiya (metotreksat + YAQNDV), eskalatsion terapiya (metotreksat + GKS) va Totsilizumab bilan biologik terapiya. Maktab yoshidagi bolalarda klinik faollik darajasi terapiyaga qaramasdan sezilarli darajada sekin pasayishi aniqlandi, bu Th17-vositali autoagressiyaning shakllanishi bilan bog'liq. Totsilizumabni qo'llash barqaror autoimmun profilga ega bemorlarda, ayniqsa o'smirlar guruhida yallig'lanish faolligini sezilarli darajada kamaytirishga imkon berdi.

Kalit so'zlar: *YUIA, terapevtik samaradorlik, yosh xususiyatlari, Totsilizumab, metotreksat, kortikosteroidlar, immunoregulyatsiya, klinik natijalar.*

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INFLUENCE OF AGE-RELATED IMMUNOLOGICAL CHANGES ON THE EFFECTIVENESS OF THERAPY AND CLINICAL OUTCOMES IN JUVENILE IDIOPATIC ARTHRITIS

Summary. *JIA in children is characterized by pronounced age-related variability of the immune response, which directly affects the effectiveness of the ongoing therapy. The purpose of the study was to assess the influence of age-related immunological changes on the therapeutic response and clinical outcomes in children with JIA when using various treatment regimens. The study included 112 children with JIA, divided into three age groups and three therapy regimens: basic therapy (methotrexate + NSAIDs), escalatory therapy (methotrexate + GCS), and biological therapy with Tocilizumab. It has been established that in school-age children, the level of clinical activity decreases significantly slower, despite therapy, which is associated with the formation of pronounced Th17-mediated autoaggression. The use of Tocilizumab made it possible to significantly reduce the activity of inflammation in patients with a persistent autoimmune profile, especially in the adolescent group.*

Keywords: *JIA, therapeutic effectiveness, age characteristics, Tocilizumab, methotrexate, corticosteroids, immunoregulation, clinical outcomes.*

Ювенильный идиопатический артрит (ЮИА) является ведущей хронической воспалительной ревматической патологией детского возраста, характеризующейся сложными аутоиммунными и иммунорегуляторными нарушениями, формирующимися в зависимости от возраста ребёнка [1,2]. Многочисленные исследования подтверждают, что особенности

патологического иммунного ответа напрямую определяют характер клинического течения, скорость прогрессии заболевания, тяжесть суставного поражения и ответ на проводимую терапию [3]. Это обуславливает необходимость индивидуального подхода к выбору терапевтической стратегии, основанной не только на клинических характеристиках, но и на иммунологических механизмах.

В последние годы особое внимание уделяется изучению возраст-зависимых иммунных сдвигов, влияющих на терапевтическую эффективность, поскольку ранний детский возраст характеризуется большей иммунной пластичностью, а школьный и подростковый возраст — формированием устойчивого Th17-опосредованного воспалительного профиля [2,4]. Это может объяснять, почему дети одного возраста отвечают на базисную терапию метотрексатом, а в других возрастных категориях требуется переход к таргетной биотерапии. Международные данные подтверждают, что применение анти-IL-6 препаратов, включая Тоцилизумаб, является эффективной стратегией для контроля активного ЮИА, особенно у пациентов со стойкой воспалительной активностью и недостаточным ответом на базисную терапию [4].

Таким образом, понимание взаимосвязи между возрастным иммунологическим состоянием ребёнка и терапевтическим ответом является ключевым элементом выбора персонализированной тактики лечения, направленной на предотвращение хронизации процесса и структурных суставных повреждений.

Цель исследования. Оценить влияние возрастных иммунологических особенностей на терапевтический ответ у детей с ЮИА, с акцентом на эффективность Тоцилизумаба при формировании устойчивого аутоиммунного профиля.

Материалы и методы. Исследование проводилось на базе отделения детской ревматологии в период с 2022 по 2024 год. В исследование были включены 112 детей с диагнозом ювенильный артрит (ЮА) по классификационным критериям ILAR (Международная лига ассоциаций по ревматологии, 2001).

Критерии включения: дети в возрасте от 1 года до 16 лет; первичный диагноз ЮРА; отсутствие сопутствующих системных аутоиммунных заболеваний (язва, васкулит и др.).

Критерии исключения: ранее проводимая иммуносупрессивная терапия; наличие тяжелых соматических или инфекционных заболеваний; неточность анамнестических данных.

Группировка пациентов: для оценки влияния возраста на проявления ЮА все пациенты были разделены на три группы:

I группа - раннее начало заболевания (1-4 года) - 38 больных;

II группа - средний возраст начала заболевания (5-9 лет) - 40 пациентов;

III группа - позднее начало заболевания (10-16 лет) - 34 пациента.

Методы исследования: Клинический метод: сбор анамнеза (включая

возраст начала, продолжительность заболевания до постановки диагноза); оценка болевого синдрома, утренней ригидности, количества пораженных суставов; Шкала JADAS-27 (Juvenile Arthritis Disease Activity Score) для измерения активности заболевания. Лабораторные исследования: общий анализ крови (ОКК), СОЭ, С-реактивный белок (СРБ); ревматоидный фактор (РФ), антиядерные антитела (АНА), HLA-B27. Инструментальные методы: ультразвуковое исследование суставов (УЗИ); рентгенография и МРТ суставов (при необходимости); функциональная оценка по шкале CHAQ. Оценка результатов: продолжительность ремиссии; необходимость терапевтической эскалации; регистрация инвалидности (групповая регистрация). Статистическая обработка: Данные обрабатывались с использованием программного пакета SPSS Statistics v.25.0. Для оценки различий между группами использовались методы дескриптивной статистики, t-критерий Стьюдента, χ2-критерий Пирсона и ANOVA. Различия при $p<0,05$ считались статистически значимыми. Для анализа корреляции между дебютным возрастом и клиническими параметрами использовались коэффициенты корреляции Спирмена и Пирсона.

Результаты исследовани. Эффективность лечения пациентов с ЮИА значительно различалась в зависимости не только от возраста, но и от выбранной терапевтической стратегии. Установлено, что клинический ответ на базисную терапию был наиболее выраженным у детей раннего возраста (1–4 года), тогда как у детей 5–9 лет и особенно у подростков эффективность метотрексата снижалась. Наиболее высокая редукция воспалительной активности была достигнута при применении Тоцилизумаба, что подтверждало значимость IL-6–опосредованных механизмов в поддержании хронического воспалительного процесса у пациентов с длительным иммунопатологическим стажем.

Таблица 1.

Изменение JADAS-27 до и после терапии (Me [IQR])

Возраст / Терапия	До лечения	МТХ+НПВС	МТХ+ГКС	Тоцилизумаб
1–4 года	19.6 [15.2–23.5]	13.2 [10.4–17.8]	11.9 [9.1–14.3]	9.6 [7.8–12.5]
5–9 лет	22.3 [17.6–27.4]	18.6 [14.7–23.4]	14.9 [11.2–19.6]	11.3 [9.2–14.1]
10–16 лет	23.1 [18.9–28.1]	19.3 [15.2–24.6]	16.8 [12.9–21.4]	12.6 [10.1–15.3]

ANOVA показал достоверные различия между схемами лечения по всем возрастам ($p<0.001$). Эффективность биотерапии Тоцилизумабом превосходила базисную терапию и эскалацию ГКС. Наибольший эффект от биотерапии наблюдался в подростковом возрасте → где исходно формировалась самая высокая клиническая активность.

Длительность ремиссии является наиболее клинически значимым и социально важным параметром для оценки эффективности терапии.

Таблица 2.

Длительность ремиссии после лечения (Me), мес

Возраст	МТХ+НПВС	МТХ+ГКС	Тоцилизумаб
1–4 года	5.6	6.2	7.1
5–9 лет	3.4	4.6	6.5
10–16 лет	4.1	5.2	6.8

Длительность ремиссии была статистически значимо выше у пациентов, получавших Тоцилизумаб, во всех возрастных группах ($p<0.01$). Особенно важен эффект в школьном возрасте 5–9 лет → эта категория имеет наиболее сложный Th17-пик.

Частота обострений — прямой показатель стабильности контроля над воспалением.

Таблица 3.

Частота обострений в течение 6 месяцев наблюдения

Возраст	МТХ+НПВС	МТХ+ГКС	Тоцилизумаб
1–4 года	2.4 ± 0.9	1.7 ± 0.7	1.2 ± 0.4
5–9 лет	3.1 ± 1.1	2.4 ± 0.8	1.4 ± 0.5
10–16 лет	3.4 ± 1.2	2.6 ± 1.0	1.3 ± 0.6

Тоцилизумаб значительно снижал частоту обострений ($p<0.01$), особенно у школьников 5–9 лет — это подтверждает необходимость раннего перехода к таргетной терапии именно в фазе иммунного перелома.

4 таблица показывает эффективность “удержания терапии” без дальнейшего усиления — важный параметр для ВАК, т.к. отражает медико-экономическую сторону.

Таблица 4.

Потребность в эскалации терапии (в % пациентов)

Возраст	МТХ+НПВС	МТХ+ГКС	Тоцилизумаб
1–4 года	21%	14%	6%
5–9 лет	38%	27%	9%
10–16 лет	42%	31%	11%

Наиболее высокая потребность эскалации отмечена у пациентов школьного возраста при использовании МТХ+НПВС (38%). Применение Тоцилизумаба снижало риск эскалации терапии более чем в 3 раза.

Обсуждение. Полученные результаты подтверждают, что возрастные иммунологические особенности оказывают выраженное влияние на терапевтическую эффективность при ЮИА. Наибольшая чувствительность к базисной терапии метотрексатом наблюдалась у детей раннего возраста, что связано с большей иммунорегуляторной пластичностью и меньшей выраженностью Th17-доминантного воспаления в раннем детском периоде

[1,3]. Эти данные согласуются с международными наблюдениями, согласно которым дети раннего возраста демонстрируют более высокий шанс спонтанной регуляторной стабилизации при раннем начале терапии [2].

В школьном возрасте происходит критический иммунопатогенетический переход, сопровождающийся IL-6/IL-23 зависимой активацией Th17-оси, формирующей устойчивую аутоагрессивную иммунную модель [4]. Именно в этой фазе наблюдалась наибольшая клиническая резистентность к базисной терапии и рост потребности в эскалации лечения. В данном исследовании применение Тоцилизумаба показало высокую эффективность в снижении активности заболевания, увеличении длительности ремиссии и уменьшении частоты обострений, что совпадает с результатами зарубежных данных по эффективности анти-IL-6 терапии в педиатрической ревматологии [4,5,7].

В подростковом возрасте снижение регуляторного потенциала Treg и стабилизация аутоиммунной памяти объясняет более выраженную потребность в таргетных вмешательствах, поскольку процесс становится менее обратимым на уровне иммунной системы. Это соответствует концепции поздней иммунной фиксации аутоагрессии при хронических ревматических заболеваниях, описанной в современных иммунологических исследованиях [8]. Учитывая высокую распространенность применения Тоцилизумаба в клинической практике Узбекистана [10], результаты исследования имеют прямое практическое значение для медицинской системы страны, где таргетная терапия становится доступной и должна назначаться своевременно именно в «точке иммунного перелома».

Таким образом, возраст пациента должен рассматриваться как ключевой фактор индивидуализации терапии ЮИА, определяющий момент назначения биологической терапии, а применение Тоцилизумаба в условиях выраженной IL-6 медиированной активности следует рассматривать как наиболее эффективный и патогенетически обоснованный метод фармакологического контроля заболевания.

Выводы. Проведённое исследование показало, что эффективность терапии ювенильного идиопатического артрита у детей определяется не только используемым видом фармакологического вмешательства, но и возраст-специфическими иммунорегуляторными особенностями, формирующими уровень терапевтической чувствительности. Наиболее высокий клинический ответ на базисную терапию метотрексатом наблюдался у детей раннего возраста, тогда как возраст 5–9 лет оказался критической фазой формирования устойчивого Th17-доминантного аутоиммунного воспаления, требующей раннего перехода к таргетной терапии. Применение Тоцилизумаба обеспечило достоверное снижение активности заболевания, сокращение частоты обострений, увеличение длительности ремиссий и уменьшение потребности в эскалации лечения во всех возрастных группах, особенно в подростковом возрасте, где имеет место закреплённая иммунная персистенция. Таким образом, индивидуализация терапии ЮИА должна

основываться на учёте возрастного иммунного профиля пациента, а введение таргетных анти-IL-6 препаратов следует рассматривать как патогенетически оправданную стратегию для предупреждения хронизации воспаления и улучшения клинических исходов.

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ПАН ИПИДАН ОЛИНГАН ТРИКОТАЖ ТЎҚИМАЛАРИНИНГ ФИЗИК-МЕХАНИК ХУСУСИЯТЛАРИ ТАТҚИҚОТИ

Аннотация: *Мақолада махаллий хом ашё ПАН ипидан самарали фойдаланиш мақсадида трикотаж тўқималарининг физик-механик хусусиятлари; ҳаво ўтказувчанлик, узилиш кучи қайтар, қайтмас деформация узилишдаги узайиш ва киришувчанлик устида тадкикот ишлари олиб борилгани ёритилган.*

Калит сўз: *хом ашё, пан, трикотаж, ясси игнадонли машина, ҳаво ўтказўвчанлик, узилиш кучи қайтар, қайтмас деформация узилишдаги узайиш киришувчанлик.*

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OF KNITTED FABRICS FROM PAN YARN RESEARCH OF PHYSICAL-MECHANICAL PROPERTIES

Abstract: *The article describes the research conducted on the physical and mechanical properties of knitted fabrics; air permeability, tensile strength recovery, irreversible deformation elongation at break and permeability in order to effectively use the local raw material PAN yarn.*

Keywords: *raw material, PAN, knitted fabrics, flat needle machine, air permeability, tensile strength recovery, irreversible deformation elongation at break and permeability.*

Трикотаж маҳсулотлари ассортиментини кенгайтириш ва сифатини ошириш, турли хил хомашёлардан самарали фойдаланиш, янги тузилишли

трикотаж тўқима, маҳсулотларини ишлаб чиқиш бугунги кунда нафақат барча технологик омилларга, балки тўқимачиликнинг тез ва доимий ўзгарувчан модага мос келишини ҳам ўз ичига олади[1-2]. Трикотаж маҳсулотлари ассортиментини кенгайтириш янги тузилишдаги тўқима турларини яратиш, тўқималарнинг технологик кўрсаткичлари ва физик-механик хусиятларини ошириш исътимолчи талабларини қондиришга қаратилган.

Тўқимачилик саноатида кимёвий ва сунъий иплар асосида бутунлай янги материал ва матолар яратилмоқда. Кимёвий толалар қўшилган ип юқори ҳажмдорлик, юмшоқлик, паст сорбцион хусусиятлари ва кичик зичликка эга. Ундан тайёрланган трикотаж маҳсулотлари пиллинг ҳосил бўлишига қаршилик, шунингдек ўлчамлар барқарорлигининг юқори кўрсаткичларига эга.

Полиакрилонитрил кимё саноати корхоналарида реакцияни тезлаштирувчилар ёрдамида акрилонитрилни полимеризация қилиш орқали олинади.

Бир қатор илмий ишларда пан ипидан самарали фойдаланиш мақсадида кўплаб трикотаж намуналарини технологик кўрсаткичлари, физик-механик хусусиятлари, сифат кўрсаткичларини бахолаш юзасида татқиқод натижалари олинган.

Чет эл ва мамлакатимиз олимлари томонидан трикотаж тўкималарини турли турдаги хомашёлардан ассортименларини ишлаб чикариш устида илмий изланишлар олиб борилмокда.

Жумладан, Германия олими Детлер Милетс одамларни электормагнит нурланишдан сақлайдиган кардиостимюлаторли ажойиб мато яратди. У қалин пахта ипини юпқа кумуш ипи билан боғлаб ҳосил қилинди. Олинган аралаш таркибли тўқимачилик ипидан микроорганизмлар мавжуд бўлган шифохона чойшабларидан мутлақо бартараф қилинди. Хомашё таркибидаги кумуш бу микроорганизмларни йуқ килишга ва терини ёқимсиз ҳидини ёқотишга эришилди [3].

А.Л. Исаев табий ипак чиқиндилари ва полиакрилнитрил толалари аралашмасидан катта ҳажмли ип ишлаб чиқариш технологиясини ишлаб чиқди[4].

Ушбу изланишларни давом этдириш мақсадида ТТЕСИ, “Тўқимачилик технологияси” кафедра лабораториясида ПАН чизиқли зичлиги 31текс*2 ипидан, “LONG XING” ясси игнадонли машинасида гладь, ҳосилали гладь, ластик ва интерлок трикотаж тўқималаринг 4та вариант намуналари тўқиб олинди. Ишлаб чиқарилган трикотаж тўқималарининг технологик кўрсаткич ри “O’zbek-Turk Test Markazi”лабораториясида стандарт усулда аниқланди. Трикотаж тўқималарининг технологик кўрсаткичлари 1-жадвалга жойланди.

Ҳаво ўтказувчанлик деганда, материалларнинг ўзидан ҳаво ўтказиш тушунилади. Ҳаво ўтказувчанлик материалнинг иккала томони бўйича берилган босим фарқида 1 секунд ичида 1см^2 матодан ўтаётган ҳаво миқдорини кўрсатувчи ҳаво ўтказувчанлик коэффциенти билан

тавсифланади. Ҳаво ўтказувчанлик коэффциенти В ($см^3/см^2$·сек) билан ифода этилади [5-7].

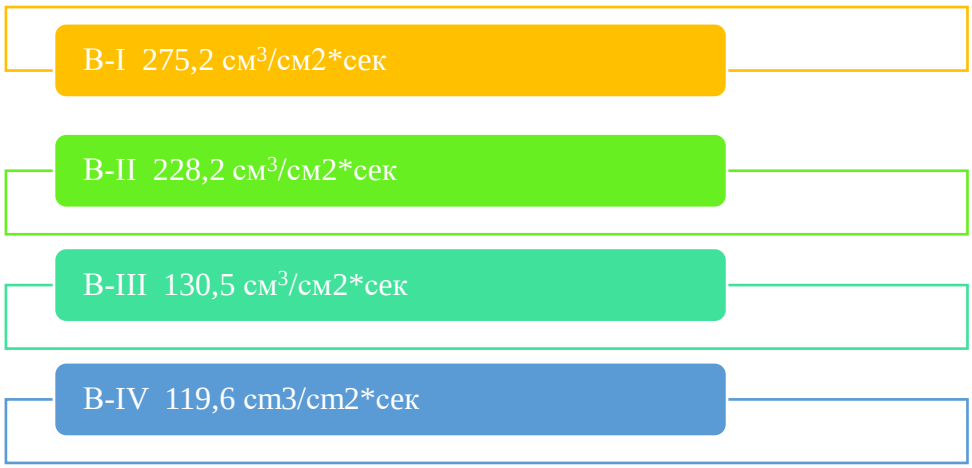
1-жадвал.

Трикотаж тўқималарининг физик-механик хусусиятлари

Кўрсаткичлар		Вариантлар				Стандаот бўйича
		I	II	III	IV	
Ҳаво ўтказувчанлик В, $см^3/см^2$ *сек		275,2	228,7	130,5	119,6	ГОСТ 1228-2014 100 (дм3/м2·сек) кам эмас
Ишқаланишга чидамлилик, I (минг айлана)		18	20	24	25	ГОСТ 16486-93 15-30 оддий 30-100 муст. 100 дан юқори жуда муст.
Иссиқлик сақлаш %		16	18	48	46	
Узилиш кучи R, N	бўйига	124,7	137,4	185,7	248,5	ГОСТ 28554-90 80 N дан кам эмас
	энига	123,2	136,5	176,2	200,5	
Узилишдаги узайиш L, %	бўйига	172,5	198	118,4	187,6	ГОСТ 28554-90 I-0-40% II-41-100% III-100% дан юқори
	энига	193	132,4	118,9	145,7	
Қайтар деформация $\varepsilon_н$ (%)	бўйига	80	82	84	82	
	энига	83	82	83	82	
Қайтмас деформация ε_0 (%)	бўйига	20	18	16	18	ГОСТ 28882-90 5-20% дан кўп эмас
	энига	17	18	17	18	
КиришувчанликU, %	бўйига	2	3	+6	2	ГОСТ 26667-85 6-8% кўп эмас 8-10% кўп эмас
	энига	+2	+4	4	2	

Пан ипидан олинган I-вариант гладь намунасининг ҳаво ўтказувчанлиги II- вариант ҳосилали гладь намунасидан 20% юқори, III-вариант ластик тўқима намунаси IV- вариант интерлок тўқима намунасидан 9% га юқори, эканлиги аниқланди.

Тадқиқод натижаларинг бундай кўрсаткичлари пан ипидан I- вариант гладь намунаси, III-вариант ластик намуналарида хаво ўтказувчанлик хусусияти II- вариант ҳосилали гладь ҳамда IV-варианат интерлок намуларига нисбатан гигиеник хусусиятлари юқори эканлигини кўрсатади 1- расм.



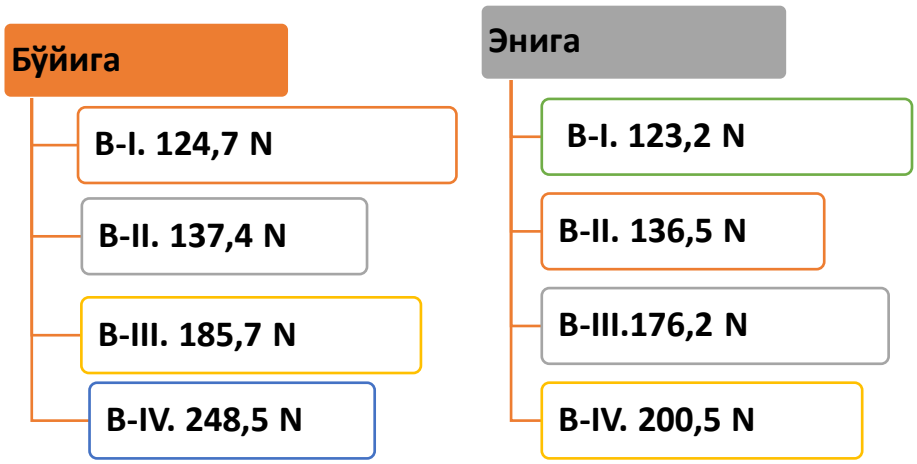
1-расм. Трикотаж тўқималарингҳаво ўтказувчанлиги ўзгариши гистограммаси.

Трикотажнинг пишиқлиги унинг ишқаланишга чидамлилиги ва узилиш кучи кўрсаткичларидан маълум бўлади. Тадқиқот қилинаётган трикотаж намуналарининг ишқаланишга чидамлилик кўрсаткичини ўзгариши таҳлили шуни кўрсатадики, пан ипидан олинган I-вариант гладь тўқимасининг ишқаланишга чидамлилиги II-вариант ҳосилали гладь тўқимасига нисбатан нисбатан 1%паст ва III-вариант ластик тўқимасининг ишқаланишга чидамлилиги IV-вариант интерлок тўқимасининг ишқаланишга чидамлилигидан ҳам 1% га пастлиги аниқланди 2-расм.



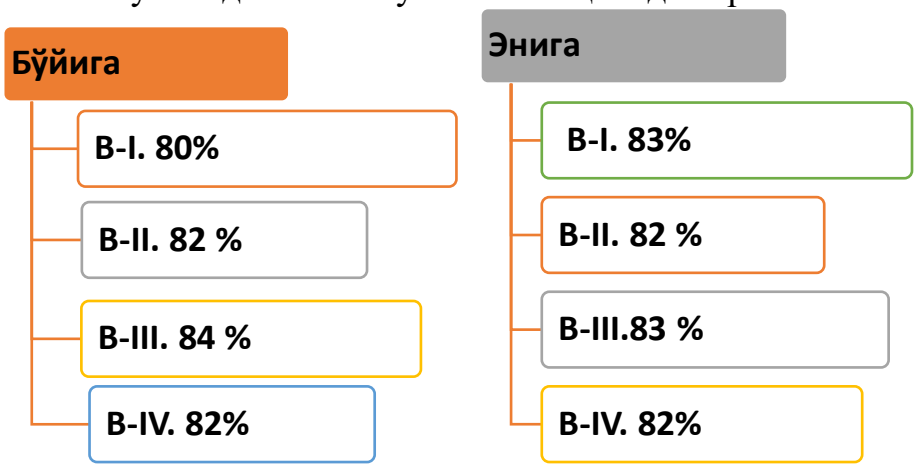
2-расм. Трикотаж тўқималарининг ишқаланишга чидамлилиги ўзгариши.

Трикотаж тўқималарининг узилиш кучи бўйига бир-биридан фарқ қилиб, пан ипидан олинган гладь тўқима I-вариант намунасининг узилиш кучи бўйига ҳосилали гладь II-вариантга намунасидан 10%га кам, III-вариант ластик намунасининг узилиш кучи бўйига IV-вариант интерлок намунасидан 34%га камлиги, гладь тўқима I-вариант намунасининг узилиш кучи энига ҳосилали гладь II-вариантга намунасидан 10%га кам, III-вариант ластик намунасининг узилиш кучи энига IV-вариант интерлок намунасидан 13%га камлиги аниқланди 3-расм.



3-расм. Трикотаж тўқималарининг узилиш кучининг ўзгариши.

Пан ипидан олинган гладь тўқима I-вариант намунасининг қайтар деформацияси бўйига ҳосилали гладь II-вариантга намунасидан 2%га кам, III-вариант ластик намунасининг қайтар деформацияси бўйига IV-вариант интерлок намунасидан 2%га кўплиги, гладь тўқима I-вариант намунасининг қайтар деформацияси энига ҳосилали гладь II-вариантга намунасидан 1%га кўп, III-вариант ластик намунасининг қайтар деформацияси энига IV-вариант интерлок намунасидан 1%га кўплиги аниқланди 5-расм.



5-расм.Трикотаж тўқималарининг қайтар деформацияси миқдорини ўзгариши.

Хулоса

1. Таклиф этилаётган трикотаж тўқима намуналариниг хаво ўтказувчанлик хусусиятлари I-вариант гладь тўқима намунаси II-вариант ҳосилали гладь намунасидан кўплиги, III-вариант ластик тўқима намунаси IV-вариант интерлок намунасидан кўплиги аникланган, бу эса I ва III-вариантлар намуналари иссиқлик сақлаш хусусияти юқори эканлигини кўрсатади.

2. Пан ипидан трикотаж тўқималарини илмий тадқиқоди махаллий хом ашёлардан кенг кўламда фойдаланиш имкониятини яратади.

3. Таклиф этилаётган трикотаж тўқималарини устки трикотаж махсулотлари ишлаб чиқариш учун тавсия этилади.

Использованные источники:

1. “Тўқимачилик ва тикув-трикотаж саноатини ривожлантиришни янги босқичга олиб чиқиш чора-тадбирлари тўгрисида” ги Президент Фармонigi (ПФ-71-сон, 01.05.2024 й.) https://kknews.uz
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ПОЛНОМОЧИЯ ПРОКУРОРОВ ПО ОСУЩЕСТВЛЕНИЮ НАДЗОРА ЗА ОРГАНАМИ ПРЕДВАРИТЕЛЬНОГО СЛЕДСТВИЯ

Аннотация: *В статье определено значение наделения прокуроров полномочиями по осуществлению надзора за органами предварительного следствия. Выявлены существующие в настоящее время проблемы правового регулирования указанной группы полномочий прокурора и предложены пути решения выявленных проблем путем внесения изменений и дополнений в действующее законодательство. В частности, пристальное внимание уделено проблеме отсутствия у прокурора полномочий по даче следователю обязательных указаний и проблеме получения прокурором материалов уголовного дела для ознакомления.*

Ключевые слова: *прокурорский надзор, предварительное следствие, процессуальная самостоятельность следователя, дача указаний, ознакомление с материалами дела.*

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PROSECUTOR'S AUTHORITY TO SUPERVICE THE PREMILINARY INVESTIGATION BODIES

Abstract: *The article defines the importance of endowing prosecutors with the authority to supervise the preliminary investigation bodies. It identifies the current problems of legal regulation of this group of prosecutor's powers and suggests ways to address these issues by amending and supplementing the current legislation. In particular, the article focuses on the lack of authority for the prosecutor to give mandatory instructions to the investigator and the issue of the prosecutor's access to the criminal case materials for review.*

Keywords: *prosecutorial supervision, preliminary investigation, procedural independence of the investigator, giving instructions, familiarization with the case materials.*

Поддержание законности и правопорядка в государстве и обществе требует применения совокупности средств, среди которых важное место

занимает контрольно-надзорная деятельность. К числу субъектов, наделенных полномочиями по надзору, относятся органы прокуратуры.

Прокурорский надзор может быть определен как особый вид государственной деятельности, реализуемый органами прокуратуры, направленный на надзор за соблюдением действующего законодательства различными субъектами, включая органы государственной власти и их должностных лиц, а также на выявление допущенных нарушений и принятие мер реагирования на них [1, с. 167].

Действующее законодательство предусматривает ряд видов прокурорского надзора. Одним из них является надзор за исполнением законов органами, которые осуществляют оперативно-розыскную деятельность, дознание и предварительное следствие.

Важность деятельности прокуроров по осуществлению надзора за органами предварительного следствия предопределяет тот факт, что данный вопрос привлекает пристальное внимание отечественных ученых. Среди авторов, чьи исследования посвящены указанному вопросу, могут быть названы такие ученые как Г.Д. Харебава, А.А. Попов, М.И. Щеглов, А.С. Жабкин и т.д.

Прокурорский надзор за процессуальной деятельностью органов предварительного следствия и дознания представляет собой деятельность, которую прокурор осуществляет на досудебных стадиях уголовного процесса, и которая заключается в обеспечении соблюдения норм действующего законодательства субъектами, осуществляющими предварительное расследование по уголовным делам, с целью обеспечения законности в сфере уголовного судопроизводства и реализации его назначения [2, с. 26].

В научной литературе выделяют следующие задачи, на реализацию которых направлен данный вид прокурорского надзора:

- обеспечение верховенства Конституции РФ;
- обеспечение реализации положений уголовно-процессуального законодательства;
- защита прав и интересов всех лиц, вовлеченных в уголовное судопроизводство;
- обеспечение надлежащего порядка производства следственных действий с тем, чтобы полученные в результате их проведения сведения имели в дальнейшем доказательственное значение и могли быть положены в основу приговора суда [3, с. 89].

Таким образом, характеризуемый вид прокурорского надзора имеет важнейшее значение. Благодаря нему создается дополнительный инструмент обеспечения и защиты прав личности, причем сказанное касается всех лиц, вовлекаемых в сферу уголовного судопроизводства, будь то субъекты со стороны защиты (подозреваемый и обвиняемый), субъекты со стороны обвинения (потерпевший), а также любые лица, не имеющие собственного интереса в исходе дела (например, свидетель). Кроме того, осуществление данного вида надзора способствует реализации принципов уголовного

судопроизводства, прежде всего, принципа презумпции невиновности. Наконец, данный вид надзора имеет своей целью обеспечить неотвратимость уголовной ответственности за совершенные преступления [4, с. 74].

Рассматриваемый вид надзора является средством недопущения нарушений уголовно-процессуального законодательства и их устранения, если они все же были допущены. Такие нарушения представляют большую опасность, поскольку могут создавать опасность привлечения к ответственности невиновного человека или, наоборот, избегания уголовной ответственности лицом, которое в действительности совершило преступление. Более того, некоторые такие нарушения сами могут являться преступлениями (в частности, в случае, когда они допускаются лицами, обладающими властными полномочиями в сфере уголовного процесса, например, по мотивам коррупционного характера, из ложно понятых интересов службы или просто по причине недобросовестного отношения к своим обязанностям) [5, с. 420].

В рамках осуществления надзора за деятельностью органов предварительного расследования на прокурора возлагаются следующие обязанности:

- осуществлять надзор единообразно за всеми органами, наделенным полномочиями в данной сфере, вне зависимости от ведомственной принадлежности таких органов;

- в случае установления фактов нарушения закона реагировать на них незамедлительно;

- обеспечивать своевременную реакцию на поступающие жалобы, с тем чтобы в кратчайшие сроки обеспечить восстановление прав, если таковые были нарушены;

- обеспечить законность процессуальных решений субъектов предварительного расследования (причем сказанное касается решения о возбуждении уголовного дела, решений, принимаемых в дальнейшем в ходе производства по такому делу, например, о применении мер процессуального принуждения, и наконец, решений, влекущих прекращение производства по делу);

- обеспечить законность проведения требуемых следственных действий [3, с. 90].

Следует отметить, что хотя законодательство о прокуратуре и объединяет надзор за органами, которые осуществляют дознание и предварительное следствие, в один вид прокурорского надзора, уголовно-процессуальное законодательство дифференцирует указанную деятельность прокурора. Это проявляется в том, что прокурор в настоящее время наделяется разным объемом полномочий в рамках предварительного следствия и дознания, и в последнем случае объем полномочий данного субъекта является значительно более широким.

Полномочия прокурора при проведении предварительного следствия были существенно сужены после того, как реализация данного вида

процессуальной деятельности была изъята у органов прокуратуры с передачей его Следственному комитету. В результате этой реформы прокурор утратил имевшиеся у него полномочия, позволявшие ему осуществлять руководство деятельностью следователя и контроль за нею (в настоящее время данные полномочия реализует руководитель следственного органа), в связи с чем прокурор сохранил лишь надзорные полномочия по отношению к данному субъекту уголовного процесса [6, с. 224].

Следует отметить, что существующее в настоящее время положение значительно больше соответствует законодательству о прокуратуре, чем прежнее, т.к. до указанной реформы между законодательством о прокуратуре и уголовно-процессуальным законодательством имело место противоречие по данному вопросу.

Дело в том, что ч. 2 ст. 21 Федерального закона «О прокуратуре Российской Федерации» предусматривает прямой запрет на подмену прокурором органов ведомственного контроля.

По сути деятельность прокурора по осуществлению надзора включает в себя два аспекта: во-первых, деятельность, связанную с выявлением допущенных нарушений закона, и, во-вторых, деятельность по реагированию на такие нарушения с целью их устранения. Инструментом последнего является применение средств и актов прокурорского реагирования.

В соответствии с этим определяются пределы прокурорского надзора. По отношению к деятельности следователя таковые определяются предметом соответствующего надзора. В свою очередь предмет прокурорского надзора можно определить как предусмотренный законодательством перечень вопросов, которые может проверять прокурор в рамках надзорной деятельности. Также упоминания заслуживает тот факт, что в свете упоминавшейся ранее недопустимости подмены прокурором при осуществлении надзора деятельности иных органов прокурор в настоящее время имеет возможности по выявлению допущенных следователем нарушений, но не обладает возможностями по их самостоятельному устранению [5, с. 421].

Уголовно-процессуальным кодексом РФ (УПК РФ) предусмотрен ряд полномочий прокурора в ходе досудебного производства по делу.

К ним относятся следующие полномочия:

- направлять материалы о выявленных прокурором фактах, которые могут свидетельствовать о совершенном преступлении, органам, уполномоченным возбуждать уголовные дела;

- в случае выявления нарушений, допущенных в ходе проверки сообщения о преступлении, требовать их устранения;

- проверять законность и обоснованность решений следователя или руководителя следственного органа и т.д. [6, с. 224]

Действующее законодательство возлагает на следователя обязанность по направлению прокурору ряда процессуальных документов. Представляется, что возложение на следователя указанной обязанности

представляет собой один из инструментов, позволяющих прокурору реализовывать предоставленные ему полномочия в сфере надзора [7, с. 131].

Речь, в частности, идет о таких документах, как постановление о возбуждении уголовного дела; постановление о принятии дела к производству; протокол задержания; постановление о привлечении в качестве обвиняемого; постановление о приостановке предварительного расследования.

Следует отметить, что в отношении некоторых из правоприменительных актов следователя прокурор имеет право их отменять, а в отношении других актов он таким правом не обладает. В частности, отмена прокурором допускается по отношению к акту, которым подводится итог доследственной проверке (при этом неважно, принял ли следователь решение возбудить уголовное дело или отказать в его возбуждении), и к актам, в соответствии с которым уголовное дело приостанавливается или прекращается. Данный перечень является исчерпывающим. Это означает, что если прокурор придет к выводу, что нарушения допущены при вынесении следователем иных правоприменительных актов, он должен использовать другие средства прокурорского реагирования [8, с. 243].

Правовое регулирование полномочий прокуроров по осуществлению надзора за органами предварительного следствия на сегодняшний день не лишено недостатков.

В качестве одной из таких проблем в научной литературе рассматривается крайне узкий перечень полномочий прокурора по воздействию на деятельность следователя. В частности, отмечается, что прокурор, даже если им выявлены допущенные следователем нарушения, не имеет возможности эффективно на них отреагировать [9, с. 260]. В частности, в настоящее время прокурор не обладает правом давать следователю указания, которые были бы обязательными для последнего. Например, прокурор не может императивно указать следователю на необходимость произвести то или иное следственное действие. В данном случае можно предположить, что наделение прокурора подобными полномочиями вступило бы в противоречие с таким элементом правового положения следователя как его процессуальная самостоятельность. В то же время необходимо учитывать, что в отдельных случаях законодатель наделяет прокурора правом дачи подобных указаний. Однако данное право может реализовываться прокурором лишь на этапе окончания предварительного следствия, а именно в том случае, если прокурор придет к выводу о наличии недостатков в обвинительном заключении, которое ему предлагается утвердить. В частности, в подобных случаях указания прокурора могут касаться изменения объема обвинения, изменения квалификации, устранения недостатков и т.д. Следовательно, отечественный законодатель не исключает полностью ограничение прокурором процессуальной самостоятельности следователя. По этой причине представляется логичным и целесообразным предоставление

прокурору права давать следователю обязательные указания на всех этапах досудебного производства по делу.

Еще одной проблемой, снижающей эффективность рассматриваемого направления деятельности прокурора, следует признать отсутствие у него законодательно гарантированной возможности истребования материалов уголовного дела с целью ознакомления с ними. Очевидно, что без ознакомления с материалами дела прокурор не может реализовывать возложенные на него обязанности по надзору за следствием с целью обеспечения законности. В то же время в настоящее время законодательство связывает получение прокурора материалов дела для ознакомления с направлением им письменного мотивированного запроса. При этом если письменная форма такого запроса является вполне логичной и обоснованной, то требование мотивировать такой запрос вызывает обоснованные нарекания. Во-первых, ввиду того, что ознакомление с материалами дела является непременным условием эффективного осуществления прокурорского надзора, вызывает недоумение факт того, что прокурор должен как-то дополнительно мотивировать необходимость такого ознакомления. Во-вторых, представляется, что для того, чтобы мотивировать свой запрос, прокурору уже необходимо быть осведомленным об обстоятельствах дела, что создает своего рода замкнутый круг. Наконец, предъявление прокурору требования мотивировать свой запрос приводит к выводу, что субъект, которому этот запрос адресован, должен обладать возможностью признать запрос немотивированным. В этом случае следователь как поднадзорный субъект получит возможность оценивать наличие оснований для осуществления надзора за ним самим, что является абсурдом. По этой причине необходимо закрепить в действующем законодательстве, что материалы уголовного дела должны предоставляться прокурору для ознакомления по его письменному запросу, без указания на мотивированность такого запроса.

Таким образом, необходимо сформулировать следующий вывод. Наделение прокуроров полномочиями по осуществлению надзора за органами предварительного следствия является важным средством обеспечения законности при производстве предварительного следствия и реализации назначения уголовного судопроизводства в целом. При этом, несмотря на высокую важность указанных полномочий прокурора, их правовое регулирование в настоящее время не лишено недостатков и нуждается в совершенствовании.

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РОЛЬ ПРОКУРАТУРЫ В ОБЕСПЕЧЕНИИ ИСПОЛНЕНИЯ ЗАКОНОВ ОРГАНАМИ ГОСУДАРСТВЕННОЙ ВЛАСТИ

Аннотация: *В статье определено значение надзора за исполнением законов, в том числе органами государственной власти, в системе прокурорского надзора. Проанализирован порядок проведения прокурорами проверки по поступившей информации о фактах нарушения норм закона. Также проведен анализ средств прокурорского реагирования, предусмотренных действующим законодательством. Выявлены проблемы, снижающие эффективность прокурорского надзора за исполнением законов, в том числе в деятельности органов государственной власти, а также сформулированы меры правового и организационного характера, реализация которых могла бы способствовать решению имеющихся проблем.*

Ключевые слова: *прокурорский надзор, проверка, протест прокурора, представление прокурора, постановление прокурора, предостережение.*

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THE ROLE OF THE PROSECUTOR'S OFFICE IN ENSURING THE ENFORCEMENT OF LAWS BY PUBLIC AUTHORITIES

Abstract*: The article defines the importance of supervision over the execution of laws, including by state authorities, in the system of prosecutorial supervision. The procedure for conducting inspections by prosecutors based on information received about violations of the law is analyzed. An analysis of the means of prosecutorial response provided for by current legislation has also been carried out. The problems that reduce the effectiveness of prosecutorial supervision over the implementation of laws, including in the activities of public authorities, have been identified, and legal and organizational measures have been formulated, the implementation of which could contribute to solving existing problems.*

Keywords*: prosecutor's supervision, verification, prosecutor's protest, prosecutor's representation, prosecutor's decision; warning.*

Одним из важнейших направлений деятельности органов прокуратуры является прокурорский надзор. Прокурорский надзор может быть определен как осуществляемая органами прокуратуры от имени российского государства деятельность, направленная на обеспечение законности и верховенства закона, защиту интересов личности, организаций, общества и государства, для реализации которой действующее законодательство наделяет органы прокуратуры совокупностью полномочий по выявлению нарушений закона и реагированию на них.

Прокурорский надзор реализуется по целому ряду направлений, одним из которых является надзор за исполнением законов. Для обозначения данного направления прокурорского надзора в научной литературе также нередко используется термин «общий надзор».

При этом общий надзор обоснованно признается важнейшим направлением прокурорского надзора. Это связано с тем, что он охватывает практически все сферы общественных отношений, урегулированных нормами права, тем самым обеспечивая поддержание законности во всех сферах жизни общества. В рамках общего надзора осуществляется обеспечение соблюдения норм практически всех отраслей действующего законодательство (исключение составляют лишь процессуальные отрасли и уголовно-исполнительное законодательство). В частности, в рамках общего надзора обеспечивается и законность в деятельности органов государственной власти [1, с. 29].

Такое направление прокурорского надзора как общий надзор (в том числе и в сфере деятельности органов государственной власти) направлен на реализацию следующих задач:

- выявление фактов нарушения закона;
- принятие мер, направленных на устранение таковых;
- установление лиц, которыми допущены такие нарушения;
- принятие мер к тому, чтобы такие лица понесли юридическую ответственность того или иного вида;
- выявление причин и условий, которые способствовали установленному нарушению;
- принятие мер к устранению таких причин и условий;
- принятие мер, направленных на недопущение таких нарушений в будущем.

Как и любое другое направление прокурорского надзора, общий надзор обладает определенными объектом и предметом.

Объектом рассматриваемого направления прокурорского надзора могут быть:

- деятельность органов исполнительной власти федерального уровня;
- деятельность Следственного комитета РФ;
- деятельность органов государственной власти регионального уровня (как представительных, так и исполнительных);
- деятельность органов местного самоуправления;

- деятельность органов военного управления;
- деятельность органов контроля;
- деятельность субъектов общественного контроля за местами принудительного содержания;
- деятельность должностных лиц перечисленных органов;
- деятельность органов управления и руководителей коммерческих и некоммерческих организаций;
- издаваемые перечисленными субъектами правовые акты.

Предметом прокурорского надзора за исполнением законов выступает надзор за соблюдением норм Конституции РФ, исполнением законов и соответствием издаваемых поднадзорными органами власти и должностными лицами нормативно-правовых актов действующему законодательству.

Рассматриваемый вид прокурорского надзора имеет важное практическое значение. Это связано с тем, что количество нарушений, выявляемых в ходе осуществления общего надзора, ежегодно исчисляется сотнями тысяч. Указанные нарушения касаются в основном правовых норм о правовом статусе личности, правовых норм, направленных на регулирование экономических отношений и отношений в сфере природопользования и т.д. [2, с. 79]

Ввиду высокой важности общего прокурорского надзора он неизменно привлекает пристальное внимание ученых. В частности, изучению прокурорского надзора за исполнением законов посвящены труды таких ученых как А.П. Стуканов, К.Ю. Винокуров, Н.Н. Макеев, С.П. Желтобрюхов, Т.И. Отечская и т.д.

На регулирование общего надзора направлены нормы главы 1 раздела III Федерального закона «О прокуратуре Российской Федерации».

Рассмотрим подробнее полномочия прокурора в рамках осуществления надзора за исполнением законов органами государственной власти.

В том случае, если прокурору поступила информация о факте нарушения закона, он вправе провести проверку указанной информации. Условием проведения такой проверки является невозможность применения иных средств для того, чтобы имеющаяся у прокурора информация была подтверждена или опровергнута.

Следует также отметить, что хотя проверка проводится применительно к факту конкретного нарушения, прокурор вправе выйти за указанные рамки. Это возможно в том случае, если он придет к выводу о том, что в деятельности соответствующего органа допущено не единичное нарушение, а, напротив, такие нарушения приобрели распространенный или систематический характер.

Придя к выводу о необходимости проверки, прокурор принимает соответствующее решение. Руководитель органа, в котором решено провести проверку, уведомляется об этом, причем такое уведомление должно быть сделано самое позднее в тот день, когда проверка будет начата. При этом он

должен быть уведомлен о том, что послужило основанием проверки, какова ее цель, каков ее предмет.

По общему правилу продолжительность проверки не должна превышать 30 дней. В то же время допускается продление указанного срока на такое же количество дней. Если и в этом случае продолжительность проверки оказалась недостаточной, новое продление может осуществляться только Генеральным прокурором или его заместителем.

В научной литературе обоснованно отмечается, что правовое регулирование проверок, осуществляемых в рамках общего прокурорского надзора, в настоящее время характеризуется пробельностью, что в свою очередь негативно отражается на эффективности таких проверок [3, с. 48]. Решению данной проблемы способствовало бы закрепление легальной дефиниции прокурорской проверки и более подробное регулирование порядка осуществления проверочных мероприятий.

Прокурор, осуществляя общий надзор, не подменяет собой аналогичную деятельность иных субъектов. При этом он вправе затребовать проведения проверок, ревизий у министерств в отношении подведомственных им учреждений и органов и у контролирующих организаций – в отношении подконтрольных им субъектов.

В то же время в научной литературе обоснованно отмечается, что множественность предмета прокурорского надзора неизбежно приводит к тому, что во многих случаях прокурорский надзор пересекается с контрольно-надзорной деятельностью иных органов. По этой причине особую важность приобретает предотвращение коллизий в правовом регулировании соответствующих полномочий, с тем чтобы прокуратура и другие надзорные институты не подменяли друг друга и не препятствовали деятельности друг друга, а, напротив, слаженно обеспечивали верховенство закона в различных сферах. Однако в настоящее время законодательство не предусматривает четких критериев, позволяющих разграничить прокурорский надзор и контрольно-надзорную деятельность, осуществляемую иными органами. Выходом из данной ситуации отчасти является направление прокурором в адрес иных контролирующих субъектов требования о проведении контрольного (надзорного) мероприятия [1, с. 30-31].

Общий надзор осуществляется органами прокуратуры на основании определенной методики. Методика прокурорского надзора может быть определена как совокупность методов и приемов, которые используют в своей деятельности прокуроры для выявления фактов нарушения законов, устранения таковых и предупреждения их в будущем. Помимо общей методики, которая распространяет свое действие на всю надзорную деятельность прокуратуры, каждому направлению прокурорского надзора, включая общий надзор, присуща и частная методика [4, с. 50].

Получив сведения о факте нарушения законов, в том числе и в деятельности органов государственной власти, прокурор должен установить:

- какая именно норма действующего законодательства нарушена;

- какие обстоятельства должны быть установлены в ходе проверки;

- есть ли основания для проведения проверки органами прокуратуры.

Если последние отсутствуют, прокурор направляет имеющуюся информацию в контролирующий орган с тем, чтобы проверка была проведена им. При этом прокурор вправе проконтролировать, было ли контролирующим органом осуществлено реагирование на полученные им сведения.

В ходе осуществления общего надзора прокурор обладает следующими полномочиями:

- беспрепятственно получать доступ на территорию объектов (органов, учреждений и т.д.), в отношении которых осуществляется надзор. Для реализации данного полномочия прокурору требуется только предъявить удостоверение;

- знакомиться с документами соответствующих органов, в том числе требовать от их руководителей предоставить документы, статистические отчеты и т.д.;

- вызывать должностных лиц и граждан, если требуется получить их объяснение.

В процессе осуществления общего надзора прокурор вправе применять следующие средства реагирования.

1. Протест. Данное средство реагирования применяется в тех случаях, когда поднадзорным субъектом был издан нормативно-правовой акт, не соответствующий закону.

Реализует данное средство реагирования прокурор или его заместитель.

Протест направляется либо самому субъекту, от которого исходит не соответствующий закону правовой акт (т.е. принявшему его органу власти или должностному лицу), либо вышестоящему органу или должностному лицу.

В научной литературе обоснованно отмечается, что эффективность использования рассматриваемого средства прокурорского реагирования напрямую зависит от того, будет ли органами прокуратуры осуществляться контроль за рассмотрением протестов прокуроров. В настоящее время необходимость осуществления такого контроля получила закрепление лишь на подзаконном уровне, а именно в актах Генеральной прокуратуры РФ [5, с. 143-144].

В то же время представляется, что с целью повышения эффективности использования такого средства прокурорского реагирования как протест целесообразно закрепление в нормах федерального закона положения о том, что прокурор обязательно принимает участие в рассмотрении протеста. В этом случае прокурор будет иметь возможность пояснить причины внесения протеста и проконтролировать принятие мер реагирования на него.

Следует также учитывать, что прокурор, выявив существование не соответствующего закону правового акта, может также прибегнуть к судебному способу восстановления законности, т.е. обратиться в суд общей юрисдикции или арбитражный суд.

2. Представление. Целью использования данного средства реагирования является устранение выявленных прокурором нарушений. В соответствии с этим представление вносится тому органу власти или должностному лицу, которое имеет необходимые для устранения нарушения полномочия.

Указанные орган или должностное лицо обязаны рассмотреть такое представление незамедлительно. Если речь идет о коллегиальном органе, с этой целью проводится заседание, о дате которого должно быть сообщено прокурору. Далее в течение одного месяца с того момента, как прокурор использовал рассматриваемое средство реагирования, он должен быть проинформирован о том, какие меры были приняты в связи с его представлением, и какие результаты эти меры повлекли.

3. Постановление. Данное средство реагирования используется прокурором в следующих случаях:

- если им выявлены факты, дающие основания полагать, что совершено административное правонарушение - в данном случае постановлением прокурора возбуждается соответствующее дело;

- если им выявлены факты, дающие основания полагать, что совершено преступление - в этом случае постановлением прокурора соответствующие материалы передаются в орган, который вправе возбудить уголовное дело.

4. Предостережение о недопустимости нарушения закона. Данное средство реагирования характеризуется значительной спецификой, поскольку носит исключительно превентивный характер. Иными словами, если прочие средства реагирования применяются в случаях, когда нарушение уже совершено, то рассматриваемое средство применяется в случае, когда прокурору поступает информация о том, что такое нарушение еще только готовится.

В этом случае прокурор (его заместитель) направляет соответствующее предостережение в письменной форме. В этом предостережении должно содержаться указание на конкретную норму закона, по поводу готовящегося нарушения которой применяется данное средство реагирования, и указание на недопустимость ее нарушения.

Завершая рассмотрение роли прокуратуры в обеспечении исполнения законов органами государственной власти, следует отметить, что на эффективности указанной деятельности в настоящее время негативно сказывается недостаточность цифровизации деятельности прокуратуры. В связи с этим повышению эффективности как прокурорского надзора в целом, так и общего надзора в частности, способствовало бы более широкое внедрение цифровых технологий в деятельность прокуратуры, создание единой информационной системы надзора, обучение сотрудников работе с указанной системой [6, с. 111-112].

Таким образом, необходимо сформулировать следующий вывод. Прокурорский надзор за исполнением законов, именуемый также общим надзором, является важным средством обеспечения законности практически во всех сферах жизни российского общества. Сказанное в полной мере

касается и органов государственной власти. В то же время в настоящее время существует необходимость в повышении эффективности указанного направления прокурорского надзора, для чего требуется реализация мер как правового, так и организационного характера.

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АНАЛИЗ ПО СТРУКТУРЕ И МЕТОДАМ ПОЛУЧЕНИЯ ТРИКОТАЖНЫХ ПОЛОТЕН С ВЫСОКИМ ТЕПЛОЗАШИТНЫМИ СВОЙСТВАМИ

Аннотация: *Отрасли трикотажного производства различаются по структуре и типу выпускаемой продукции. В статье приведены сведения трикотажных полотен с высокими теплозащитными свойствами.*

Ключевые слова: *трикотаж, способ, одежда, теплозащита, ассортимент, материал.*

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ANALYSIS OF THE STRUCTURE AND METHODS OF OBTAINING KNITTED FABRICS WITH HIGH THERMAL PROTECTIVE PROPERTIES

Annotation: *Knitwear manufacturing industries vary in structure and product type.This article provides information on knitted fabrics with high thermal insulation properties.*

Keywords: *knitwear, method, clothing, thermal protection, assortment, material.*

Иссиқлик сақлаш хусусияти юқори бўлган трикотаж маҳсулотлари мода йўналишига мос, ташқи кўриниши чиройли, пишиқ, деформация хусусиятига эга бўлиши керак. Ушбу трикотаж маҳсулотларини ишлаб чиқаришда табиий ва аралаш, сунъий юқори хажмдор таркибий тузилишдаги ип ва калава иплардан кенг қўлланилиб келинмоқда. Соҳа олимлари ва ишлаб чиқариш корхоналари билан биргаликда хом ашё сарфи кам бўлган, янги трикотаж маҳсулотлари ассортиментини ишлаб чиқаришнинг технологик жараёнлари ва усули тадқиқ этилмоқда. Истиқболда машинанинг иш унумдорлигини ва юқори сифатга эга бўлган маҳсулотлар ҳажмини ошириш, матога сарфланадиган хомашёни максимал тежаш ва маҳсулот таннархини камайтириш йўналишлари долзарб масалага айланиб бормоқда [1-3].

Трикотаж саноати, тўқимачилик саноатининг муҳим тармоғи ҳисобланади. Мақолада трикотаж саноатида мавжуд бўлган иссиқлик сақлш хусусиятлари юқори бўлган тўқималарининг тузилиши ҳамда уларни олиш усулларига оид маълумотлар келтирилган.

Иссиқлик сақлаш ҳусусиятлари юқори бўлган трикотаж тўқимасининг фойдаланиш доирасини кенгайтириш, маҳсулот сифатини ошириш, ассортимент турини кенгайтириш ва замонавий тўқув машиналари имкониятларидан тўлиқ фойдаланиш бўйича ҳам бир қатор тадқиқот ишлар [4,5] олиб борилганлиги аниқланди ва улар таҳлил қилинди. Таҳлил натижаларидан маълум бўлдики, тўқималарнинг технологик кўрсаткичлари ва физик–механик хусусиятлари тўлиқ ўрганилмаган ва аниқ тавсиялар келтирилмаган.

Иссиқлик сақлаш ҳусусиятлари юқори бўлган трикотаж тўқималарини ишлаб чиқариш ва янги тузилишдаги тўқималар яратиш борасида доцент А.Э. Исабоевнинг тадқиқот ишларида икки игнадонли айлана тўқув машиналарида хом ашёни тежаш усули билан иссиқлик сақлаш ҳусусиятлари юқори бўлган трикотажни олиш технологияси яратилган [6]. Муаллиф трикотаж тўқимасини ишлаб чиқаришда хом ашё сарфини тежашнинг янги усулини яратди.

Навбатдаги ишда донали трикотаж маҳсулотларини ясси игнадонли машиналарда олиш ва улардан маҳсулот тайёрлаш билан боғлиқ бўлган имкониятлар ўрганиб чиқилган [7].

Таҳлил қилинаётган ишда [8] пресс, жаккард ва аралаш тўқималар асосида иссиқлик сақлаш ҳусусиятлари юқори бўлган трикотаж тўқималарини олишда шакл сақлаш хусусиятини яҳшилаш технологияси ишлаб чиқилган. Таклиф қилинган технология маҳсулот ассортимент

турларини ва трикотаж тўқув машинасининг технологик имкониятларини кенгайишига олиб келди.

Инглиз ихтирочилари [9] илгакли игнали айлана игнадонли трикотаж тўқув машиналарида иссиқлик сақлаш ҳусусияти юқори бўлган трикотаж тўқишнинг янги усулини таклиф қилишган. Таклиф қилинган усул бўйича тўқиладиган тўқима шахмат тарзида алмашиб келувчи биттали (асос) ҳалқалар ва (ёпқичли) иккитали ҳалқалардан иборат.

Трикотаж маҳсулотлари ассортиментларини кенгайтириш ва сифатини яхшилаш мақсадида [10] ҳосилали ластик тўқимаси асосида, ташқи кўринишини ва қўлланилиш кўламини кенгайтириш, [11] пресс тўқимаси асосида, шакл сақлаш хусусиятларини ошириш, [12] жаккард тўқимаси асосида, [13] арқоқ тўқимаси асосида, иссиқлик сақлаш ҳусусиятлари юқори бўлган трикотаж тўқималарини олиш тавсия қилинган.

Иссиқлик сақлаш ҳусусиятлари юқори бўлган трикотаж тўқималарига қўйилган талаблар ортиб бормоқда. Шу муносабат билан, ҳом ашёларни чуқур қайта ишлаш, трикотаж машиналарининг технологик имкониятларидан кенг фойдаланиб, янги тузилишдаги иссиқлик сақлаш хусусиятлари юқори бўлган тўқималарнинг ассортимент турларини кенгайтириш бугунги кунда долзарб ҳисобланади.

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ИССИҚЛИК САҚЛАШ ҲУСУСИЯТИ ЮҚОРИ БЎЛГАН ТРИКОТАЖ ТЎҚИМАЛАРИНИ ОЛИШДА ҲОМ АШЁ САРФИНИ КАМАЙТИРИШ УСУЛЛАРИ

Аннотация: *Мақолада иссиқлик сақлаш ҳусусияти юқори бўлган трикотаж тўқималарини ишлаб чиқаришда ҳом ашё сарфини камайтириш усуллари ҳақида сўз боради.*

Калит сўзлар: *трикотаж, усул, ҳусусият, тўқима, иссиқлик сақлаш, ҳом ашё.*

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A METHOD FOR REDUCING RAW MATERIAL CONSUMPTION IN THE PRODUCTION OF KNITTED FABRICS WITH HIGH THERMAL PROTECTIVE PROPERTIES

Annotation: *The article discusses methods for reducing raw material consumption in the production of knitted fabrics with high thermal insulation properties.*

Keywords: *knitwear, method, properties, fabric, heat retention, raw materials.*

Трикотаж маҳсулотларининг сифати асосан, ишлаб чиқариш жараёнида шаклланади. Бунда қўлланиладиган хомашё ва ишлаб чиқарилаётган трикотаж тўқималарининг сифат кўрсаткичлари муҳим аҳамият касб этади [1,2].

Юқоридаги ишларни амалга оширишда соҳа олимлари ва ишлаб чиқариш корхоналари билан биргаликда хомашё сарфи кам бўлган, янги трикотаж маҳсулотлари ассортиментини ишлаб чиқаришнинг технологик ҳолатини тадқиқ этмоқдалар. Давлат иқтисодиётини ривожлантиришда ишлаб чиқариш сектори катта роль ўйнайди. Бунга япон олимлари томонидан ҳам катта эътибор қаратилган [3].

Технология ва техника ривожланиб боргани сари, трикотаж маҳсулотларини ишлаб чиқаришда тикиш жараёни камайиб бормоқда. Бунга, трикотаж маҳсулотларини мунтазам усулда ишлаб чиқариш ҳисобига эришилмоқда [4].

Трикотаж маҳсулотларини ишлаб чиқаришда хомашё сарфини камайтиришнинг иккита асосий йўналиши белгилаб олинди:

- мато бирлигига нисбатан хомашё сарфини камайтириш;
- барча технологик жараёнлар бўйича ишлаб чиқариш чиқиндиларини камайтириш.

Чизиқли зичлиги кам бўлган тўқимачилик ипларидан фойдаланиш хомашё сарфи ва трикотаж тўқима структурасининг ўзгаришига таъсир кўрсатади. Трикотаж машиналарининг классига мос равишда юза зичлиги бўйича бир-биридан фарқ қиладиган, трикотаж тўқимасининг турли вариантларини олиш мумукин.

Трикотаж тўқимасининг юза зичлик кўрсаткичини камайтиришнинг кейинги йўли горизонтал ва вертикал бўйича ҳалқа зичликларини ўзгартириб мато ишлаб чиқаришдир[5-7]. Олиб борилган илмий тадқиқот натижалари асосида трикотаж тўқимаси юза зичлигининг камайиши, унинг мустаҳкамлик хусусиятларига салбий таъсир этмайди [8-10].

Тукли трикотажнинг технологик кўрсаткичларига асос тўқима тузилишининг таъсирини ўрганиш бўйича олиб борилган илмий ишлар натижаларининг таҳлили шуни кўрсатдики, бунда тукли трикотаж тузилишига прессли ҳалқалар киритилганда, трикотажнинг юза зичлиги асос тўқимага нисбатан 3,6% га, прессли ҳалқалар киритилганда эса, 4,9% га юза зичлик ошганлиги маълум бўлди. Тукли трикотаж таркибида жаккард ҳалқалари 10% гача оширилганда, тукли трикотажнинг ҳажмий зичлиги камайган. Ажур ҳалқалари 10% гача ортиши билан, трикотажнинг ҳажм зичлиги камайиб борган [11].

Россиянинг трикотаж ишлаб чиқариш илмий текшириш институти олимлари томонидан олиб борилган илмий ишлар асосида трикотаж маҳсулотларини ишлаб чиқаришда ҳомашё сарфи кам, янги тузилишга эга бўлган тўқималарни яратиш учта йўналиш бўйича олиб борилиши аниқланган:

-икки игнадонли трикотаж машиналарида енгил, икки қаватли тўқималарни олиш;

-бир игнадонли машиналарда енгил, бир қаватли тўқималарни олиш;

-икки игнадонли машиналарда енгил, бир қаватли тўқималарни олиш.

Трикотаж ишлаб чиқариш корхоналарида маҳсулот бирлигига нисбатан тўқимачилик иплари сарфини камайтириш бўйича кўплаб илмий тадқиқот ишлари олиб борилмоқда. Хомашё сарфи камайтирилган трикотаж тўқималарини ишлаб чиқариш бўйича ресурстежамкор технологиялардан фойдаланишда амалий кўникмалар ўрганилган. Бироқ, трикотаж технологияси назариясида амалий тажриба ва илмий асослар етарли даражада эмас. Иссиқлик сақлаш хусусияти юқори бўлган трикотаж тўқималарини олиш усуллари етарлича ўрганиб чиқилмаган. Ҳозирги кунда иссиқлик сақлаш ҳусусияти тўқималар таркибига тузилиши бўйича асос ва тукли тўқима элементларини қўллаб ишлаб чиқарилмоқда. Бу эса, ўз навбатида нафақат трикотаж машиналарида, балки кейинги жараёнларда ҳам ортиқча технологик жараённи бажарилишига ва иш унумдорлигини камайишига таъсир этишига олиб келмоқда. Ваҳоланки, бугунги кунда иссиқлик ва шакл сақлаш хусусиятлари юқори бўлган трикотаж тўқималарига қизиқиш катта.

Юқорида келтирилган омилларни қисман бартараф этишда трикотаж тўқималарини ортиқча тукли элементларсиз, трикотаж машиналарини эса, иш унумдорлигиа таъсир этмасдан ишлаб чиқариш муҳим аҳамиятга эга. Шу мақсадда иссиқлик сақлаш хусусиятлари юқори бўлган янги тузилишли трикотаж тўқималарининг олиш технологиясини такомиллаштириш долзарб ҳисобланади.

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ИССИҚЛИК САҚЛАШ ҲУСУСИЯТИ ЮҚОРИ БЎЛГАН ТРИКОТАЖ ТЎҚИМАЛАРИНИ ОЛИШ УСУЛИ

Аннотация: *Мақолада ясси игнадонли трикотаж машинасининг технологик имкониятларидан келиб чиқиб, иссиқлик сақлаш ҳусусияти юқори бўлган трикотаж тўқималарини олиш усули ёритилган.*

Калит сўзлар: *трикотаж, усул, ҳусусият, тўқима, технология.*

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A METHOD FOR PRODUCING KNITTED FABRICS WITH HIGH HEAT-PROTECTIVE PROPERTIES

Annotation: *This article describes a method for producing knitted fabrics with high thermal insulation properties, using the technological capabilities of a flat knitting machine.*

Keywords: *knitwear, method, properties, fabric, technology.*

Трикотажнинг функционал хусусиятларини такомиллаштириш, хусусан, иссиқлик сақлаш ҳусусиятини ошириш бугунги кунда махсус кийимлар, спорт формалари, ташқи муҳитга мослашувчи технологиялар ва тиббий текстил соҳаларида муҳим ўрин тутади. Иссиқлик сақлаш

хусусиятини таъминлаш учун нафақат хом ашёнинг таркиби, балки тўқиманинг тузилиши, ишлаб чиқариш технологияси ва термик ҳолат билан боғлиқ кўплаб омиллар ҳисобга олинади.

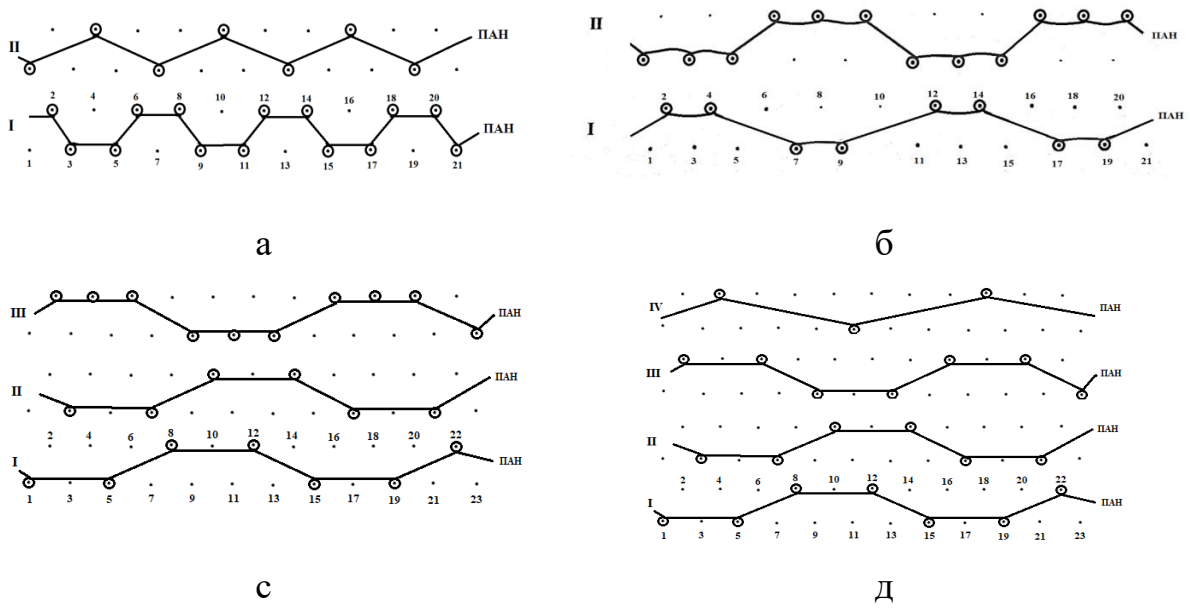
Трикотаж тўқималарнинг иссиқлик сақланишига катта таъсир кўрсатадиган яна бир муҳим омил-тўқиманинг тузилиши ва зичлиги ҳисобланади [1,2]. Трикотаж тўқима ассортиментлари кундан-кунга кенгайиб бормоқда. Ҳозирги ишлаб чиқариш ва истеъмолчилар томонидан маҳсулотга қўйилган талаблар жуда юқори. Бу айниқса иссиқлик сақлаш ҳусусияти юқори бўлган трикотаж маҳсулотлари учун ҳам аҳамиятли омилдир.

Трикотаж тўқимасини олишнинг ресурстежамкор технологиясини ишлаб чиқиш, сифат кўрсаткичларини тадқиқ этиш, ассортимент турини кенгайтириш, ҳамда янги тузилишга эга бўлган трикотаж тўқималарини олиш технологиясини такомиллаштириш ҳисобига, трикотаж тўқув машиналарининг технологик имкониятларини кенгайтириш, тўқимачилик саноати олдида турган илмий-амалий муаммолардан биридир [3,4].

Юқоридаги муаммоларни қисман бўлсада ечиш мақсадида иссиқлик сақлаш ҳусусияти юқори бўлган трикотаж тўқималарини олиш усули ишлаб чиқилди. Трикотаж тўқималари STOLL русумли ясси игнадонли трикотаж машиналарида полиакрилонитриль ипидан тўқиб олинди. Намуналар бир-биридан тўқима тузилиши ва раппорти (1-расм) билан фарқланади. Намуналарни олишда трикотаж машинаси игналарини ластикли тартибда жойлаштириш усули орқали, тўртта вариант ишлаб чиқарилди [5,6].

Иссиқлик сақлаш ҳусусияти юқори бўлган трикотаж тўқимасининг биринчи вариантини ишлаб чиқаришда трикотаж машина кареткаси ҳаракатланиб, олд игнадоннинг 3,5,9,11,15,17,21 игналари ҳамда орқа игнадоннинг 2,6,8,12,14,18,20 игналарида ҳалқа ҳосил қилиш жараёни бажарилади. Бунда ип берувчи мослама ёрдамида полиакрилонитриль ипидан икки қаватли ҳалқа қаторини шакллантиради. Натижада, олд ва орқа игнадоннинг ҳалқа ҳосил қилиш жараёнида иштирок этган тўқув игналарида полиакрилонитриль ипидан хар иккита ҳалқадан сўнг битта игна оралаб намунанинг биринчи қатори шаклланади (1-расм, а). Намунанинг иккинчи қаторини олишда олд игнадоннинг 1,7,13 ва 19 игналарида олд ҳалқалар, орқа игнадоннинг 4, 10 ва 16 игналарида орқа ҳалқалар шаклланади ва улар ўзаро бир-бир билан протяжкалар орқали боғланади.

Трикотаж тўқимасининг иккинчи вариантида олд ва орқа игнадонларда учта игна оралатиб, иккита кетма-кет ҳалқа ҳосил қилиш йўли билан намуна шакллантирилди. Трикотаж тўқимасининг II қаторини тўқиб олишда олд игнадоннинг 1,3,5 ва 11,13,15 игналарида олд ҳалқалар, орқа игнадоннинг 6,8,10 ва 16,18,20 игналарида орқа ҳалқалар ўзаро бир-бир билан протяжкалар орқали боғлаб шаклланади (1-расм, б). Натижада янги технология асосида олинган умумий раппорти 2-қатордан ташкил топган янги тузилишли иссиқлик сақлаш ҳусусияти юқори бўлган трикотаж тўқимасининг II варианти ишлаб чиқарилди.



1-расм. Иссиқлик сақлаш ҳусуситяи юқори бўлган трикотаж тўқималарининг графикли ёзуви.

Трикотаж тўқимасининг III вариантини тўқиб олишда намуна раппортига мос равишда олд ва орқа игнадоннинг 1,5 ва 15,19, 8, 12 ва 22 тўқув игналарида ҳалқалар шаклланади ва улар ўзаро бир-бир билан протяжкалар орқали боғланади. Трикотаж тўқимасининг II қаторини тўқиб олишда тўқув игналарига ип узатишда тўртта игнага силжитиб жойлаштириб, битта игна оралаб ҳалқа ҳосил қилиш йўли билан ишлаб чиқарилиши орқали аҳамиятлидир (1-расм, с). Трикотаж тўқимасининг III қаторини тўқиб олишда учинчи қатор раппортига мос равишда олд ва орқа игнадоннинг танланган игналарида ҳалқа ҳосил қилади.

Иссиқлик сақлаш ҳусусияти юқори бўлган трикотаж тўқимасининг IV вариантида намунанинг I ва II қаторларини тўқиб олиш жараёни ҳудди III вариантни I ва II қаторларини тўқиб олиш жараёни каби бажарилади. Намунанинг III қаторини тўқиб олишда полиакрилонитрил ипидан намуна раппортига мос равишда олд ва орқа игнадоннинг танланган игналарида кетма-кет ҳалқа ҳосил қилади ва улар ўзаро бир-бир билан протяжкалар орқали боғланади. Трикотаж тўқимасининг IV қаторини тўқиб олишда ип узатишда олтита игнага силжитиб жойлаштириб, битта игнада ҳалқа ҳосил қилиш йўли билан протяжкалар орқали боғлаб ҳосил қилиниши билан аҳамиятли.

Трикотаж машинасининг технологик имкониятларидан фойдаланиб. полиакрилонитрил ипидан тузилиши билан бир-биридан фарқланадиган иссиқлик сақлаш ҳусусияти юқори бўлган трикотаж тўқималарини олиш усули ишлаб чиқилди. Ишлаб чиқарилган иссиқлик сақлаш ҳусусияти юқори бўлган намуналар устки маҳсулот ассортиментига тавсия этилди.

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ИССИҚЛИК САҚЛАШ ҲУСУСИЯТИ ЮҚОРИ БЎЛГАН ТРИКОТАЖ ТЎҚИМАЛАРИНИ ҚАЛИНЛИК КЎРСАТКИЧИ ТАДҚИҚИ

Аннотация: *Мақолада ясси игнадонли трикотаж машиналарида ишлаб чиқарилган иссиқлик сақлаш ҳусусияти юқори бўлган трикотаж тўқималарининг қалинлик кўрсаткичи тадқиқи келтирилган.*

Калит сўзлар: *трикотаж, машина, иссиқлик сақлаш, кўрсаткич, қалинлик, мато.*

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STUDY OF THICKNESS INDICATOR OF KNITTED FABRICS WITH HIGH THERMAL PROTECTIVE PROPERTIES

Annotation: *The article presents research on the thickness of knitted fabrics with high thermal insulation properties produced on flat knitting machines.*

Keywords: *knitwear, machine, heat retention, indicator, thickness, fabric.*

Республика тўқимачилик ва тикув-трикотаж саноатининг инвестицион жозибадорлигини ва рақобатбардошлигини янада ошириш, соҳанинг экспорт салоҳиятини янада кенгайтириш, маҳаллий тўқимачилик маҳсулотларининг

хорижий бозорларга кенгроқ кириб бориши учун шароитлар яратиб борилмоқда [1].

Тўқимачилик ва тикув-трикотаж саноатини янги сифат босқичига олиб чиқишнинг асосий йўналишлари этиб қуйидагилар белгиланди: газлама, трикотаж мато ишлаб чиқариш ва бўяш ҳажмини ошириш, республикани «тўқимачилик хаби»га айлантириш ва бошқалар. Юқоридаги масалалрни ижобий ечишда бир қанча йўналишларда илмий тадқиқот ишлари олиб борилмоқда. Жумладан, трикотажнинг структураси ўзгартирилиши орқали, яъни мавжуд асосий тўқув усулларининг янги комбинациялари ёки турли хом ашё турларидан фойдаланиш, янги авлод трикотаж машиналарини қўллаш кабилар [2].

Шунингдек, олдиндан белгиланган хусусиятларга эга бўлган янги ишлаб чиқариш усуллари ва технологияларини яратиш ёки такомиллаштириш ҳам ижобий самара беради. Тадқиқотлар давомида тўқима тузилиши, раппорти ва қаторлар сонини ошириш ҳисобига трикотажнинг қалинлигини яҳшилаш масаллари кўриб чиқилди. Асосий мақсад эса, трикотаж тўқималарининг иссиқлик сақлаш ҳусусиятларини оширишдан иборат.

Тадқиқотлар давомида трикотаж тузилиши ўзгаришини қалинлик кўрсаткичига таъсири тадқиқ этилди. Намуналар 56 tex x 3 чизиқли зичликка эга бўлган полиакрилонитрил ипидан 4 та вариант ишлаб чиқарилди. Иссиқлик сақлаш ҳусусияти юқори бўлган трикотаж тўқималарининг қалинлик кўрсаткичи “KOR-UZ” технопарки синов лабораториясида стандарт услубда аниқланиб, натижалар 1-жадвалда келтирилди.

1-жадвал.

Иссиқлик сақлаш ҳусуситяи юқори бўлган трикотаж тўқималарининг қалинлик кўрсаткичлари

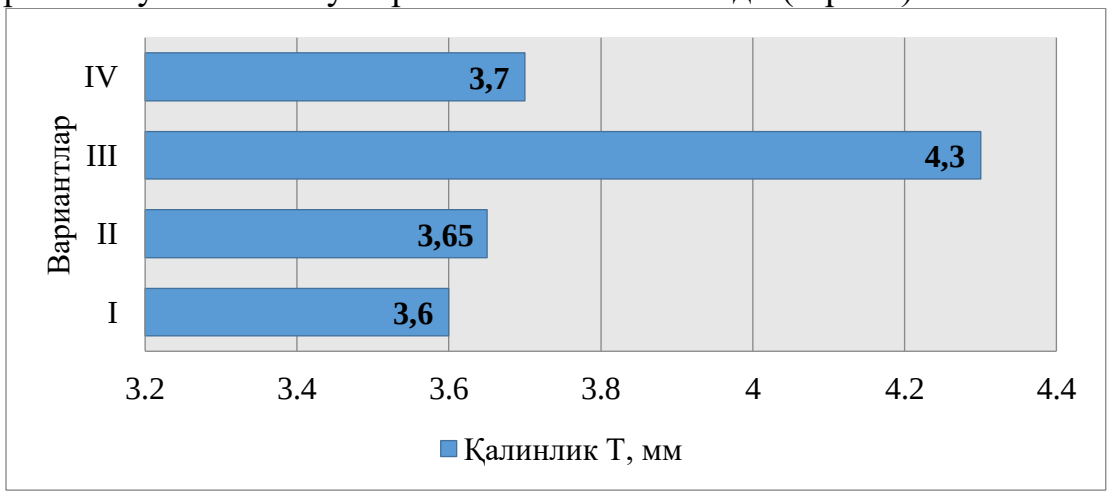
Кўрсаткичлар	Вариантлар			
	I	II	III	IV
Ипларни тури, чизиқли зичликлари ва матодаги % миқдори	ПАН ипи 56 x 3 tex			
Трикотажнинг қалинлиги T, mm	3,6	3,6	4,3	3,7

Унга кўра, трикотаж тўқималарининг асосий технологик кўрсаткичларидан бири бўлган қалинлик кўрсаткичи аниқланиб, иссиқлик сақлаш ҳусусиятига таъсири ўрганилди [3,4].

Трикотаж учун керакли технологик кўрсаткичлардан бири қалинлик бўлиб, мато қанчалик “қалин” эканлигини англатувчи кўрсаткич ҳисобланади. Трикотаж тўқимасининг зичлик кўрсаткичи катта бўлса чизиқли зичлиги кичик ҳом ашёлардан тўқилган бўлса ҳам қалинлиги катта бўлиши ва иплар орасидаги бўш жой камайиши мумкин. Табиий ёки кимёвий толаларнинг тузилишида ҳам фарқ бор. Табиий ҳом ашёларни кўндаланг кесими бўйича тузилиши табиий шаклга эга бўлиб, нотекислиги юқори бўлади, кимёвий ҳом ашёларда эса, бундай тузилиш жараённи ўзида созлангани ва ишлаб чиқаришдаги шаклига боғлиқ бўлгани учун нисбатан текис, силлик ва нотексилиги кам этиб ишлаб чиқарилади. Шунинг учун, ҳом

ашё турини ўзгариши ҳам тўқиманинг қалинлик кўрсаткичига таъсир қилади. Матонинг қалинлиги махсус асбоб-ускуналар ёрдамида микрометр, тольшиномер ёки қалинлик ўлчагичлар ёрдамида миллиметр (мм) ёки микрометрларда (μм) ўлчанади.

Иссиқлик сақлаш ҳусуситяи юқори бўлган намуналарининг қалинлик кўрсаткичи тадқиқ этилди. Унга кўра 3,6 mm дан 4,3 mm гача ораликда ўзгарди. Энг кичик қалинлик биринчи вариант тўқимасида кузатилган бўлса, энг катта кўрсаткич III вариантда қайд этилди. Қолган вариантларнинг қалинлик кўрсаткичлари биринчи вариант тўқимасидан мос равишда 1,3%, 19,4% ва 2,7% га юқорилиги аниқланди. Бу намуналарнинг зичлиги, тўқима раппорти ва тузилишини ўзгариши билан асосланади (1-расм).



1-Расм. Иссиқлик сақлаш ҳусуситяи юқори бўлган трикотаж тўқималарининг қалинлигини ўзгариш гистограммаси

Қалинлик кўрсаткичлари, айрим манбааларда [5] шифон учун- 01-0,3 mm, пахта (поплин) учун- 02-0,5 mm, джинси учун- 06-1,2 mm, фетр учун- 1,0-4,0 mm, пальтобоп матолар учун- 1,5-5 mm гача ораликларда бўлиши тавсия этилган. Шу билан бирга [6] тадқиқот ишида айнан пальтобоп тўқималарда эркаклар махсулоти учун-2,3-4,5 mm гача, аёллар махсулоти учун-1,0-3,5 mm гача қийматлар тавсия этилган.

Қалинлик кўрсаткичлари таҳлилидан шундай ҳулосага келиш мумкинки, барча вариантларда қалинлик кўрсакткичлари 3,6 mm дан 4,3 mm гача ораликда ўзгаргаришини, ҳамда юқоридаги тадқиқот ишларида келтирилган ҳаволалар асосида игналари ластик тартибида жойлаштириб олинган иссиқлик сақлаш ҳусуситяи юқори бўлган трикотаж тўқималарини эркаклар маҳсулотлари учун тавсия этиш мақсадга мувофиқдир.

Иссиқлик сақлаш ҳусуситяи юқори бўлган трикотаж тўқималарининг қалинлик кўрсаткичларини тадқиқ этиш давомида намуналарни олишда тўқима раппорти, зичлиги ва тузилишини ўзгариши унинг технологик кўрсаткичларига таъсир этиши маълум бўлди.

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ОСОБЕННОСТИ ИНВЕСТИЦИОННОГО КЛИМАТА КАМЕРУНА

Аннотация: *В статье рассматриваются особенности формирования инвестиционной привлекательности компаний Камеруна. Анализируются ключевые факторы, влияющие на приток инвестиций: макроэкономическая стабильность, развитие транспортной, энергетической и цифровой инфраструктуры, состояние финансового сектора и доступность кредитных ресурсов. Отдельное внимание уделяется аграрному и лесопромышленному комплексам, а также влиянию политической нестабильности и институциональных барьеров на деятельность компаний. Показано, что внедрение международных стандартов финансовой отчётности, повышение прозрачности корпоративного управления и проведение структурных реформ являются важнейшими условиями для роста инвестиционной привлекательности. Сделан вывод о том, что устойчивое развитие компаний Камеруна возможно только при сочетании макроэкономических реформ и усилий бизнеса по укреплению доверия со стороны инвесторов.*

Ключевые слова: *инвестиционная привлекательность; Камерун; прямые иностранные инвестиции; инфраструктура; финансовый сектор; агросектор; политическая стабильность; корпоративное управление; институциональные реформы; устойчивое развитие.*

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FEATURES OF THE INVESTMENT CLIMATE IN CAMEROON

Abstract: *The article examines the features of the formation of the investment attractiveness of companies in Cameroon. The key factors influencing the inflow of*

investments are analyzed: macroeconomic stability, the development of transport, energy and digital infrastructure, the state of the financial sector and the availability of credit resources. Special attention is paid to the agricultural and timber industry, as well as the impact of political instability and institutional barriers on the activities of companies. It is shown that the introduction of international financial reporting standards, increased transparency of corporate governance and structural reforms are the most important conditions for the growth of investment attractiveness. It is concluded that the sustainable development of Cameroonian companies is possible only with a combination of macroeconomic reforms and business efforts to strengthen investor confidence.

Keywords: *investment attractiveness; Cameroon; foreign direct investment; infrastructure; financial sector; agricultural sector; political stability; corporate governance; institutional reforms; sustainable development.*

Инвестиционная привлекательность компании является одной из ключевых категорий современной экономической науки. Она отражает совокупность финансовых, организационных и институциональных характеристик, определяющих готовность внешних и внутренних инвесторов вкладывать капитал в предприятие. При этом инвестиционный климат страны во многом формирует основу для оценки инвестиционной привлекательности отдельной компании. Уровень политической стабильности, качество институтов, развитие инфраструктуры и степень открытости национальной экономики напрямую влияют на готовность инвесторов рассматривать конкретные предприятия как надёжные объекты для вложений. Таким образом, привлекательность бизнеса не может рассматриваться изолированно — она тесно связана с макроэкономической ситуацией, государственной политикой и условиями деловой среды в целом.

В классической трактовке это понятие связывалось с уровнем прибыльности и устойчивости бизнеса, однако в современных условиях оно всё чаще рассматривается через призму качества бухгалтерского учёта, прозрачности отчётности и эффективности корпоративного управления. Именно эти параметры позволяют снижать уровень информационной асимметрии и формировать доверие со стороны потенциальных инвесторов [16, с. 29–30].

Важным элементом повышения привлекательности является совершенствование финансовой отчётности и аудит. Как подчёркивает Kum E., систематизация учётных процедур и внедрение международных стандартов обеспечивают более полное раскрытие информации и формируют у инвесторов уверенность в стабильности компании [2, с. 47–48]. Аналогичные выводы делает Chabe L., отмечая, что положительное влияние на приток капитала оказывает именно наличие независимого аудита и строгое соблюдение принципов транспарентности [1, с. 143]. Таким образом,

финансовая дисциплина и прозрачность отчётности являются важнейшими предпосылками роста инвестиционной привлекательности.

При этом макроэкономическая среда также оказывает решающее воздействие на готовность инвесторов вкладывать средства в компании. Johannes N.C. на примере Камеруна показал, что развитие финансового сектора напрямую способствует росту экономики, а значит, формирует более благоприятные условия для корпоративных инвестиций [6, с. 80–81]. Исследование Kesuh J.T. и соавторов дополняет этот вывод, фиксируя долгосрочную положительную зависимость между стабильностью макроэкономики и динамикой ПИИ [7, с. 53–55]. Следовательно, инвестиционная привлекательность компании зависит не только от её внутренних характеристик, но и от общей институциональной среды.

Ресурсная специфика Камеруна подтверждает данное положение. В промышленном лесном секторе на протяжении последних десятилетий действует система крупноконцессионного производства, ориентированного преимущественно на экспорт. Несмотря на принятие ряда нормативных актов, направленных на устойчивое управление лесами, на практике выявляется существенный разрыв между официальными декларациями и их реализацией. Это снижает предсказуемость деловой среды и усиливает восприятие рисков инвесторами [17, с. 27–29]. Аналогичные проблемы характерны и для агропромышленного комплекса: вооружённый конфликт в англоязычных регионах подорвал работу Cameroon Development Corporation, одного из крупнейших работодателей и экспортёров, что привело к падению производства и финансовым потерям [18, с. 282–283].

Тем не менее правительственные стратегические документы (*Vision-2035*, *Growth and Employment Strategy Paper*) предусматривают реформы, направленные на стимулирование экономического роста, развитие инфраструктуры и снижение бедности. В этих условиях перед компаниями стоит задача адаптироваться к требованиям долгосрочных программ, что предполагает более высокие стандарты финансовой отчётности, развитие внутреннего аудита и укрепление корпоративного управления. Именно сочетание макроэкономической стабильности, институциональных реформ и внедрения международных стандартов в учёте и аудите рассматривается как основной путь повышения инвестиционной привлекательности компаний Камеруна и, шире, развивающихся стран [19, с. 73–75].

Инвестиционная привлекательность компаний Камеруна формируется под воздействием макроэкономических факторов, состояния инфраструктуры, особенностей финансового сектора и институциональной среды. Одним из важнейших индикаторов здесь выступает динамика прямых иностранных инвестиций (ПИИ). Исследования показывают, что в 1977–2010 гг. объём ПИИ устойчиво рос, превысив 2 % ВВП, что сопровождалось положительной корреляцией с экономическим ростом [1, с. 145; 2, с. 52]. Анализ более поздних данных (2000–2020 гг.) подтверждает этот тренд: за двадцать лет объём ПИИ увеличился с 184 млн до 762 млн долл., а ВВП

страны вырос более чем в 2,5 раза [3, с. 60]. Это позволяет рассматривать ПИИ как один из ключевых факторов, формирующих инвестиционный климат Камеруна.

Инвестиционная привлекательность Камеруна во многом определяется состоянием его инфраструктуры, которая выступает основой для экономической активности и долгосрочного роста. Транспортная сеть страны имеет смешанный характер: главные магистрали соединяют экспортные порты Дуала и Криби с промышленными регионами, однако значительная часть дорог остаётся грунтовой и труднопроходимой в сезон дождей. Это существенно увеличивает логистические издержки и снижает конкурентоспособность камерунеких компаний на региональном и мировом рынках. Развитие телекоммуникаций показало более положительную динамику: в период с 2000 по 2018 год модернизация мобильной связи и расширение доступа к интернету сопровождались ростом объёма прямых иностранных инвестиций (ПИИ) на 14 %, что подтверждает прямую зависимость между цифровой инфраструктурой и инвестиционными потоками [4, с. 113]. Однако энергетический сектор остаётся хронически слабым звеном. Нехватка электроэнергии и высокая себестоимость её производства снижают эффективность агропромышленных предприятий, препятствуют развитию обрабатывающей промышленности и вынуждают компании использовать дорогостоящие дизельные генераторы. Государственные капиталовложения в энергетику и транспорт, по оценкам Всемирного банка, оказывают мультипликативный эффект, стимулируя рост частных инвестиций и создавая более предсказуемую деловую среду [5, с. 28]. Таким образом, инфраструктурное развитие можно рассматривать как необходимое условие для повышения конкурентоспособности компаний и укрепления доверия инвесторов, при этом недоинвестированность в энергетику и транспорт является одним из главных барьеров для долгосрочной устойчивости экономики.

Финансовая система Камеруна также оказывает непосредственное влияние на инвестиционный климат. Она характеризуется высокой степенью концентрации капитала: несколько крупных банков контролируют основной объём активов, что обеспечивает устойчивость сектора, но ограничивает доступность кредитов для малого и среднего бизнеса. Согласно исследованию Johannes N.C.a, предприятия сталкиваются с высокими ставками и жёсткими условиями кредитования, что препятствует их модернизации и ограничивает инвестиционный потенциал [6, с. 84]. В условиях, когда малый и средний бизнес составляет значительную долю формальной экономики, этот фактор становится серьёзным препятствием для диверсификации. При этом рынок капитала остаётся недостаточно развитым: отсутствует полноценная фондовая биржа, способная аккумулировать внутренние ресурсы и перераспределять их в пользу инвестиционных проектов. Крупные компании зачастую привлекают ресурсы за рубежом, что делает их зависимыми от международных колебаний ликвидности. В то же время исследования Kesuh

J.T. и его соавторов показывают, что стабильность макроэкономической среды — умеренная инфляция, предсказуемая динамика обменного курса и процентных ставок — оказывает положительное долгосрочное влияние на приток ПИИ [7, с. 56]. Таким образом, модернизация финансового сектора, развитие инструментов долгосрочного финансирования и расширение доступа МСБ к кредитам являются неотъемлемыми условиями для повышения инвестиционной привлекательности.

Не менее важной проблемой остаётся институциональная среда. Камерун сталкивается с хроническими проблемами коррупции, низкой эффективности правоприменения и высокой степенью административных барьеров для бизнеса. Исследования фиксируют значительную утечку капитала через схему «misinvoicing» в нефтегазовом и лесном секторах, которая приводит к сокращению налоговой базы и ограничивает возможности государства для финансирования инфраструктурных проектов [9, с. 88]. Лесопромышленный комплекс страны, являющийся одной из ключевых статей экспорта, демонстрирует противоречивую динамику: несмотря на принятие ряда нормативных актов по устойчивому управлению лесами, на практике выявляется существенный разрыв между формальными декларациями и их реализацией [17, с. 27]. Это снижает доверие инвесторов, которые требуют дополнительных гарантий и часто включают в контракты завышенные премии за риск. В результате конкурентные позиции Камеруна на глобальном рынке ухудшаются по сравнению с соседними странами, например, Ганой, где внедрение более жёстких стандартов управления лесными ресурсами позволило частично снизить уровень неформальной деятельности. Решение институциональных проблем возможно только через комплексные реформы, включающие усиление независимости судебной системы, цифровизацию государственных услуг и обязательное применение международных стандартов аудита.

Аграрный сектор Камеруна, обеспечивающий занятость большей части населения и значительную часть экспортной выручки, характеризуется сочетанием высокого потенциала и серьёзных ограничений. Либерализация торговли в начале 2000-х годов способствовала росту сельскохозяйственного производства, однако одновременно сделала экономику более уязвимой к колебаниям мировых цен [10, с. 37]. По данным исследования Tumeni A.A., низкий уровень механизации и слабая инфраструктура препятствуют полной реализации потенциала аграрного комплекса [11, с. 69]. Пример крупнейшей агропромышленной корпорации Cameroon Development Corporation (CDC) иллюстрирует зависимость инвестиционной привлекательности от политической стабильности. Вооружённый кризис в англоязычных регионах привёл к остановке более половины производственных мощностей компании и сокращению занятости почти на 40 %, что негативно сказалось не только на финансовых результатах CDC, но и на имидже страны в целом [18, с. 283]. Этот случай демонстрирует, что политическая нестабильность является

ключевым фактором риска, который невозможно компенсировать даже благоприятной макроэкономической динамикой.

Несмотря на наличие проблем, стратегические документы государства — «Vision-2035» и *Growth and Employment Strategy Paper* — фиксируют приоритетные направления модернизации. Среди них особое значение имеют развитие транспортной и энергетической инфраструктуры, реформирование финансовой системы, стимулирование инвестиций в аграрный сектор и внедрение международных стандартов финансовой отчётности [19, с. 74]. Повышение качества учёта и обязательный внешний аудит способны существенно улучшить уровень прозрачности бизнеса и создать условия для интеграции камерунеких компаний в глобальные финансовые рынки. Важным шагом является также цифровизация бухгалтерской отчётности и переход к использованию технологий XBRL, которые обеспечивают сопоставимость финансовых данных и упрощают доступ инвесторов к информации о деятельности компаний.

В совокупности рассмотренные факторы позволяют сделать вывод, что инвестиционная привлекательность Камеруна определяется комплексным воздействием макроэкономической стабильности, качества инфраструктуры, состояния финансового сектора, институциональных характеристик и уровня политической безопасности. При этом даже наличие благоприятных показателей по ПИИ или росту ВВП не гарантирует долгосрочного интереса инвесторов, если сохраняются риски, связанные с непрозрачностью финансовой отчётности, коррупцией и нестабильностью в отдельных регионах. Поэтому ключевой задачей на ближайшую перспективу является создание сбалансированной модели, в которой государственные реформы в сфере управления, финансов и инфраструктуры будут сочетаться с корпоративными усилиями по повышению прозрачности и эффективности бизнеса. Именно такая комбинация факторов способна обеспечить Камеруну устойчивый рост инвестиционной привлекательности и укрепить его позиции в глобальной конкуренции за капитал.

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ИНВЕСТИЦИОННАЯ ПРИВЛЕКАТЕЛЬНОСТЬ КОМПАНИЙ КОМПАНИЙ В КОНТЕКСТЕ РЕАЛИЗАЦИИ НАЦИОНАЛЬНЫХ ПРОЕКТОВ 2025-2030

Аннотация: *Привлекательность Камеруна для инвесторов связана с богатым ресурсным потенциалом, большими разнообразием минералов, запасами нефти и газа, обширными территориями для сельского хозяйства, все это указывает на необходимость включения страны в международные хозяйственные отношения в том числе и через реализацию национальных проектов.*

Ключевые слова: *инвестиционная привлекательность, Камерун, национальные проекты, Африканский континент.*

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INVESTMENT ATTRACTIVENESS OF COMPANIES IN THE CONTEXT OF THE IMPLEMENTATION OF NATIONAL PROJECTS 2025-2030

Abstract: *Cameroon's attractiveness to investors stems from its rich resource potential, a wide variety of minerals, oil and gas reserves, and vast agricultural territories. All of this points to the need for the country to integrate into international economic relations, including through the implementation of national projects.*

Keywords: *investment attractiveness, Cameroon, national projects, African continent.*

Камерун по праву считается африканским континентом в миниатюре, потому что почти все природные ресурсы находятся в стране, что делает страну более привлекательной и непохожей на другие африканские страны.

Камерун - развивающаяся страна и актуальным направлением развития для неё является сфера международных экономических отношений. Политика внешней экономики связана не только с государственным уровнем, но и с отдельными субъектами хозяйства. Если Камерун будет вести рациональную политику, то со временем это неизбежно приведёт к росту национального дохода, научно - техническому прогрессу и повышению эффективности капиталовложений.

Камерун, благодаря своему географическому расположению в центральной части Африки, удобен для реализации внешнеэкономической деятельности в Африке, а имея развитие транспортные развязки, может взаимодействовать и со странами других континентов.

В настоящее время существует 5 ключевых национальных проектов республики, которые привлекательны для инвесторов и имеют прогноз развития вплоть до 2035 года. Их реализация даст возможность ускорить экономический рост страны и получить доступ к рынку потребителей ориентировочным объёмом в 300 миллионов человек[2].

• Национальная железная дорога: этот проект первый в цикле национального развития железных дорог, под него было выделено из государственного бюджета 14 976,5 млрд франков КФА, впервые проект представили в Яунде ещё в 2011 году с планом реализации до 2020 года, но CAMRAIL, первая железнодорожная компания в Камеруне не справилась с установленными сроками и было принято решение продлить реализацию проекта до 2035 года с привлечением иностранных инвесторов, так как железная дорога позволит не просто расширить инфраструктуру Камеруна, но и связать страну с соседями[4]. Таким образом, появится возможность доступа как к сельскохозяйственным, так и к горнодобывающим районам, что особенно актуально для сезона дождей.

• Сельское хозяйство: проект IRAD направлен на разработку новых сортов какао и кофе, устойчивость которых к меняющимся климатическим условиям будет выше. Таким образом при успешной реализации проекта удастся расширить посевы и увеличить прибыль, учитывая мировую потребность в кофе и какао данный проект привлекателен для инвесторов и может увеличить производство кофе в Камеруне с 60 000 до 185 000 тонн к 2030 году.

• Проект по развитию инклюзивных и устойчивых городов – Нгаундер и Яунде. Этот проект стартовал в 2017 году и был направлен на улучшение инфраструктуры бедных районов и на улучшение системы городского управления. По предварительной оценке, реализация проекта обойдётся в 160 миллионов долларов и пройдёт в 4 этапа: укрепление потенциала города, улучшение транспортной доступности, быстрое реагирование на различные

непредвиденные ситуации, должна быть постоянная координация проекта. Завершить проект планируют к 2030 году.

• Телекоммуникации: ZTE - китайская компания была основана в 2015 году и в основе заложено 480 миллионов франков КФА[11]. Полное название компании ZTE Cameroun Sarl, её деятельность направлена на развитие телекоммуникаций, в том числе ремонтом и техническим обслуживанием сетей. Полученный грант позволяет ZTE продвигать своё оборудование напрямую и тем самым насытить своей продукцией рынок Камеруна. Проект так же продлён до 2030 года, как и ряд других национальных проектов.

• Солнечная энергия: Солнце источник не только энергии, но и источник финансового благополучия для многих сфер деятельности. Президент компаний Bolloré - Винсент Боллоре, направил свою деятельность на то, чтобы обеспечить электроэнергией отдалённые деревни при помощи децентрализованных систем, так как доступ к электричеству для отдалённых территорий если и возможен, то связан с высокими финансовыми затратами. Кинотеатр Canal Olympia был сдан в эксплуатацию в 2016 году, в строительство инвестировала группа компаний, особенность кинотеатра в том, что он полностью работает на солнечной энергии. Сам кинотеатр территориально расположен в Университете Яунда I[8].

Развитие этих и других национальных проектов в Камеруне не только привело и способствует дальнейшему росту финансового благосостояния жителей, но и интересует международное сообщество. Планирование инвестиций национальных проектов до 2035 году способствует развитию страны в долгосрочной перспективе.

Так, существует проект, направленных на добычу боксита в Камеруне, по плану в год будет производится 6,4 миллиона тонн этого минерала сроком в 20 лет. Во главе проекта стоит Canyon Resources, компания из Австралии, которая в 2024 году подписала с правительством Камеруна соответствующее соглашение, работы начнутся после того, как появится достаточно финансирования.

Финансовым директором с января 2025 года был назначен Кудзай Мцанбивы, в прошлом под его управлением были золотые шахты Perseus Mining в Западной Африке[3]. С его подачи было принято решение о инвестировании в такие инфраструктуры, как железнодорожная и портовая, так как в дальнейшем это позволит быстрее и доступнее транспортировать боксит. Кроме того, произойдёт обновление техноэкономических обоснований проекта, что привлечёт ещё больше инвесторов и ускорит его реализацию.

Камерун обладает такими преимуществами, как:

- имеет сухопутную границу с шестью государствами;
- население разговаривает на 250 местных языках;
- высокий уровень этнического разнообразия населения.

Государственными языками являются английский и французский языки.

В течение 77 лет Камерун находился под контролем трех европейских держав, прежде чем в 1960 году стал полностью независимым.

С момента обретения независимости в 1960 году Камерун стал одним из самых процветающих государств Африки и крупнейшей экономикой Центральноафриканского экономического и валютного сообщества (ЦАЭВС).

Камерун является естественным транзитёром товаров стран Центральной Африки [7].

В 2020 г. пандемия Covid-19 подтолкнула экономику Камеруна к рецессии, но рост ВВП восстановился до 3,6% в 2021 г. благодаря восстановлению ненефтяного сектора и общему восстановлению мировой экономики (МВФ).

Республика является крупным мировым производителем таких товаров, как какао, кофе, бананы, пальмовые продукты, табак, каучук, хлопок, кукуруза и маниока.

По оценкам МВФ, экономический рост продолжит укрепляться, темпы роста достигнут 4,6% в 2022 г. и 4,9% в 2025 г.. Эти показатели будут поддерживаться государственными инвестициями в такие проекты, как гидроэлектростанции Лом Пангар и Нахтигал , а также порт Криби .

Постпандемийной стабилизации государственных финансов способствовали:

- ограничительная налогово-бюджетная политика;
- скромный план восстановления;
- поддержка МВФ, через чрезвычайный фонд;
- согласование приостановки выплаты долгов.

Современная экономическая политика властей Камеруна направлена на избежание преждевременного ужесточения фискальной политики и постепенного сокращения дефицита бюджета[6].

Ожидается, что государственный долг снизится до 36,5% ВВП в 2025 году (МВФ). Инфляция, по прогнозам МВФ, составит не более 3% в 2025 г..

В контексте Расширенного кредитного механизма МВФ и Расширенного механизма финансирования МВФ власти Камеруна сосредоточили внимание на укреплении налогово-бюджетной дисциплины, устранении бюджетных рисков, связанных с государственными предприятиями, и ускорении структурных реформ.

Несмотря на достаточно удовлетворительные экономические показатели страны, бедность затрагивает почти 40% населения, около 8 млн человек. Бедность все больше концентрируется на Севере страны (Всемирный банк).

Основным потребителем сырой нефти Камеруна является Китай. Китай, вместе с США, Нидерландами, Индией и Италией, обеспечивает стабильный экспорт углеводородов Камеруна[10]. Страна стабильно входит в третий десяток экспортёров сырой нефти в мире. Камерун располагает тремя крупными бассейнами углеводородов.

Объём экспорта какао-бобов определяет Камерун одним из крупнейших в мире поставщиков данного продукта. Какао-бобы занимают лидирующее место в экспорте Камеруна по объёму. Значимость какао-бобов для кондитерской промышленности позволяет Камеруну получать стабильный доход от международной торговли. Основным направлением экспорта какао-бобов из Камеруна являются Нидерланды, Малайзия, Сингапур, Германия, Индонезия и др.

Стабильным направлением экспорта является торговля пиломатериалами. Объём экспорта пиломатериалов позволяет Камеруну стабильно входить в двадцатку крупнейших поставщиков глобального рынка. Основными направлениями экспорта пиломатериалов Камеруна являются Китай, Бельгия, Вьетнам, Италия, Франция и др.[1].

Согласно Докладу о мировых инвестициях за 2024 год ЮНКТАД, приток прямых иностранных инвестиций в Камерун, традиционно низкий по сравнению с потенциалом экономики страны, в 2023 году составил 799 миллионов долларов США по сравнению с 926 миллиардами годом ранее из-за сокращения инвестиций в инфраструктуру.

По состоянию на конец того же периода общий объём входящих прямых иностранных инвестиций составил 7,28 млрд долларов США. Большая часть прямых иностранных инвестиций в Камерун поступает из Европейского союза, в частности из Франции и Германии, и направляется в горнодобывающую промышленность, в том числе на добычу нефти.

Однако основным инвестором в стране стал Китай, реализующий крупные инфраструктурные проекты. В рамках растущего интереса к Африке Китай стабильно инвестирует в Камерун, что позволяет ему строить порт и промышленный комплекс Криби, а также гидроэлектростанцию Мемвеле.

В 2023 году Министерство финансов Камеруна объявило о заключении нового соглашения с Китаем, направленного на «предотвращение двойного налогообложения доходов и борьбу с уклонением от уплаты налогов». Это соглашение было заключено в связи с реализацией Камеруном различных проектов по добыче полезных ископаемых, многие из которых представляют значительный интерес для Китая[4].

Среди этих проектов — горнодобывающее предприятие Мбалам-Набеба, расположенное на обширном месторождении железной руды, которое находится на территории Камеруна и Конго. Камерун выбрал инвестиционную компанию Bestway Finance, связанную с китайской компанией AustSino, для строительства железной дороги, необходимой для разработки месторождения.

Лицензия на добычу полезных ископаемых для этого проекта была выдана Камерунской горнодобывающей компании, также связанной с Bestway Finance, которая заключила соглашения о реализации проекта как минимум с четырьмя китайскими фирмами[11]. В южном регионе Камеруна, на месторождении железной руды Лобе в Криби, китайская компания

Sinosteel получила лицензию на добычу полезных ископаемых, подписанную 1 июля 2022 года.

Экономика Камеруна имеет потенциал стать одной из самых процветающих стран и одним из основных мест для получения прямых иностранных инвестиций в Африке.

Страна предлагает широкие инвестиционные возможности в сфере инфраструктуры, сельского хозяйства, добывающей промышленности, потребительских рынков и современных коммуникаций, включая широкополосную связь, оптоволокно и центры обработки данных. Однако слабая инфраструктура, недостаточный уровень верховенства права и сохраняющаяся неэффективность крупной полугосударственной системы в ключевых отраслях препятствуют росту прямых иностранных инвестиций[8].

Инвесторы могут создавать совместные предприятия и государственно-частные партнёрства с правительством. В Камеруне действует система проверки, которая распространяется как на внутренние, так и на иностранные инвестиции[8]. Эта система гарантирует, что инвесторы соблюдают определённые критерии, в том числе квоты на трудоустройство и экспорт, чтобы получить право на льготы для частных инвестиций. Страна занимает 123-е место среди 133 экономик в Глобальном индексе инноваций 2024 и 134-е место из 184 стран в последнем Индексе экономической свободы.

Развитие и реализация потенциала сельского хозяйств Камеруна предполагает изменения приоритетности задач, которые необходимо решить в первую очередь: парадигмы государственного управления:

- необходимо обеспечить сельхозтоваропроизводителей доступными среднесрочными кредитами, дав им возможность сформировать и / или модернизировать производственные мощности[5];
- осуществлять постоянный мониторинг и планирование функционирования сельского хозяйства и АПК в целом;
- осуществлять обучение фермеров и сельское население;
- поощрять создание перерабатывающих предприятий;
- оказывать помощь в получении ресурсов для сельскохозяйственного производства; и другое.

Сельскохозяйственное производство в Камеруне нуждается в повышении его энерговооружённости, за счёт развития ~~малой~~ механизации в секторе малых хозяйств и роботизации крупных производств.

Камерун, обладая высоким энергетическим потенциалом, диверсифицированным по источникам, испытывает инфраструктурные проблемы в сфере реализации энергии;

- страна имеет дорогое государственное управление, по сравнению со странами Африки, так президент Камеруна постоянно проживает в Швеции вместе с правительством, что ощутимо влияет бюджет страны;
- высоки институциональные издержки, связанные как с прямыми затратами: исполнение законодательных норм, так и косвенными: постоянная трансформация содержания законов.

Плохая инфраструктура, медленная и обременительная повсеместная государственная служба, а также быстро развивающиеся фискальные и регуляторные режимы, лишённые прозрачности, создают проблемы для малых и средних предприятий, пытающихся выйти на рынок. Даже незначительные решения о закупках требуют одобрения министерства. Наличие местного партнера является обязательным для компаний, желающих вести бизнес в Камеруне[3].

Перспективными направлениями сотрудничества с Камеруном является: Камеруна является:

- разработка и реализация для Камеруна портфельного торгового решения по обеспечению его продовольственной безопасности, реализуя не пшеницу, а продовольственные товары. Увеличению объёмов производства продукции АПК в 1,5 раза, к 2030 г.;
- создание и совершенствование рыночной и социальной инфраструктуры сельских территорий республики, одновременно реализуя специализированные сельскохозяйственные машины, разработанные под специфику производства специальных сельскохозяйственных культур и растений (какао-бобы и др.);
- внедрить в сектор государственного управлении цифровые инструменты;
- возможно сотрудничество в сфере разработки и освоения месторождений нефти и полезных ископаемых.

Подводя итоги, можно с уверенностью говорить о том, что инвестировать в национальные проекты Камеруна выгодно, каждый инвестор может выбрать направление, которое будет соответствовать его сфере деятельности, будь то добыча полезных ископаемых или развитие транспортных развязок, развитие городов или сельское хозяйство.

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ЭТОЛОГИЧЕСКИЕ И ЭКОЛОГИЧЕСКИЕ ОСОБЕННОСТИ БОЛЬШОЙ ПЕСЧАНКИ (*RHOMBOMYS OPIMUS*) В УСЛОВИЯХ ЮЖНОГО ПРИАРАЛЬЯ

Аннотация*:Южное Приаралье, характеризующееся экстремально засушливым климатом и опустыниванием, является уникальной степно-пустынной экосистемой, где ключевую роль в поддержании биоразнообразия играет большая песчанка (*Rhombomys opimus*). В работе представлены результаты комплексного изучения её морфологических, поведенческих и экологических адаптаций к суровым условиям региона. Полевые наблюдения, морфологический и экологический анализ показали, что песчанка ведёт полуколониальный образ жизни, создаёт сложные подземные системы нор, активно перемещает грунт, участвует в почвообразовании и перераспределении семян растений.*

Ключевые слова: *большая песчанка, Южное Приаралье, экосистема, адаптация, поведение.*

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ETHOLOGICAL AND ECOLOGICAL CHARACTERISTICS OF THE GREAT GERBIRD (RHOMBOMYS OPIMUS) IN THE SOUTHERN ARAL SEA REGION

Abstract:*The Southern Aral Sea region, characterized by an extremely arid climate and desertification, is a unique steppe-desert ecosystem where the great gerbil (Rhombomys opimus) plays a key role in maintaining biodiversity. This paper presents the results of a comprehensive study of its morphological, behavioral, and ecological adaptations to the region's harsh conditions. Field observations and morphological and ecological analysis revealed that the great gerbil leads a semi-colonial lifestyle, creates complex underground burrow systems, actively moves soil, and participates in soil formation and seed redistribution.*

Key words: *great gerbil, Southern Aral Sea region, ecosystem, adaptation, behavior.*

Введение

Южное Приаралье в Республике Каракалпакстан — уникальный степно-пустынный регион с экстремально жарким и засушливым летом, холодной зимой и малым количеством осадков (до 100 мм в год). Опустынивание и усыхание Аральского моря создают трудные условия для сохранения биоразнообразия. В этом регионе важную экологическую роль играет большая песчанка (Rhombomys opimus), обладающая высокими адаптивными способностями к суровым условиям. Изучение её этологии и экологической роли позволяет лучше понять функционирование экосистем и разрабатывать меры по сохранению биологического разнообразия.

МАТЕРИАЛЫ И МЕТОДЫ

Исследование этологических и экологических особенностей большой песчанки (Rhombomys opimus) в Южном Приаралье проводилось комплексно: включало полевые наблюдения, морфологический и экологический анализ, а также обзор литературы. Полевые наблюдения охватывали активность животных, кормовое поведение, взаимодействия внутри колоний и подсчёт нор для оценки плотности популяции. Морфологический анализ включал измерение размеров тела, хвоста, массы и окраски меха, а экологический — оценку почвы, растительности, влажности и влияния антропогенных факторов. Сравнительный анализ с данными по песчанкам других регионов Центральной Азии позволил выявить общие закономерности и региональные особенности вида.

Результаты и обсуждение

Большая песчанка (*Rhombomys opimus*) в условиях Южного Приаралья демонстрирует ряд морфологических адаптаций, обеспечивающих выживание в экстремально засушливой среде. Длина тела взрослых особей варьирует в пределах 20–25 см, хвост длинный и густо опушённый, что способствует поддержанию равновесия при передвижении по неровной поверхности песчаных массивов. Окраска меха варьируется от светло-песочной до серо-жёлтой, обеспечивая высокую степень маскировки на фоне песчаного грунта, что снижает риск хищничества. Масса тела и пропорции конечностей позволяют эффективно передвигаться по рыхлому песку и быстро реагировать на потенциальную опасность.

Вид проявляет преимущественно дневной и сумеречный тип активности, с пиковыми периодами ранним утром и ближе к закату. Песчанка ведёт полуколониальный образ жизни: отдельные семейные группы занимают определённые участки с сетью подземных ходов, которые включают жилые камеры, склады корма и выходы на поверхность. Такая организация снижает внутривидовую конкуренцию, обеспечивает защиту от хищников и способствует рациональному использованию ограниченных ресурсов. Роющая активность значительна: песчанка активно перемещает грунт, создавая множественные входы и выходы, что улучшает аэрацию почвы и перераспределение питательных веществ. Система подземных ходов также выполняет функции терморегуляции, поддерживая оптимальные условия температуры и влажности для проживания и воспроизводства.

Большая песчанка является всеядным грызуном, потребляющим преимущественно корни, побеги и семена местных кустарников, таких как саксаул и тамарикс, а также травянистую растительность. При высокой численности песчанка способна поедать до 50% кормовых растений на определённой территории, что оказывает локальное влияние на растительный покров и структуру пастбищ.

Вместе с тем вид выполняет важные функции в экосистеме: способствует почвообразованию, улучшает водопроницаемость почвы и перераспределение семян, что создаёт условия для восстановления растительности. Песчанка также является ключевой кормовой базой для хищников, включая лисицу, корсака, степных сов и хищных птиц, поддерживая устойчивость пищевых цепей региона.

Среда обитания песчанки включает песчаные массивы, барханы и слабо закреплённые засолённые почвы. Усыхание Аральского моря расширяет ареал и способствует росту численности, тогда как антропогенные мероприятия (посадка саксаула, создание лесополос и зелёных зон) изменяют структуру среды и влияют на распределение популяций. Песчанка активно использует восстановленные территории, но её численность зависит от доступности пищи и плотности растительности.

В Южном Приаралье песчанка демонстрирует физиологические и поведенческие адаптации, обеспечивающие выживание: получение влаги из пищи, использование подземных нор для защиты и групповая организация колоний. Эти особенности поддерживают стабильность популяций и делают вид важным элементом экосистемы, влияя на растительный покров и устойчивость сообществ.

Заключение

Большая песчанка (*Rhombomys opimus*) — ключевой обитатель степно-пустынной зоны Южного Приаралья, обладающий адаптациями к засушливости и антропогенным изменениям. Ведя полуколониальный образ жизни, она создаёт подземные норы, участвует в почвообразовании, перераспределении питательных веществ и семян, способствует восстановлению растительности и поддержанию пищевых цепей. Как

«инженер экосистемы», песчанка поддерживает устойчивость сообществ и требует мониторинга для сохранения биоразнообразия.

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КОМПЛЕКСНАЯ ДИНАМИЧЕСКАЯ МОДЕЛЬ МНОГОКРИТЕРИАЛЬНОЙ ОПТИМИЗАЦИИ ПЕРЕВОЗОК В ЭКСТРЕМАЛЬНЫХ И ТРУДНОДОСТУПНЫХ УСЛОВИЯХ

Аннотация. *В статье представлена многоуровневая динамическая модель транспортировки грузов в экстремальных и труднодоступных условиях, основанная на принципах многокритериальной оптимизации. Рассмотрены особенности функционирования транспортных систем при чрезвычайных ситуациях, разработан алгоритм выбора рациональной стратегии перевозок с учетом природно-климатических и социально-экономических факторов. Приведены результаты моделирования и предложены рекомендации по повышению эффективности транспортных операций в условиях неопределенности.*

Ключевые слова*. Многокритериальная задача, динамическая модель, транспортировка грузов, труднодоступный район, экстремальная ситуация, вертолётный транспорт, ущерб, социально-экономический эффект.*

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COMPREHENSIVE DYNAMIC MODEL OF MULTI-CRITERIA OPTIMIZATION OF TRANSPORTATION IN EXTREME AND HARD-TO-REACH CONDITIONS

Abstract. *The article presents a multi-level dynamic model for cargo transportation in extreme and hard-to-reach conditions, based on the principles of multi-criteria optimization. The specific features of transport system operation during emergency situations are examined, and an algorithm for selecting a rational transportation strategy is developed, taking into account natural–climatic and socio-economic factors. The results of the modeling are provided, and recommendations are proposed to improve the efficiency of transport operations under uncertainty.*

Keywords: *multi-criteria problem, dynamic model, cargo transportation, hard-to-reach area, extreme situation, helicopter transport, damage, socio-economic effect.*

Введение

Последствия мощных землетрясений, техногенных аварий (включая событие на Чернобыльской АЭС) и токсичного загрязнения окружающей

среды приводят к серьёзному моральному и материальному ущербу. В таких условиях взаимодействие различных видов транспорта помогает смягчить последствия чрезвычайных ситуаций [3].

Экстремальные условия характеризуются внезапностью, быстрым развитием событий, стрессовым состоянием населения, значительным экологическим и экономическим ущербом, разрушением инженерных систем, трудной проходимостью и цепным развитием событий, например наводнения после землетрясений.

Ликвидация последствий стихийных бедствий требует больших материальных затрат и применения различных видов транспорта, машин и механизмов в условиях неопределённости. В зоне чрезвычайной ситуации осуществляются спасательные работы, эвакуация населения, защита материальных ценностей и восстановительные мероприятия. Эти процессы напрямую связаны с транспортом, на который приходится основная часть трудовых и материальных затрат.

Поэтому планирование и управление взаимодействием разных видов транспорта в экстремальных условиях требует детального изучения структуры и особенностей функционирования транспортных систем. Исследование таких процессов представляет собой значимую научную задачу [2,3].

Методы исследования

В исследовании применён системный подход к анализу транспортных процессов в экстремальных условиях, а модель построена с использованием методов многокритериальной оптимизации и динамического программирования. В качестве основных критериев рассматриваются минимизация экологического ущерба, транспортных затрат и потерь грузов, что формализовано через систему ограничений и целевых функций.

В условиях землетрясений, наводнений и других ЧС работа транспорта изменяется поэтапно: сначала используется вертолётный транспорт для разведки, спасательных работ и доставки техники; после восстановления дорог включается автомобильный транспорт; грузы доставляются самолётами в ближайшие действующие узлы; далее, после восстановления путей, подключается железнодорожный транспорт.

Стратегия должна обеспечивать оперативное спасение людей и доставку жизненно важных грузов. По мере ликвидации последствий меняются критерии эффективности: скорость доставки, загрузка техники, производительность и минимизация ущерба. Эти параметры рассматриваются как по отдельности, так и в сочетаниях.

Затраты на транспортировку, особенно вертолётами, зависят от климатических условий: в горных районах зимой они существенно выше, а в период март–сентябрь условия наиболее благоприятны. Потери грузов в труднодоступных районах учтены в модели.

Впервые предложена общая многокритериальная модель транспортировки грузов с учётом природно-климатических факторов и экстремальных ситуаций, а также укрупнённый алгоритм её решения [1–3].

Математическая модель такой задачи в общем случае имеет следующий вид:

Найти минимумефункции $F_э$,$F_т$,и $F_п$

$F_э = \sum_{i=1}^{n}\sum_{j=1}^{m} e_{ij}(t,з)x_{ij}(t,з) \to min(1)$

(суммарный экологический ущерб при перевозке грузов до потребителей взависимости природно-климатических условиях должен быт минимальным),

$F_т = \sum_{i=1}^{n}\sum_{j=1}^{m} q_{ij}(t,з)x_{ij}(t,з) \to min(2)$

(общий затрат при перевозке грузов в рассматриваемых условиях должен быть минимальным),

$F_т = \sum_{i=1}^{n} \delta_i(t,з) + \sum_{j=1}^{m} \varepsilon_j(t,з) \to min(3)$

(общий объем потеря грузов должен быть минимальным),при ограничениях

$\sum_{i=1}^{n}\left[1 - a_{ij}(t,з)\right] x_{ij}(t,з) = b_j(t,з) - \varepsilon_j(t,з)\ ,\ j = 1,2,\dots,m(4)$

(общий объем перевозок грузов от всех производителей до j-го потребителя, должен быть равно объема потребностиj-го потребителя) ,

$\sum_{j=1}^{m}\left[1 - a_{ij}(t,з)\right] x_{ij}(t,з) = a_i(t,з) - \delta_i(t,з)\ , i = 1,2,\dots,n(5)$

(общий объем перевозимых грузов по всему потребителей от i-го поставщика должен быть равно объему производства i-го производителя),

$\sum_{i=1}^{n} \delta_i(t,з) - \sum_{i=1}^{n} \varepsilon_j(t,з) = \sum_{i=1}^{n} a_i(t,з) - \sum_{j=1}^{m} b_j(t,з)$ (6)

$x_{ij}(t,з) \geq 0, \delta_i(t,з) \geq 0, \varepsilon_j(t,з) \geq 0 i = 1,2,\dots,n\ , j = 1,2,\dots,m(7)$

(граничные условия-наиболее часто в технических и экономических задачах все искомые переменные, как правило, неотрицательны),

Где: n, m- соответственно, общее количество производителей (поставщиков) и потребителей;

$t,з$ - соответственно, время (месяц, квартал, год и признак, характеризующие природно-климатических условиях;

$a_i(t,з)$-общий объем производствоеi-го производителя в t-ом периода и З-ом условиях;

$b_j(t,з)$-общий объем потребности i-го потребителя в t-ом периоде и в рассматриваемых условиях;

$e_{ij}(t,з)$-ущерб при перевозке 1т. груза от i-го поставщика до j-го потребителя t-ом периоде и в рассматриваемых условиях (в сумах);

$q_{ij}(t,з)$- себестоимость перевозки 1т. груза от i-го поставщика до j-го потребителя в рассматриваемых условиях (в сумах);

$a_{ij}(t,з)$- доля потеря грузов при до j-го потребителя в рассматриваемых природно-климатических условиях.

(здесь$0 \leq a_{ij}(t,з) \ll 1$ при всех $i,j,t,з$);

$x_{ij}(t,ʒ)$- необходимый объем грузов,перевозимого из i-го производителя на j-й потребителя в рассматриваемых условиях (подлежит к определению);

$\delta_i(t,ʒ)$- общий объем потеря при перевозке грузов от i-го поставщика в рассматриваемых условиях;

$\varepsilon_j(t,ʒ)$- общий объем потеря при перевозке грузов до j-го потребителя в рассматриваемых условиях;

Результаты

Результаты моделирования показали, что использование динамической многокритериальной модели позволяет значительно снизить транспортные затраты и время доставки грузов при сохранении требуемого уровня экологической безопасности. В частности, модель обеспечивает адаптацию логистической схемы в зависимости от изменения климатических условий, что особенно важно при планировании операций в горных и труднодоступных районах.

Нам известно, что задачи (1)-(7), в которых оптимизация проводится по нескольким критериям ($F_э$, $F_т$, $F_п$), называют задачами многокритериальной оптимизации. Такая задача представляет собой попытку найти компромисс между принятыми критериями. [1,2]

Решение многокритериальной задачи (1)- (7) сводится к оптимизации по одному обобщенному критерию (F), в который входят все принятые критерии со своими весовыми коэффициентами (α_1, α_2, α_3) (весовые коэффициенты определяются, например, с помощью экспертных оценок).

Целевой функции в общем случае имеют разные единицы измерения. Поэтому в F введено умножение третий целевой функции на ее нормированное значение β (β-цена 1 т. Груза, сум/т.).

Обобщенная критерия (F) записывается следующим образом:

$F = \alpha_1 F_э + \alpha_2 F_T + \alpha_3 F_п \to min(8)$

$\alpha_1 + \alpha_2 + \alpha_3 = 1,\ \ 0 < \alpha_\nu < 1,\ \ \nu = 1,2,3$ (9)

После некоторых алгебраических преобразований задачи (4)-(7) и (9), имеем следующую одно критериальную транспортную задачу:

$F = \sum_{i=1}^{n}\sum_{j=1}^{m} z_{ij}(t,ʒ)\, x_{ij}(t,ʒ) \to min$ (10)

при ограничениях (4)-(7).

Где $z_{ij}(t,ʒ) = \alpha_1 e_{ij}(t,ʒ) + \alpha_2 \beta q_{ij}(t,ʒ) + \alpha_3 \gamma a_{ij}(t,ʒ)$

Если закрытая транспортная задача, то $\sum_{i=1}^{n} a_i(t,ʒ) = \sum_{j=1}^{m} b_j(t,ʒ)$ и следовательно

$$\sum_{i=1}^{n} \delta_i(t,ʒ) = \sum_{j=1}^{m} \varepsilon_j(t,ʒ)$$

Тогда после подстановкой $x_{ij}(t,ʒ) = \frac{x_{ij}^{*}(t,ʒ)}{1-a_{ij}(t,ʒ)}$

Из задачи (10), (4)-(7) получим следующую одно критериальную динамическую задачу:

$F = \sum_{i=1}^{n} \sum_{j=1}^{m} z_{ij}^{*}(t,ʒ) x_{ij}^{*}(t,ʒ) \rightarrow min$ (11)

при ограничениях

$\sum_{i=1}^{n} x_{ij}^{*}(t,ʒ) = b_j^{*}(t,ʒ) \quad , \; j = 1,2,\dots,m,$ (12)

$\sum_{j=1}^{m} x_{ij}^{*}(t,ʒ) = a_i^{*}(t,ʒ) \quad , \; i = 1,2,\dots,n,$ (13)

$x_{ij}^{*}(t,ʒ) \geq 0 \; , i = 1,2,\dots,n \; , j = 1,2,\dots,n,$(14)

где $x_{ij}^{*}(t,ʒ) = \left[1 - a_{ij}(t,ʒ)\right] x_{ij}$,

$a_i^{*}(t,ʒ) = a_i(t,ʒ) - \delta_i(t,ʒ)$,

$b_j^{*}(t,ʒ) = b_j(t,ʒ) - \varepsilon_j(t,ʒ)$,

$$z_{ij}^{*}(t,ʒ) = \frac{z_{ij}(t,ʒ)}{1 - a_{ij}(t,ʒ)} \quad , \qquad i = 1,2,\dots,n \; , j = 1,2,\dots,m$$

Исходные допустимое решение задачи (11)-(14) может быть поучено по алгоритму «минимальной удельной стоимости» по каждому t и ʒ ,и имеет вид

$x_{ij}(t,ʒ) = \frac{x_{ij}^{*}(t,ʒ)}{1 - a_{ij}(t,ʒ)}$ (15)

Рассчитанные оптимальные объемы перевозок по видам транспорта демонстрируют эффективность комбинированного применения авиационного, автомобильного и железнодорожного транспорта. Это подтверждает необходимость комплексного подхода к управлению транспортными системами в экстремальных ситуациях.

Обсуждение и заключение

Предложенная многокритериальная динамическая модель служит универсальным инструментом поддержки решений в условиях неопределённости и ограниченных ресурсов. Она пригодна для планирования транспортных операций в зонах стихийных бедствий и оптимизации логистики в удалённых регионах.

Отмечено, что решение трёхкритериальной задачи существенно отличается от решений по каждому отдельному критерию. Модель учитывает взаимодействие разных видов транспорта: наземного до границы труднодоступных районов и вертолётного — внутри этих зон. Такое распределение перевозок обеспечивает социально-экономическую эффективность и снижает ущерб.

Ключевое преимущество модели — интеграция экологических, экономических и временных критериев, позволяющая находить оптимальный баланс между скоростью, стоимостью и безопасностью. Дальнейшие исследования связаны с разработкой интеллектуальных методов адаптации модели в реальном времени с использованием искусственного интеллекта и IoT-технологий.

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МИКОБАКТЕРИЙ ТУБЕРКУЛЕЗА БАКТЕРИОЛОГИЧЕСКИЙ В МЕТОДЕ ОПРЕДЕЛЕНИЕ УРОВЕНЬ ПАРАМЕТРЫ ОПИСАНИЕ

Аннотация*:как известно, туберкулёз – одна из самых распространённых инфекций в мире, проявляющаяся инфекционным заболеванием человека и животных. Его возбудитель – микобактерия туберкулёза и родственные ей возбудители – был открыт Р. Кохом и доказан трудами многих исследователей. Хотя локализация заболевания, вызываемого этим возбудителем, наблюдается в различных органах, патологический процесс преимущественно локализуется в лёгких. Дифференцировать возбудителя среди 74 существующих на сегодняшний день видов микобактерий весьма сложно, поэтому бактериологической диагностике туберкулёза уделяется большое внимание.*

Если учесть, что патогенность и вирулентность возбудителей изменяются под влиянием факторов внешней среды, состояния макроорганизма и, соответственно, некоторых других его биологических характеристик , то становится очевидным, что идентификация возбудителя данного заболевания занимает ведущее место в диагностике данного заболевания. Наличие эндогенного реактивного процесса при туберкулезе делает бактериологическую диагностику этого заболевания обязательной.

Учитывая вышеизложенное , была поставлена цель провести сравнительное исследование уровня выявления возбудителя туберкулеза микробиологическими методами и сделать обоснованное заключение , интерпретируя полученные результаты .

Ключевые слова: *туберкулез, распространенность, множественная лекар ственная устойчивость, широкая лекарственная устойчивость*

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MYCOBACTERIUM TUBERCULOSIS BACTERIOLOGICAL METHOD OF DETERMINATION LEVEL PARAMETERS DESCRIPTION

Abstract: *Tuberculosis is known to be one of the most widespread infections in the world, affecting humans and animals. Its causative agent, Mycobacterium tuberculosis and related pathogens, was discovered by R. Koch and has been proven by numerous researchers. Although the disease caused by this pathogen can be localized in various organs, the pathological process is predominantly localized in the lungs. Differentiating the pathogen among the 74 currently existing species of mycobacteria is extremely difficult, so bacteriological diagnosis of tuberculosis is given considerable attention.*

Considering that the pathogenicity and virulence of pathogens vary under the influence of environmental factors, the condition of the host, and, accordingly, certain other biological characteristics, it becomes clear that identification of the causative agent is crucial in the diagnosis of this disease. The presence of an endogenous reactive process in tuberculosis makes bacteriological diagnosis of this disease essential. Taking into account the above, the goal was to conduct a comparative study of the level of detection of the tuberculosis pathogen by microbiological methods and to make a well-founded conclusion, interpreting the results obtained.

Key words: *tuberculosis, prevalence, multidrug resistance, extensive drug resistance*

Материалы и методы:этот для исследовать объект как Бухара в регионе постоянный резиденция деятель туберкулез к болезни играл и Бухара в центре фтизиатрии и пульмонологии области 315 человек прошли лечение большой старый пациентов Из числа обследованных 195 (61,90 ± 2,73%) были мужчинами . и 120 (38,10±2,73%) были женщины были для исследования притяжение сделанный пациентов от 50 до 70 лет был пациентов много мет (67,62± 2,64%, n=213)

Как оказалось , сегодня в тот день туберкулез болезни много диагноз методы если оба их между самый важный один бактериологический это метод , потому что болезнь этиология или диагностика без уточнения стоя , адекватный туберкулез против излечивать обозначение его/ее эффективность старый уменьшать отправляет .

Данный метод позволяет идентифицировать возбудителя заболевания и подтвердить установленный клинический диагноз. Хотя бактериологическая выявляемость различных инфекционных заболеваний невысока (Нуралиев Н.А. и др ., 2014; Мухаммедов И.М. и др ., 2016) (до 36,0 %), бактериологический метод считается важным диагностическим средством . Это относится и к туберкулезу , который не утратил своей актуальности и значения по сей день .

Результаты и обсуждение: возбудителем туберкулеза является микобактерия туберкулеза . Полученные результаты исследования уровня бактериологической выявляемости туберкулеза (таблица 4.1) показывают, что «положительный бактериологический результат» наблюдался в 82,86±2,12%

(n =261) случаев , а « отрицательный бактериологический результат» выявлен в 17,14±2,12% (n =54) случаев .

Параметры бактериологического выявления возбудителя туберкулеза Mycobacterium tuberculosis.

Обнаружение микобактерий туберкулеза	Абсолютное число	Относительное число
БК+ (положительный бактериологический результат)	268	85,08 ± 2,01
БК- (отрицательный бактериологический результат)	47	14,92± 2,01
общий	315	100

Примечательным является тот факт , что БК «+» выявлялось в 5,70 раз чаще, чем БК «-». Это обусловлено , во-первых, внедрением современных бактериологических методов идентификации возбудителя, во-вторых, устойчивостью возбудителя к внешним факторам среды, в-третьих, увеличением процента штаммов, устойчивых к противотуберкулёзным препаратам , и, в-четвёртых, формированием иммунитета у больного. Это объясняется снижением активности иммунной системы (иммунной реактивности макроорганизма).

Если проанализировать частоту отрицательных результатов бактериологического исследования (14 926) , то невыявление возбудителя при бактериологическом исследовании было связано с несколькими факторами. Во-первых, с несоблюдением правил сбора мокроты у пациента (исследователя) для бактериологического исследования , её сбора и транспортировки в бактериологическую лабораторию (медицинский фактор) . Во-вторых , недостаточная обработка мокроты для бактериоскопической и бактериологической диагностики в бактериологической лаборатории (неправильное использование флотации и других методов) , в результате чего возбудитель не виден в определенном поле зрения или присутствие очень малого количества возбудителя в биологических материалах при бактериологическом посеве (бактериологический фактор) ; в-третьих, технологические погрешности при приготовлении основной питательной среды для получения возбудителя - питательной среды Левенштейна -Йенсена , неправильная инкубация культуры и недостаточное ее хранение в течение достаточного периода времени (фактор идентификации); в-четвертых, появление штаммов с определенными биологическими характеристиками, включая вирулентность и резистентность, под воздействием различных факторов в организме человека (фактор изменчивости штамма); в-пятых, неверный первоначальный диагноз больного , отсутствие триггера (фактор отрицательного результата i) .

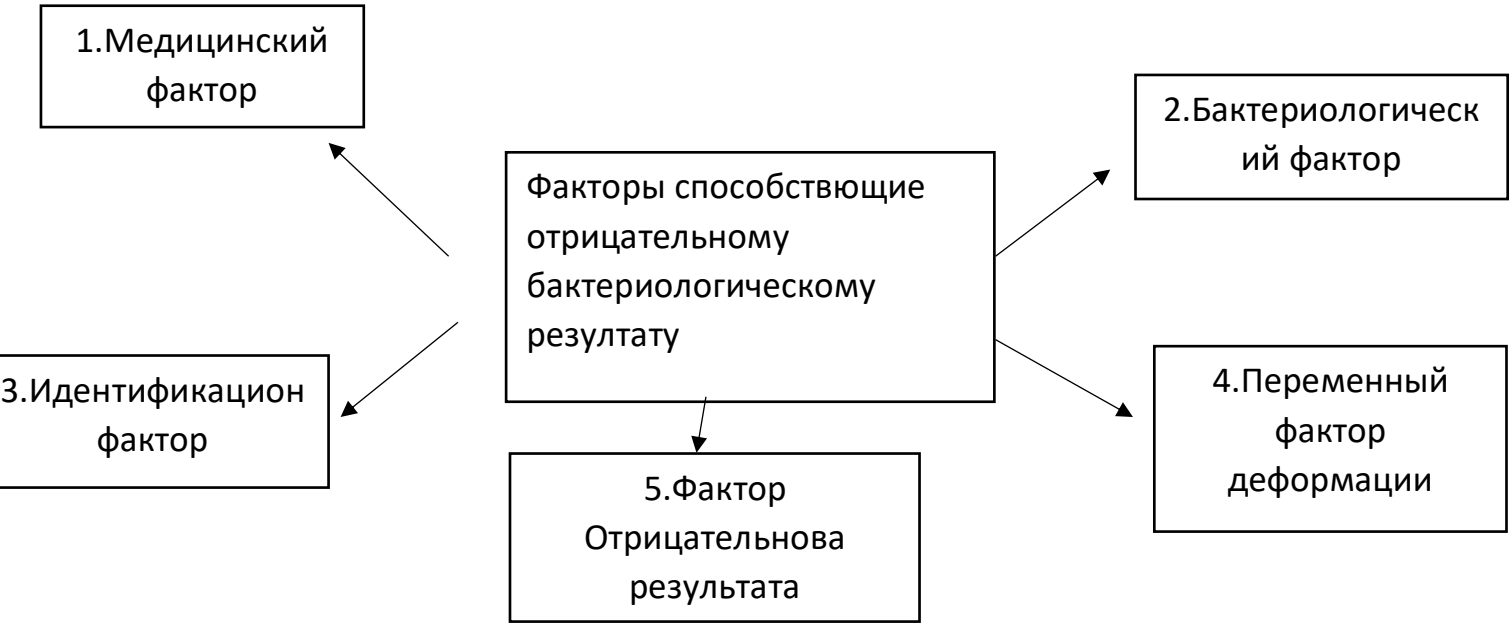


Рисунок 4.1. Факторы, приводящие к отрицательному бактериологическому результату при культивировании Mycobacterium tuberculosis – возбудителя туберкулеза.

Очевидно, что бактериологическое выделение возбудителя туберкулеза – сложный процесс, зависящий от множества объективных и субъективных факторов. Поэтому большое значение имеют высокий профессионализм всех звеньев этой процедуры, использование полноценного питания, стандартизированного оборудования, а также квалификация врача-первичного диагноста.

В результате проведенных таким образом бактериологических исследований положительный бактериологический результат составил 85,08%, а «отрицательный бактериологический результат» – 14,92%, что означает, что выявляемость возбудителя туберкулеза – микобактерий туберкулеза бактериологическим методом выше в 5,70 раз.

Также впервые выделены 5 факторов, которые могут привести к отрицательному бактериологическому результату: медицинский фактор, бактериологический фактор, фактор идентификации, фактор вариабельности штамма, фактор отрицательного результата. Показано, что в идентификации и дифференциации возбудителя, наряду с высокой квалификацией врача-бактериолога и фтизиатра, важную роль играют использование стандартизированного оборудования, технология приготовления питательных сред и инкубации культуры.

Помимо бактериологического исследования мокроты пациентов, для идентификации возбудителей также использовался метод XpertMTB/RIFUltra. Чувствительность метода при выявлении микобактерий туберкулеза составляет до 98,0%, специфичность – до 99,0%, а при выявлении устойчивости к рифамицину (РИФ) – до 98,0%. Поскольку преимущества и методика применения этого нового метода подробно описаны в главе II, мы не посчитали необходимым останавливаться на нем подробно. Частота

положительных результатов, выявленных обоими методами, представлена для сравнения в таблице 4.2.

Параметры выявления возбудителя туберкулеза Mycobacterium tuberculosis различными методами:

Результат	Бактериологический метод		Эксперт/MTB РИФ	
	абсолютно	%	Абсолютно	%
Положительный результат	268	85,08± 2,01	269	85,40± 1,99
Отрицательный результат	47	14,92± 2,01	46	14,60± 1,99

Примечание: убедительного тавафута нет.

Полученные результаты подтверждают отсутствие практически значимой разницы в выявлении возбудителей: положительные результаты составили 85,08 ± 2,01% и 85,40 ± 1,99% соответственно, а отрицательные – 14,92 ± 2,01% и 14,60 ± 1,99% соответственно (PS 0,05). Это свидетельствует о возможности использования обоих методов в бактериологической диагностике. Метод Xpert MT B / RIF отличается более быстрой детекцией по сравнению с традиционным методом, одновременно индицируя устойчивость штаммов к RIF .

определения стойкости актюатора к РИФ, выявленный данным методом, представлен на рисунке 4.2.

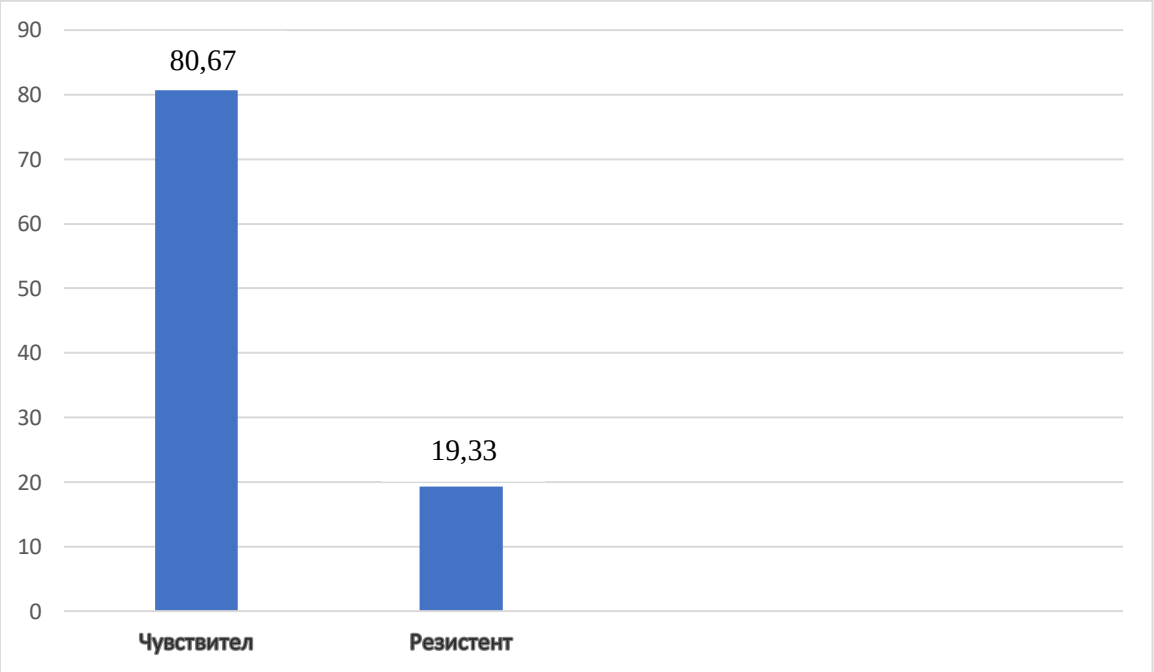


Рисунок 4.2. Показатели чувствительности к рифампицину выявленных штаммов Mycobacterium tuberculosis (n = 269) , %

Из данных рисунка 4.2 видно, что чувствительность культивируемых штаммов возбудителя туберкулеза к РИФ составила 80,67±2,41% (n=217), соответственно, уровень выявления резистентных штаммов – 19,33±2,41% (n=52). Данные показатели основаны на количестве выявленных

возбудителей (n=269). Также следует подчеркнуть, что процент чувствительных штаммов был достоверно выше процента резистентных – в 4,17 раза.

Выводы: таким образом, идентификация Mycobacterium tuberculosis методом Xpert MTB/RIF дала положительный бактериологический результат в 85,40% и «Отрицательный бактериологический результат» в 14,60%, с разницей в 5,85 раза (P<0,001). Этот показатель выявления достоверно не отличался от традиционного бактериологического метода (85,08% и 14,92% соответственно) (P>0,05). Из выявленных штаммов (n=269, 85,40%) 80,67% были чувствительны к рифампицину, а 19,33% – резистентны, с увеличением доли чувствительных штаммов в 4,17 раза. В связи с этим метод Xpert MTB/RIF продемонстрировал как высокую чувствительность (98%) и специфичность (99%), так и высокую бактериологическую эффективность. В то же время, выявление резистентности к рифампицину (РИФ) определило быстроту и точность теста, что позволило адекватно и своевременно начать противотуберкулёзную терапию. В последние годы было рекомендовано много новых методов диагностики туберкулёза и определения устойчивости возбудителей к противотуберкулёзным препаратам. Одним из таких методов является тест HAIN, который с помощью молекулярно-генетических методов позволяет определить резистентность возбудителя туберкулёза и двух основных противотуберкулёзных препаратов первого ряда – изониазида (H) и рифампицина (R) – в мокроте пациента. Определение проводится непосредственно на бактериологическом мазке с положительным результатом бактериологического исследования. Мокроту пациента центрифугируют и деконтаминируют с помощью тест-полоски. Чувствительность этого теста составляет 98,6%, а специфичность – 100%. Положительный результат составляет 100%, отрицательный – 97,1% (Хамраев А.К., 2012) (Чункаева Д.Д., Мансурова Д.А., 2017). Ещё одним положительным моментом является очень быстрое получение результата. Результаты теста HAIN получаются в течение 5,5 часов, в то время как метод MGIT требует 10–12 дней, а среда Левенштейна–Йенсена позволяет наблюдать результат такого определения через 3–6 недель.

Следует подчеркнуть, что преимущества использования теста HAIN при определении резистентности к основным противотуберкулезным препаратам (H и R) заключаются в следующем: во-первых, он позволяет быстро (5,5 часов) выявить резистентность к основным противотуберкулезным препаратам H и R ; во-вторых, он предотвращает распространение широкой лекарственной устойчивости внутри больницы; в-третьих, он позволяет на ранних стадиях выявить профиль лекарственной устойчивости пациента ; в-четвертых, он улучшает соблюдение мер инфекционного контроля; в-пятых, он позволяет классифицировать пациентов по диагнозу и лекарственной устойчивости и своевременно назначать адекватное лечение.

Наряду с положительными сторонами данного метода существуют и следующие организационные трудности : во-первых, необходимо обеспечить

соответствующую подготовку и навыки персонала лаборатории , во-вторых, используемое оборудование должно быть стандартизировано, а для управления им необходим специально обученный инженерно-технический персонал , в-третьих, должны быть лица, контролирующие процесс с целью предотвращения загрязнений и ошибок, в-четвертых, должен быть точный контроль качества по отношению к шести стандартам (MGIT), в-пятых, учитывая высокую стоимость данного метода, необходимо его эффективное использование.

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ОБЕСПЕЧЕНИЕ МЕЖДИСЦИПЛИНАРНЫХ СВЯЗЕЙ - КАК ФАКТОР УСИЛЕНИЯ ПРАКТИЧЕСКОЙ НАПРАВЛЕННОСТИ МАТЕМАТИКИ

***Аннотация**: В данной статье обоснованы возможности усиления практического направления в процессе обучения математики на основе принципа дидактики "Междисциплинарности". Роль задач таких проблем раскрывается с помощью вопросов практического содержания. Вместе с тем, в работе сформулированы требования для составления задач практического содержания.*

***Ключевые слова:** принцип междисциплинарности, задача практического содержания, уравнение, система уравнений, диаграмма, процент, тригонометрия, функция.*

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ENSURING INTERDISCIPLINARY CONNECTIONS IS A FACTOR IN STRENGTHENING THE PRACTICAL DIRECTION OF MATHEMATICS

***Abstract**: This article substantiates the possibilities of strengthening the practical orientation in the process of teaching mathematics based on the principle of "Interdisciplinary Connection" in didactics. The role of such problem questions is revealed through problem questions of practical content. At the same time, the work formulates requirements for compiling problems of practical content.*

***Keywords:** Interdisciplinary principle, practical content problem, equation, system of equations, diagram, percentage, trigonometry, function.*

Практическое направление преподавания математики в традиционном образовании отражалось в одном из дидактических принципов - политехническом принципе. В дальнейшем, с развитием человеческой деятельности и появлением новых современных наук, а также математизацией этих дисциплин, усиление практической направленности преподавания математики стало одним из основных факторов решения проблем не только в

производственной сфере, характерной для политехнического принципа, но и в таких областях, как экономика, экология, социология, история, юриспруденция, биоматематика. Основным средством усиления практической направленности преподавания математики являются задачи практического содержания.

Основная особенность школьного курса алгебры заключается в том, что в его содержании в той или иной степени теоретически обосновываются такие понятия, как числа, преобразования, уравнения и неравенства, функции.

Основными целями преподавания математики в современной школе являются следующие, при этом каждый учащийся [1]:

осознанно овладевать достаточными математическими знаниями, необходимыми для изучения других дисциплин и продолжения образования;

формирование способностей мышления, характерных для математической деятельности и необходимых для эффективного функционирования в обществе;

В настоящее время в совершенствовании математического образования важно усилить практическую направленность школьного курса математики, то есть связать его содержание и методику обучения с практикой.

Российский ученый-методист Н.А.Терешин рассматривает понятие "задача практического содержания" как "задачу, поставленную вне математики и решенную с помощью математических средств."

Г. М. Морозов, подходя к формированию определения понятия “задача практического содержания” с точки зрения “деятельности” утверждает, “что в качестве основного понятия формирующего свойства при определении задачи практического содержания выделяется свойство, связанное с обучением учащихся деятельности по применению математики для решения различных проблем.”

Достижение усиления практической направленности школьного курса математики требует особой подготовки от учителя, который является одним из основных субъектов образовательного процесса, в частности [3]:

решение задач практического характера требует больше времени, чем изучение теоретического материала. Поэтому каждый учитель математики должен обладать навыками и умениями правильного планирования и проектирования уроков, а также рационального распределения времени;

должен обладать навыками и умениями выбирать или самостоятельно составлять задачи практического содержания.

При выборе или составлении задач практического содержания преподавателю важно придерживаться следующих требований к ним [3]:

1. Содержание задач практической направленности должно включать как математические, так и нематематические задачи. При этом в содержании математических и нематематических задач должна быть отражена их взаимосвязь.

2. Содержание каждой выбранной или составленной задачи практического характера должно соответствовать изучаемой теме или программе, а их решение должно способствовать достижению образовательных целей.

3. Понятия и различные термины в содержании задачи практического характера должны быть понятны учащимся.

4. Содержание задачи практического характера должно соответствовать действительности.

Для этого каждый учитель математики должен [3,4]:

а) определение математических тем, оказывающих широкое влияние на формирование и развитие мировоззрения личности;

б) определение наиболее подходящих тем для использования математического аппарата при преподавании таких дисциплин, как физика, биология, химия, черчение, технология, политология, лингвистика, юриспруденция;

с) правильное определение цели изучаемых тем и на этой основе верный выбор методов и приемов обучения;

д) обладание навыками и умениями проектирования каждого урока на основе предварительного планирования;

Данные анализы показывают, что большинство задач, представленных в школьных учебниках по математики, не в полной мере отвечает требованиям, предъявляемым к задачам практического содержания. Поэтому для каждого урока учителю необходимо заранее подобрать задачи практического содержания из других источников или составить их самостоятельно.

Считаем целесообразным осуществлять решение практических задач на следующих этапах [1,2,4]:

1. Анализ текста задачи.

2. Установление взаимосвязей между данными задачи и её вопросами.

3. Перевод текста задачи на язык математики, то есть построение математической модели.

4. Решение математической модели.

5. Проверка и оценка решения задачи.

Ниже приводим вопросы, связанные с междисциплинарными отношениями.

Задача 1 (Экономика). Человек взял из сберегательной кассы сначала $\frac{1}{4}$ всех своих денег, затем $\frac{4}{9}$ оставшихся денег и еще 64 доллара. После этого в его сбережениях осталось $\frac{3}{20}$ всех денег. Каков был первоначальный размер сбережений?

Решение. Пусть в сберегательной кассе имеется сумма x \$.

При первом снятии берется $\frac{x}{4}$ \$, остается $\frac{3x}{4}$ \$.

При втором снятии берется $\frac{3x}{4} \cdot \frac{4}{9}$ \$.

Итак, $\frac{x}{4}+\frac{3x}{4}\cdot\frac{4}{9}+64+\frac{3x}{20}=x \Leftrightarrow \frac{x}{4}+\frac{3x}{9}+64+\frac{3x}{20}=x \Leftrightarrow x-\frac{x}{4}-\frac{3x}{9}-\frac{3x}{20}=64 \Leftrightarrow 16x=64\cdot 60 \Leftrightarrow x=240$ \$.

Ответ: 240$.

Это означает, что первоначальный вклад клиента составляет 240**$** долларов.

Задача 2 (Химия). К 5 литрам 16% - го водного раствора вещества добавили 7 литров воды. Какова будет процентная концентрация полученного раствора?

Решение. Концентрация раствора $\rho=\frac{V_1}{V_2}\cdot 100\%$. Объем вещества в исходном растворе составляет $0{,}16\cdot 5=0{,}8$. При добавлении 7 литров воды общий объем раствора становится равным 12 литрам. Объем растворенного вещества остается прежним.

Таким образом, концентрация полученного раствора равна $\frac{0{,}8}{12}\cdot 100\%=6{,}7\%$

При добавлении 7 литров воды к 5 литрам 16%-го раствора образуется 12 литров 6,6%-го раствора.

Примечание. Концентрация раствора равна отношению массы растворенного вещества к массе раствора, а также отношению их объемов.

Ответ. 6,7%

Задача 3 (Технические науки). Батискаф, равномерно погружаемый в воду по вертикали, испускает ультразвуковые импульсы с частотой 362 кГц. Скорость погружения батискафа в воду рассчитывается по формуле. Здесь $c=1300$ м/с - скорость звука в воде, f_0 - частота испускаемых импульсов, f - частота звука (единица измерения кГц). Определите частоту звука в кГц, если скорость погружения Батискафа 4 м/с.

Решение. $v=4\,m/s,\ c=1300\,m/s,\ f_0=362$кГц

$v=c\frac{f-f_0}{f+f_0}=1300\cdot\frac{f-374}{f+374}=4;$

$1300(f-362)=4(f+362),\ 325(f-362)=(f+362),\ 325f-325\cdot 362=f+362$

$324f=362+325\cdot 362,\ 324f=118012,\ f=364$





Батискаф — это самоходный подводный аппарат, предназначенный для глубоководных океанографических и научных исследований.

Ответ:364 кГц

Батискаф, погружаясь в воду со скоростью 4 м/с, имеет звуковую частоту 364 кГц.

Задача 5 (Физическое воспитание). Волейбольный мяч был брошен под углом $\propto$. Время полета мяча определяется по формуле $t = \frac{2v_0 \sin\propto}{g}$. Под каким углом должен быть выброшен мяч, если он выброшен с начальной скоростью $v_0 = 50\,m/s$и время полета равно 5 секундам? Ускорение свободного падения $g = 10\,m/s$.

Решение.

$t = \frac{2v_0 \sin\propto}{g}$; $v_0 = 50\,m/s$; $g = 10\,m/s$; $t = 5s$;

$5 = \frac{2\cdot 50\cdot \sin\propto}{10}$; $\sin\alpha = \frac{1}{2}$; $\alpha = 30^0$.

Ответ: 30^0

Значит, волейбольный мяч, брошенный под углом 30^0 с начальной скоростью $50\,m/s$, может пролететь 5 сек.

Выводы:

В целом, усиление практической направленности преподавания математики играет важную роль в обеспечении:

- *обеспечение интеллектуального развития учащихся;*
- активного участия учащихся в образовательном процессе;
- повышения интереса к изучению математики;

Широкое использование задач практического содержания, служащих обеспечению межпредметной связи в преподавании математики, играет важную роль в усилении практической направленности математики.

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ПРОЦЕСС РАЗВИТИЯ РЕЧИ ДЕТЕЙ ДОШКОЛЬНОГО ВОЗРАСТА И ЕГО ОСНОВНЫЕ ФАКТОРЫ

Аннотация: *Речь является важнейшим средством связи человека с окружающей средой. Формирование и развитие речи, особенно у детей раннего возраста, служит основой для общего интеллектуального и социального развития. Сегодня многие дети сталкиваются с различными проблемами в развитии речи. Это напрямую влияет на их способность читать, писать и мыслить. Поэтому понимание поэтапного развития детской речи и раннее выявление проблем является одной из актуальных задач современного образования и воспитания. Развитие речи ребенка неразрывно связано с семьей, окружающей средой и дошкольным образовательным учреждением. Развитие речи детей происходит постепенно под влиянием биологических, психологических и социальных факторов. В этой статье рассматриваются этапы развития детской речи и недостатки, встречающиеся в детской речи.*

Ключевые слова: *Речь, способности, ранний возраст, словарный запас, произношение, беглая речь*

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THE PROCESS OF SPEECH DEVELOPMENT IN PRESCHOOL CHILDREN AND ITS KEY FACTORS

Annotation: *Speech is the most important means of communication between a person and the environment. Especially in young children, the formation and development of speech serves as a foundation for general intellectual and social development. Today, many children face various problems in speech development. This directly affects their ability to read, write, and think. Therefore, understanding the gradual development of children's speech and early identification of problems is one of the urgent tasks of modern education and upbringing. The development of a child's speech is inextricably linked to the family environment and the preschool educational institution. The development of children's speech occurs gradually under the influence of biological, psychological, and social factors. This article presents the stages of child speech development and the shortcomings encountered in children's speech.*

Keywords*: Speech, abilities, vocabulary, pronunciation, fluency*

Основная задача дошкольного образования заключается в подготовке детей к обучению в школе. То есть, в период дошкольного воспитания дети должны не только получить определённые знания, но и овладеть навыками мышления, понимать речь сверстников и взрослых, свободно выражать свои мысли, а также уметь взаимодействовать и сотрудничать с другими.

Цель процесса обучения и воспитания в дошкольной образовательной организации заключается в создании условий для формирования у ребёнка базовых и предметных компетенций в различных сферах развития. В состав этих компетенций входит и развитие речи.

Речь является важнейшим средством для когнитивного и социального развития ребёнка, а также для познания окружающего мира. В содержательной и стимулирующей образовательной среде дети развивают навыки устного и письменного общения, что способствует формированию уверенности в себе, установлению взаимоотношений с окружающими, расширению представлений о мире, а также участию в занятиях и выполнении коллективных проектных работ.

Дети могут выражать себя так, чтобы быть понятыми взрослыми и сверстниками. Они слушают и наблюдают, чтобы понять сказанное; воспринимают вопросы и задания и соответствующим образом реагируют на них. Они проявляют положительное отношение к занятиям, которые включают развитие речи, особенно к чтению и письму. Дети знакомятся с различными формами и функциями речи, используют их и умеют адаптировать в различных ситуациях общения. [1]

Для детей важно уметь образно и логически мыслить на родном языке, правильно выражать свои представления через речь, контролировать и управлять собой, наблюдать, слушать, запоминать, обобщать и сравнивать. Формирование таких интеллектуальных навыков является необходимым компонентом их подготовки. В осуществлении данной задачи важную роль играет предмет «Развитие речи на родном языке». Так как язык является средством общения между людьми и одинаково служит всем членам общества, он представляет собой социальное явление. Все изменения и обновления, происходящие в жизни общества, находят своё отражение в языке.

На основе требований Закона Республики Узбекистан «Об образовании» (23.09.2020) организация образовательного процесса должна быть рациональной, предполагающей эффективное использование педагогического и дидактического подходов, а также формирование у педагогов высокой профессиональной культуры и педагогического мастерства в условиях реальной дошкольной образовательной практики.

Президент Республики Узбекистан Ш.М. Мирзиёев подчёркивает, что основной целью проводимых реформ в сфере педагогического образования является создание условий и действенных механизмов развития личности, её гармоничного совершенствования и благополучия, а также подготовка конкурентоспособных педагогических кадров. Его мысли отражают

необходимость воспитания квалифицированных специалистов по дошкольному образованию на основе богатого интеллектуального наследия народа и общечеловеческих ценностей, с учётом современных достижений культуры, экономики, науки, техники и технологий. Развитие новой системы подготовки таких специалистов стало одним из важнейших условий прогресса дошкольного образования в Республике Узбекистан.

Дошкольный возраст является одним из важнейших этапов личностного и психического развития ребёнка. Особенно интенсивно в этот период происходит формирование речи. Развитие речи составляет основу для становления мышления ребёнка, его общения и адаптации в обществе.

На развитие речи ребёнка влияют как внешние, так и внутренние факторы. В первую очередь, огромное значение имеет семейная среда. Уже в первый год жизни ребёнок реагирует на обращённую к нему речь звуками, и эти звуки становятся средством общения со взрослыми. Круг общения дома, а также частота и содержание взаимодействия взрослого и ребёнка оказывают непосредственное влияние на развитие речи.

Словарный запас ребёнка увеличивается по мере взросления и тесно связан с возрастными особенностями. Русский педагог В.А. Сухомлинский особо подчёркивал, что развитие речи ребёнка охватывает все её стороны. Природа не дарит человеку способность говорить с рождения. Для того чтобы ребёнок начал говорить, требуется время. Для правильного и своевременного формирования речи взрослым необходимо приложить много усилий — на этом акцентировал внимание Сухомлинский [5].

Дошкольный возраст является периодом активного освоения разговорной речи ребёнка, формирования и развития всех её сторон — фонематической, лексической и грамматической. Полное овладение родным языком в дошкольном возрасте является необходимым условием для решения задач умственного, эстетического и нравственного воспитания в наиболее чувствительный (сенситивный) период развития. Чем раньше начинается обучение родному языку, тем свободнее ребёнок будет пользоваться им в дальнейшем.

В дошкольном возрасте расширяется круг общения ребёнка. Став более самостоятельными, дети выходят за пределы узкого семейного круга и вступают в более широкие отношения, прежде всего со сверстниками. Расширение сферы общения требует от ребёнка полного овладения средствами коммуникации, основным из которых является речь. Усложняющаяся деятельность ребёнка также предъявляет повышенные требования к развитию речи.

С.Л. Рубинштейн отмечал, что речь — это общение посредством языка, деятельность, направленная на выражение, воздействие и передачу информации; речь — это язык в действии. Речь, будучи связанной с языком, представляет собой особую форму деятельности, единство взаимодействия и смысла, через которую отражается и осознаётся действительность. Иными словами, речь является формой существования сознания (мыслей, чувств и

переживаний) для другого человека и средством общения, социальной формой отражения действительности.

Развитие языка у дошкольников происходит на протяжении нескольких возрастных этапов. Наиболее важным считается период от одного до четырёх лет, когда ребёнок усваивает основные закономерности языка [3].

В процессе взаимодействия ребёнка с окружающим миром и людьми он обогащает свой жизненный опыт, получает новые впечатления, и в зависимости от этого развиваются его умственные способности и, соответственно, речь.

Работа по развитию речи детей должна быть комплексной и охватывать все стороны речевого развития — фонематическую, лексическую и грамматическую. Всестороннее воздействие на речь является необходимым условием её полноценного формирования. Однако стихийное развитие речи не может вывести ребёнка на высокий уровень — требуется помощь взрослых, их целенаправленное обучение и участие. Взрослый пробуждает у ребёнка интерес к языку, побуждает его к речевому творчеству.

Своевременное и полноценное формирование речи в дошкольном возрасте является одним из важнейших условий нормального развития ребёнка и его успешного обучения в школе. Любые задержки или нарушения в развитии речи отражаются на поведении ребёнка, а также на различных видах его деятельности.

Современное и полноценное усвоение речи означает формирование у ребёнка целостной психики и является первым важным условием правильного развития в будущем. Современное — значит, начиная с первых дней жизни ребёнка. Под полноценностью понимается достаточный объём языкового материала, который на каждом возрастном этапе мотивирует ребёнка овладевать речью в соответствии со своими возможностями.

Речевое развитие детей рассматривается как развитие навыков понимания и использования языка: развитие фонематического слуха, звукового анализа, словарного запаса, грамматических категорий, коммуникативных умений, навыков связной речи. Среди множества важных задач воспитания и обучения детей дошкольного возраста в детском саду одной из основных является обучение родному языку, развитие речи и речевого общения.

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СРАВНИТЕЛЬНАЯ ХАРАКТЕРИСТИКА ВЫСЕВАЕМОСТИ ВОЗБУДИТЕЛЕЙ ОСТРЫХ И ХРОНИЧЕСКИХ ОСТЕОМИЕЛИТОВ В ЗАВИСИМОСТИ ОТ ВОЗРАСТА

Аннотация. *Целью исследования явилось изучение причинно-следственных связей высеваемости возбудителей острых и хронических остеомиелитов в зависимости от возраста больных в динамике. Установлено, что основными отличиями по высеваемости возбудителей явились: у детей при острых и хронических остеомиелитах между высеваемостью микроорганизмов достоверных отличий нет, у взрослых эта разница была в 7,6 раз больше в пользу хронических остеомиелитов; у детей по высеваемости S.aureus отличий нет, у взрослых при хронических остеомиелитах этот параметр был больше в 7,3 раз; при обеих формах остеомиелитов спектр возбудителей у детей был узким.*

Ключевые слова: *острые и хронические остеомиелиты, возбудители, больные дети и взрослые, микробиологические методы.*

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COMPARATIVE CHARACTERISTICS OF THE RATE OF CULTIVATION OF ACUTE AND CHRONIC OSTEOMYELITIS AGENT BY AGE

Abstract. *The aim of the study was to investigate the causal relationships between the rate of bacterial isolation of acute and chronic osteomyelitis pathogens over time, depending on the patient's age. The main differences in bacterial isolation were as follows: no significant differences were found between bacterial isolation rates in children with acute and chronic osteomyelitis, while in adults, this difference was 7.6 times greater, favoring chronic osteomyelitis; There were no differences in the rate of S. aureus culture in children, while in adults with chronic osteomyelitis, this parameter was 7.3 times higher. In both forms of osteomyelitis, the spectrum of pathogens in children was narrow.*

Keywords: *acute and chronic osteomyelitis, pathogens, sick children and adults, microbiological methods.*

На сегодняшный день доказано, что заболеваемость остеомиелитами связаны с социальными и экономическими факторами. Эта патология характеризуется широкой распространенностью, тяжелым течением при снижении защитных факторов организма под влиянием различных внутренних и внешних отрицательных факторов [3, 4, 5, 8].

Этиологические агенты остеомиелитов относятся к разным родам и видам микроорганизмов. Среди них идентифицированы грамположительные кокки, грамотрицательные бактерии, анаэробы, вместе с тем высеяны и различные микроскопические грибы [1, 2, 6, 7, 9, 10].

Проведены достаточно практических и фундаментальных исследований посвященных патогенезу, клинике, лечению и профилактике остеомиелитов, но исследований посвященных микробиологическим аспектам, степени высеваемости этиологических агентов при различных формах заболевания в зависемости от возраста в динамике течения болезни редки.

Целью исследования явилось изучение высеваемости возбудителей острых и хронических остеомиелитов в зависимости от возраста больных в динамике течения заболевания.

Материалы и методы исследования. Для выполнения данной работы обследованы 448 больных острыми (n=53) и хроническими (n=395) формами остеомиелитов, 380 из них (84,8±1,7%) были взрослыми и 68 (15,2±1,7%) детьми. Выявлено, что хронические остеомиелиты чаще встречались чем острые у взрослых - соответственно 92,1±1,4% (n=350) против 7,9±1,4% (n=30). У больных детей сохранилась такая же тенденция - соответственно 66,2±5,7% (n=45) против 33,8±5,7% (n=23). Нужно подчеркнуть, что хотя и тенденция высеваемости были близки между собой, но по кратности отличий разница была большая, если у взрослых разница между показателями было равно 11,7 раз, то у детей этот параметр составил 2,0 раза.

Из всего контингента 324 больных (72,3±2,1%) были мужчинами и 124 больных (27,7±2,1%) женщинами. Если у взрослых соотношение женщин и мужчин было 1:2,62, то у девочек и мальчиков этот параметр был 1:2,58.

Посттравматический остеомиелит у взрослых составил 66,3±2,4% (n=252), а у детей этот показатель равнялся 41,2±6,0% (n=28). Гематогеный остеомиелит у взрослых больных проявлялся в 25,0±2,2% (n=95) случаях, а у детей этот показатель составил 42,6±6,0% (n=29). Из обследованного контингента 7,9±1,4% (n=30) взрослых и 16,2±4,5% (n=11) детей (или их родители) причину возникновения болезни указать не смогли.

Локализация патологического процесса чаще наблюдались на костях бедра, голени, плеча и стопы ($P<0,05$). Эта тенденция встречаемости были схожими как у взрослых, так и у больных детей. В некоторых случаях патологический процесс локализовался в обеих костях, из за этого на 380 больных приходилось 391 локализация. Всего в 73,2% случаях у взрослых и 74,9% случаях у детей патологический процесс распологался на костях бедра и голени. У больных детей локализацию патологического процесса на костях колена, таза и ключицы не наблюдали.

Всему контингенту обследованных больных диагнозы остеомиелитов верифицировали с помощью клинических, клинико-инструментальных (рентгенологических) и лабораторных методов по International Statistical Classificftion of Diseases and Related Health Problems 10 th Revision Version for (2007) и подтверждали бактериологическими методами.

Для оценки микробиологических аспектов выполненных исследований использовали традиционные микробиологические методы. Идентификацию микроорганизмов проводили по Bergey´s Manual Systematic Bacteriology (1997). Для бактериологических исследований применяли питательные среды фирмы «HiMedia» (Индия).

Полученные результаты и их обсуждение. От обследованныъх 68 больных детей высеяны 78 штаммов. Не выявлены достоверные отличия между выявляемостью монокультуры (53,9±5,6%, n=42) и ассоциации микроорганизмов (46,2±5,6%, n=36). Такая же информация получена и по сравнительной оценке высеваемости грамположительных кокков и грамотрицательных бактерий.

У 380 взрослых больных с остеомиелитами высеяны 399 штаммов. Из них 227 штаммов (56,9±2,5%) идентифицированы в виде монокультуры, 172 штамма (43,1±2,5%) в качестве ассоциации микроорганизмов. По этим параметрам результаты взрослых были близки к данным больных детей. В отличии от них у взрослых грамположительные кокки выявлены достоверно больше, чем грамотрицательные бактерии в качестве монокультуры (соответственно 36,4±2,4%, n=145 против 16,9±1,9%, n=67).

Привлекает внимание тот факт, что у детей в качестве монокультуры на ведущих позициях были у *S.aureus* и затем у *P.aeruginosa*, то у взрослых эта последовательность выглядело по другому: *S.aureus* (22,3±2,1%, n=89), *S.epidermidis* (9,0±1,4%, n=36), *E.coli* (7,3±1,3%, n=29), *P.aeruginosa* (6,8±1,3%, n=27). При ассоциации микроорганизмов у детей ведущее место по степени высеваемости было у грамположительных кокков (*S.aureus* и *S.epidermidis*), то у взрослых наблюдали обратную картину, то есть на ведущих позициях были *E.coli* (8,3±1,4%, n=33) и *P.aeruginosa* (7.2±1,3%, n=29). Другим межвозрастным отличием является то, что у взрослых в 11 случаях (2,7±0,8%) отмечали рост *Bacteroides spp*, которую идентифицировать у детей не удалось.

При анализе результатов по проценту высеваемости штаммов, выявленных в виде монокультуры и ассоциации микроорганизмов установлено, что из 13 штаммов у 4 возбудителей выявляли отличия, если *S.aureus* (22,3±2,1%, n=89 против 6,8±1,3%, n=27) и *Klebsiella spp* (4,5±1,0%, n=18 против 1,0±0,5%, n=4) достоверно больше высевались в качестве монокультуры, то *Bacteroides spp* и *Candida spp* не удалось идентифицировать в качестве монокультуры, однако выявляли в виде ассоциации микроорганизмов (соответственно 2,7±0,8%, n=11 и 2,5±0,8%, n=10). У детей такое явное отличие наблюдали только по высеваемости *P.aeruginosa* (11,5±3,6%, n=9 против 2,6±1,8%, n=2).

Результаты сравнительного анализа высеваемости в качестве монокультуры и ассоциации микроорганизмов некоторых отличающихся между собой штаммов в зависимости от возраста приведен на рис. 1.

Идентифицированные у взрослых больных в качестве ассоциации микроорганизмов 172 штамма определяли по 2 микроорганизма в 37 случаях (у детей в 15 случаях), по 3 микроорганизма в 21 случае (у детей в 2 случаях), по 4 микроорганизма в 9 случаях (у детей нет). Результаты показывают, что у взрослых ассоциации микроорганизмов встречается больше, чем у детей.

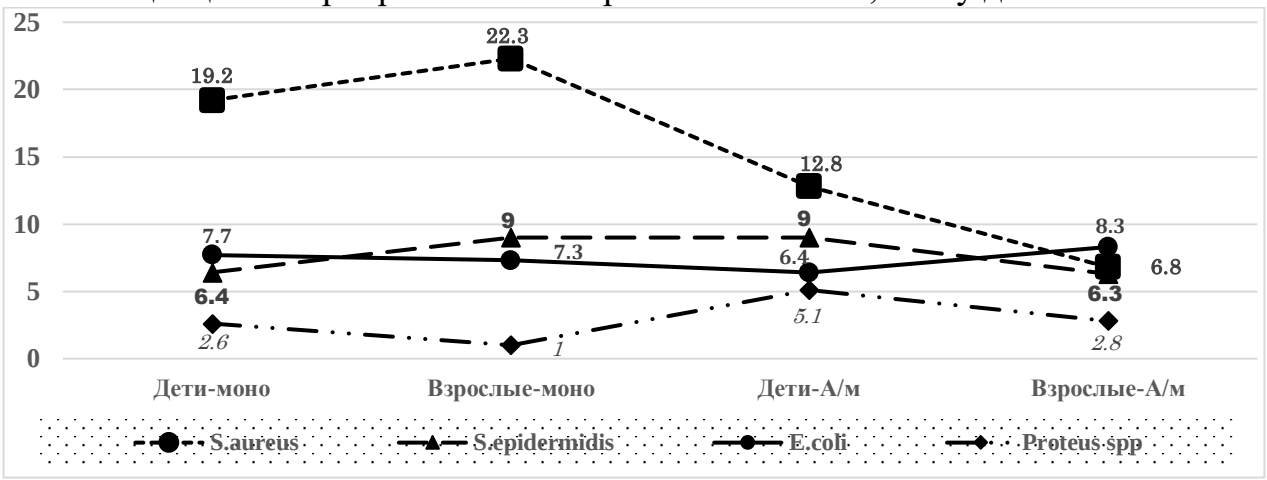


Рис. 1. Сравнительные показатели высеваемости возбудителей остеомиелитов у детей и взрослых, % (А/м – ассоциация микроорганизмов)

Привлекает внимание то, что по процентам высеваемости возбудителей обнаружены межвозрастные отличия и причинно-следственные взаимосвязи среди больных. Они выглядели следующим образом:

- у детей при острых и хронических остеомиелитах достоверные отличия (P>0,05) между высеваемости грамположительных и грамотрицательных микроорганизмов не выявляли, а у взрослых этот показатель в 7,6 раз был достоверно больше (P<0,001) при хронических остеомиелитах;

- если по высеваемости *S.aureus* у детей в зависимости от формы болезни достоверных отличий не наблюдали, то взрослых больных полученные цифры достоверно отличались (P<0,001) между собой - при хронических остеомиелитах в 7,3 раза больше;

- у детей при острых остеомиелитах идентифицированы 4 рода и вида возбудителей, а у взрослых больных 10 родов и видов (в 2,5 раза больше);

- у детей при хронических остеомиелитах высеяны 10 родов и видов возбудителей, а у взрослых 13 родов и видов (в 1,3 раза больше);

- при острых остеомиелитах не зависимо от возраста больных не высевались *Klebsiella spp, P.aeruginosa* и *Candida spp*, то при хронических остеомиелитах они идентифицированы в качестве возбудителей;

- при острой форме болезни ассоциации микроорганизмов наблюдали достоверно меньше, чем при хронической форме болезни – соответственно 1 случай по 2 микроорганизма против 83 случаев по 2, 3 и 4 микроорганизма.

Сравнительный анализ полученных результатов показали, что между микробным пейзажом острой и хронической формы остеомиелитов у больных детей и взрослых имеются заметные отличия (рис. 2).

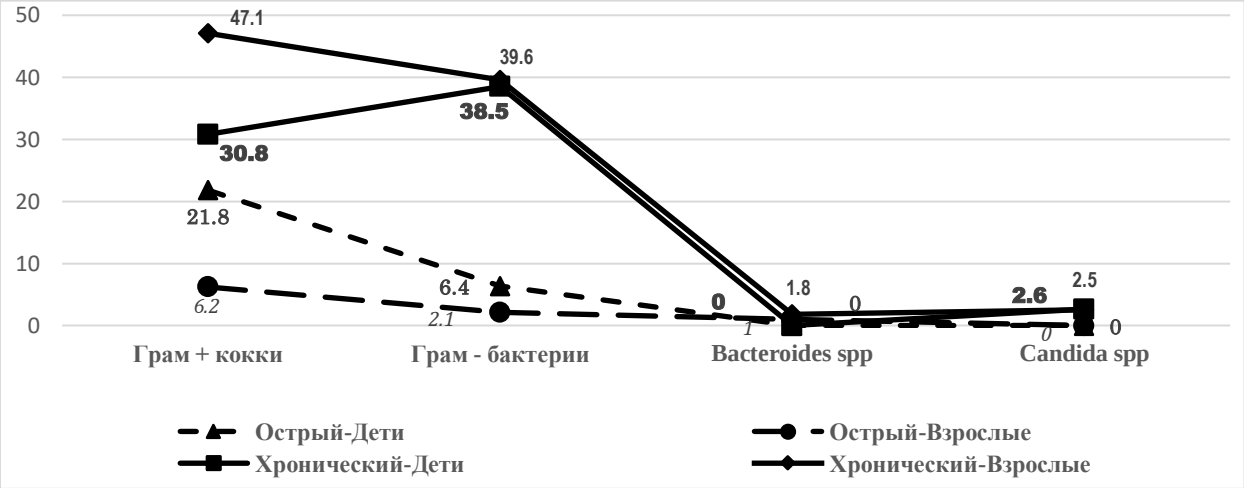


Рис. 2. Показатели распределения возбудителей остеомиелитов в зависимости от формы болезни и возраста больных, %

Выявлено, что при постравматическом остеомиелите у взрослых микроорганизмы высевались достоверно больше, чем при гематогенных остеомиелитах. Достоверные отличия по причинам заболевания в зависимости от возраста больных не наблюдали (P>0,05). Оставались на том же уровне полученные цифры, тенденция их изменений, причинно-следственные связи. Если у больных детей при постравматическом остеомиелите не удалось идентифицировать *S.hemolyticus, S.pyogenes, Enterobacter spp* и *Bacteroides spp*, то у взрослых не высевались *E.faecalis* и *Enterobacter spp*. Спектр возбудителей высеянных при гематогенных остеомиелитах является узким по отношению к постравматическому (9 штаммов против 11) - P<0,05 - P<0,001.

Привлекает внимание то, что при гематогенном остеомиелите в обеих возрастных группах не высевались *S.hemolyticus, S.pyogenes, S.saprophyticus* и *Candida spp*. По причинам формирования остеомиелитов не выявлены межвозрастные отличия среди больных детей и взрослых.

Исследования показали, что изучение состава этиологических агентов, их степени встречаемости, соотношения между процентами высеваемости возбудителей, межвозрастные отличия позволяют понять место микроорганизмов при формировании остеомиелитов, определить причинно-следственные взаимосвязи между ними, формировать тактику лечения и определить прогноз исхода патологического процесса.

На следующем этапе исследований изучали пейзаж возбудителей, высеянных от больных остеомиелитами детей и взрослых в динамике течения

болезни. Все исследования проведены до операции, через 1, 3, 7, 14 дней после оперативного вмешательства. Приведен анализ результатов исследований 9 детей, 14 взрослых больных острыми остеомиелитами, 17 детей, 28 взрослых больных хроническими остеомиелитами.

Полученные результаты показывают, что детей и взрослых с острыми остеомиелитами в динамике течения болезни (до, через 1, 3, 7, 14 дней после операции) изученные возбудители высевались редко. Динамика роста у детей (n=9) было в следующей последовательности: до операции 100%; через 1 день роста нет; через 3 дня рост в 11,1±10,5%, через 7 дней в 11,1±10,5% случаях, через 14 дней роста нет. У взрослых наблюдали такие же результаты: до операции 100%; через 1 день роста нет; через 3 дня рост в 7,1±6,8%; через 7 дней в 14,3±9,3% случаях; через 14 дней роста нет.

Полученные близкие результаты в обеих возрастных группах указывает на продолжающиеся тенденцию угасания патологического процесса, минимальность перехода процесса в хроническую форму, положительный прогноз исхода болезни.

У детей и взрослых с хроническими остеомиелитами в динамике течения болезни процент роста возбудителей было достоверно больше, чем при острой форме (P<0,001). Динамика роста у детей (n=17) было в следующей последовательности: до операции 100%; через 1 день роста нет; через 3 дня рост в 58,8±11,9%, через 7 дней в 64,7±11,6%, через 14 дней в 88,2±7,8% случаях.

Отсутствие соответствующего эффекта в течение данного времени указывает на повышение риска перехода патологического процесса от острой формы к хронической, неблагоприятный прогноз исхода болезни. Повышение процента высеваемости возбудителей в динамике течения болезни рекомендован как один из микробиологических прогностических критериев, определяющий переход патологического процесса от острой к хронической форме болезни.

Выводы. 1. Основными отличиями по высеваемости возбудителей явились: у детей при острых и хронических остеомиелитах между высеваемостью микроорганизмов достоверных отличий нет, у взрослых эта разница была в 7,6 раз больше в пользу хронических остеомиелитов; у детей по высеваемости *S.aureus* отличий нет, у взрослых при хронических остеомиелитах этот параметр был больше в 7,3 раз; при обеих формах остеомиелитов спектр возбудителей у детей был узким; при острой форме болезни не зависимо от возраста не высевались *Klebsiella spp, P.aeruginosa, Candida spp,* но при хронической форме они были идентифицированы; при острой форме ассоциации наблюдали меньше, чем при хронической форме.

2. В динамике течения болезни при острых остеомиелитах высеваемость возбудителей в обеих возрастных группах было минимальной, а в конце периода наблюдения отмечали отрицательный бактериологический результат. При хронических остеомиелитах в динамике течения болезни

высеваемость этиологических агентов было достоверно больше, чем при острых остеомиелитах.

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ФАКТОРЫ ПОВЫШЕНИЯ АКТИВНОСТИ СТУДЕНТОВ В САМОСТОЯТЕЛЬНОЙ УЧЕБНОЙ СРЕДЕ

Аннотация: *в данной статье даются основы по организации сдачи студентами самостоятельной работы. А также перечисляются факторы повышения активности студентов в самостоятельной учебной среде. Предлагаются методы и формы стимулирующие активизацию* познавательной *деятельности обучающихся и ускоряющие процесс освоения нового материала.*

Ключевые слова: *самостоятельная работа, формы, методы, виды, факторы, качество, активизация, эффективность, творческие способности.*

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FACTORS CONTRIBUTING TO STUDENT'S ACTIVITY IN AN INDEPENDENT LEARNING ENVIRONMENT

Annotation: *this article provides the basics for organizing the delivery of independent work by students. It also lists the factors for increasing the activity of students in an independent learning environment. Methods and forms are proposed that stimulate the activation of the cognitive activity of students and accelerate the process of mastering new material.*

Key words: *independent work, forms, methods, types, factors, quality, activation, efficiency, creativity.*

Одним из важных факторов подготовки квалифицированных кадров является повышение качества и эффективности образования. Современные методы, формы и инструменты обучения, игровые технологии, проблемное обучение и нетрадиционные методы самостоятельного обучения играют важную роль в повышении качества и эффективности образования.

Одна из главных задач сегодняшнего дня - научить студентов работать самостоятельно. Для этого необходимо развивать формирование дополнительных навыков, которые помогут пробудить творческие способности студента и закрепить полученные знания в аудитории. Актуальной задачей современной школы является реализация компетентностного подхода в образовании, а именно, формирование ключевых компетентностей, обобщенных и прикладных предметных умений, жизненных навыков. Вопросы активизации учения студентов относятся к числу наиболее значимых проблем современной педагогической науки и практики [1]. Самостоятельная работа — это способность студента понять задачу, поставленную преподавателем, а также объяснить ее содержание и социально-экономическое значение. Разновидности форм самостоятельных работ могут включать в себя: подготовку к сдаче контроля, написание реферата, подготовку курсовой работы, подготовку к дипломным проектам и посещение семинаров в вузах. Не будет преувеличением сказать, что самостоятельная работа студентов является одной из важнейших задач педагогики высшей школы. Так как к подготовке самостоятельной работы студент подходит творчески. Благодаря широкому использованию литературы, журналов, газет и средств массовой информации, он стремится раскрыть всю глубину социально-экономической значимости поставленных задач в самостоятельной работе. Это стремление в дальнейшем проявляется в виде повышенного интереса студентов к научно- академической работе, что создает почву для роста до степени ученого. Одной из основных задач преподавателей каждого предмета является создание методических разработок и методических указаний, связанных с организацией самостоятельного обучения, а также повышением эффективности самостоятельного обучения. Это в свою очередь решает следующие проблемы:

- взаимоотношения действий преподавателя и студента в условиях самостоятельного обучения
- факторы повышения активности студентов в самостоятельной учебной среде;
- критерии для определения степени раскрытия поставленных задач в работах студентов при самостоятельном образовании и т. д.

Когда речь идет о самостоятельном обучении, важно отличать его форму обучения (лекции, семинары, практикумы), предоставляемую преподавателем. Организация самостоятельной работы в основном имеет две цели:

- обучить студентов самостоятельной работе, развить навыки творческого мышления будущих специалистов;

- через самостоятельное обучение под контролем преподавателя научить студентов организовывать выполнение работ самостоятельно.

При организации самостоятельной работы студентов работа преподавателя заключается в обеспечении эффективности самостоятельной работы, консультирования, практической помощи и мониторинга результатов самостоятельного обучения. Самостоятельное обучение может принимать две формы:

- выполнение студентом самостоятельной работы, запланированной преподавателем заранее и частично контролируемая в соответствии с определенными инструкциями;

- самостоятельная работа, планируемая самим студентом и мотивированная собственными интересами и пожеланиями студента.

Во втором случае внутренняя мотивация студента контролирует достижение цели, поставленной самоконтролем самообразования. Акцент в организации самостоятельного обучения должен быть сосредоточен на выборе учебного материала и последовательности обучения в зависимости от количества часов, выделенных для самостоятельного обучения в учебной программе. Существуют различные формы самостоятельного обучения: это требует творческого подхода к поиску эффективных способов организации самостоятельного обучения, а не ограничивается преподаванием методической литературы. Например, необходимо заранее тщательно спроектировать и организовать независимое обучение, чтобы определить целевое использование интерактивных методов, таких как групповая работа, создание пар, индивидуальная работа и технологии решения проблем.Это полностью соответствует требованиям педагогической технологии и технологическим подходам, которые сейчас широко используются в образовании. Также необходимо подготовить наглядные пособия и раздаточные материалы для каждого изучаемого предмета. Повышение вовлеченности студентов в самостоятельное обучение является одним из наиболее важных факторов в достижении желаемого результата. Это показывает необходимость мотивации студентов к изучаемым темам. Существуют разные формы самостоятельного обучения:

1. Самостоятельное изучение определенных тем или частей из учебников и учебных пособий. Этот тип самостоятельного обучения обычно подходит для студентов первого курса, которые еще не обладают достаточными навыками самообучения. Результат этой работы будет проверен путем выполнения рефератов, отдельных вариантов и тому подобного.

2. Использование передовых информационных технологий. Этот тип самостоятельного обучения эффективно используется для практической работы и для подготовки устных задач. В частности, использование Интернета, использование электронных книг и возможность дистанционного

обучения предоставляют новую информацию. С помощью Интернета студенты могут получать разнообразную дополнительную и новую научную и практическую информацию по интересующим их темам, критически анализировать и применять их в своих собственных исследованиях. Мы можем сделать вывод, что независимое обучение позволяет студентам самостоятельно мыслить, иметь собственные представления о событиях, оттачивать свое космическое зрение, развивать свои творческие способности, быстро решать сложные ситуации, получать более глубокие знания, использовать свою внутреннюю память. навыки, такие как приобретение формируются.

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РИСКИ КИБЕРБЕЗОПАСНОСТИ И МЕХАНИЗМЫ УПРАВЛЕНИЯ

Аннотация статьи: *В данной статье анализируются риски кибербезопасности и механизмы управления ими как актуальная проблема современного информационного общества. В исследовании рассматриваются основные киберугрозы, возникающие с развитием цифровых технологий, – кража данных, вредоносное ПО, фишинговые атаки, распределенный отказ в обслуживании (DDoS) и внутренние угрозы. Также освещается роль международного опыта, национального законодательства, политики информационной безопасности, повышения цифровой грамотности сотрудников и использования современных технических средств в обеспечении кибербезопасности. В статье на основе анализа научных трудов зарубежных и узбекских ученых, опубликованных в 2021–2025 годах, разрабатываются эффективные подходы и практические механизмы управления кибербезопасностью. Результаты исследования служат для разработки рекомендаций по формированию культуры информационной безопасности в организациях и снижению рисков.*

Ключевые слова: *Кибербезопасность, анализ угроз, управление рисками, защита информационных систем, киберзащита от «ИИ».*

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CYBERSECURITY RISKS AND MANAGEMENT MECHANISMS

Annotation: *This article analyzes cybersecurity risks and their management mechanisms as a pressing issue in the modern information society. The study examines the main cyberthreats arising with the development of digital technologies, including data theft, malware, phishing attacks, distributed denial of service (DDoS), and insider threats. It also highlights the role of international experience, national legislation, information security policies, improving employee digital literacy, and the use of modern technical tools in ensuring cybersecurity. Based on an analysis of scientific papers by international and Uzbek scholars*

published between 2021 and 2025, the article develops effective approaches and practical mechanisms for cybersecurity management. The results of the study serve to develop recommendations for developing an information security culture in organizations and mitigating risks.

Key words: *Cybersecurity, threat analysis, risk management, information systems protection, cyber defense against AI.*

Введение: В современную эпоху глобализации и цифровых технологий информационные системы глубоко проникают во все сферы деятельности человека. При этом вопросы безопасности в цифровой среде, в частности риски кибербезопасности, становятся актуальной проблемой. Кибербезопасность – это сложная система мер, направленных на защиту информационных ресурсов от несанкционированного доступа, повреждения, кражи или потери. Рост числа и сложности кибератак в последние годы представляет большую угрозу для государственных органов, субъектов предпринимательства и рядовых пользователей. В Республике Узбекистан в рамках стратегии «Цифровой Узбекистан – 2030» проводится системная работа по укреплению информационной безопасности, развитию национальной инфраструктуры компьютерную безопасность и внедрению механизмов управления, соответствующих международным стандартам. В этой связи выявление, оценка и разработка эффективных механизмов управления рисками информационная безопасность становятся неотъемлемой частью современной управленческой практики. Данная статья посвящена данному вопросу – теоретическим и практическим аспектам снижения рисков компьютерную безопасность и управления ими.

Обзор литературы: Зарубежный учёный Дж. Уильямс (2022) в своём исследовании проанализировал уязвимости цифровых инфраструктур и подчеркнул необходимость использования технологий искусственного интеллекта для их выявления. Также **Р. Чен и Л. Парк (2023)** научно обосновали эффективность проактивной модели управления рисками при разработке стратегий безопасность информационных технологий. По их мнению, раннее выявление источников киберрисков и мониторинг рисков в режиме реального времени существенно повышают безопасность организации.

Узбекский учёный А. Холматов (2022) отметил важность гармонизации национальных стандартов и международных требований при формировании системы информационная безопасность. По его словам, сотрудничество государства и частного сектора является одним из основных факторов предотвращения кибератак. **Д. Джоураев (2023)** также подчеркнул необходимость повышения кадрового потенциала, развития культуры информационной безопасности и обновления технической инфраструктуры в обеспечении информационная безопасность в нашей стране.

На **международном уровне Э. Браун (2024)** рассматривает кибербезопасность как неотъемлемую часть экономической безопасности в

контексте цифровой экономики. Он анализирует непосредственное влияние факторов киберриска на экономическую стабильность и обосновывает необходимость комплексного подхода к управлению ими.

Методология исследования: В качестве методических методов исследования были использованы аналитический подход, статистический анализ данных, графический анализ, сравнение с передовым зарубежным опытом и научное обобщение.

Анализ и результаты: Риски кибербезопасности и преимущества управления: Внедрение механизмов управления рисками кибербезопасности дает организациям, государственным органам и обществу ряд важных преимуществ. Прежде всего, эти системы позволяют надежно защищать информационные ресурсы и предотвращать кибератаки. Обеспечивается безопасность данных, что предотвращает утечку или порчу конфиденциальной информации. Гарантируется непрерывность бизнес-процессов. Механизмы безопасность информационных технологий сокращают время простоя систем, что обеспечивает стабильную работу бизнес-процессов. Они служат повышению доверия клиентов и партнеров. Высокий уровень информационной безопасности организации повышает ее конкурентоспособность. Система управления кибербезопасностью снижает финансовые потери. Существенно сокращаются ущерб, штрафы или репутационный ущерб, наносимый кибератаками. Повышение цифровой грамотности сотрудников формирует в организации культуру безопасности.

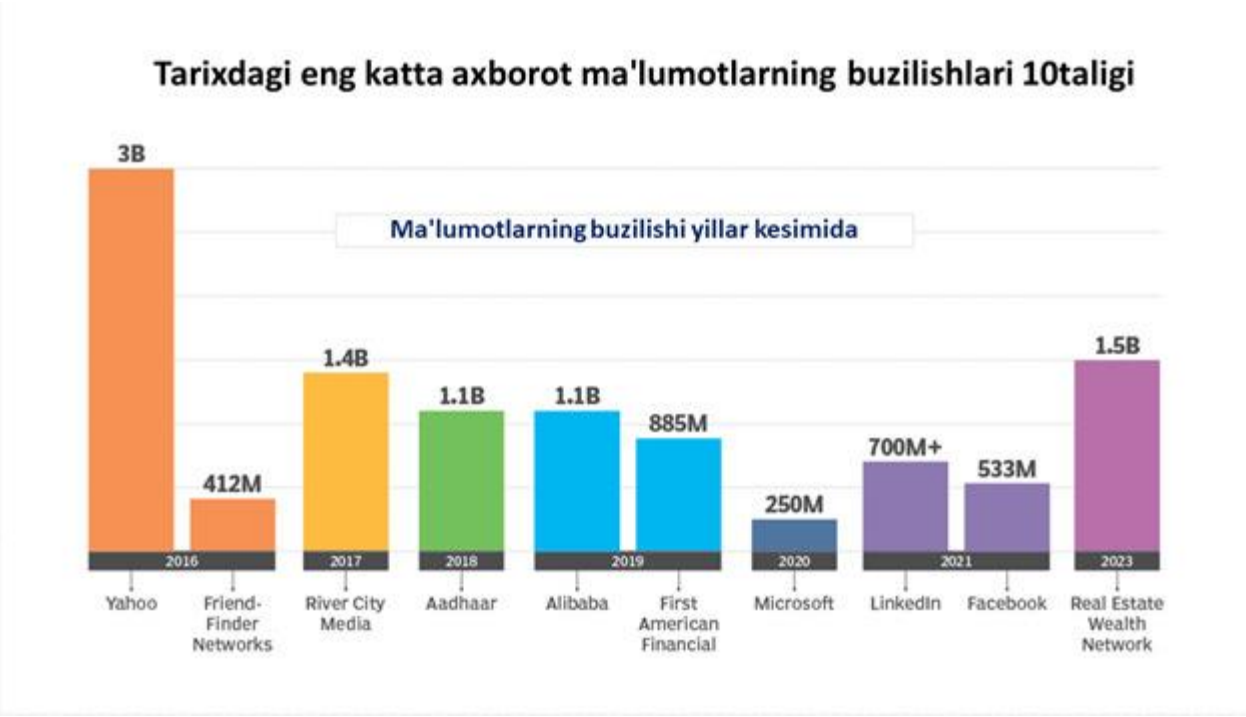


Диаграмма 1. Крупнейшие утечки данных в истории
Источник: https://infocom.uz/articles/cybersecurity-statistics

Графический анализ: Количество атак вредоносных программ увеличилось на 71% в период с 2016 по 2021 год. Число жертв атак программ-вымогателей увеличилось на 128,17% в период с 2022 по 2023 год. 4,1 миллиона сайтов были навсегда заражены вредоносным ПО.

Риски кибербезопасности и слабые стороны механизмов управления: **Высокие затраты** - внедрение современных систем защиты, программного и аппаратного обеспечения требует значительных финансовых ресурсов, что создает трудности для малых и средних предприятий. Нехватка специалистов - в результате нехватки квалифицированных кадров в области компьютерную безопасность могут возникать ошибки в процессах анализа и управления рисками. Сложность адаптации к быстро меняющейся среде угроз - киберпреступники постоянно используют новые методы, что приводит к устареванию существующих систем защиты в короткие сроки. Из-за низкой культуры информационной безопасности в некоторых организациях халатность или некорректные действия сотрудников создают внутренние источники риска. Недостаточно развитая нормативно-правовая база также снижает эффективность управления кибербезопасностью, поскольку в ряде случаев механизмы ответственности за киберпреступления четко не определены. Проблемы интеграции между различными системами и трудности в согласовании политик безопасности также являются существенными недостатками.

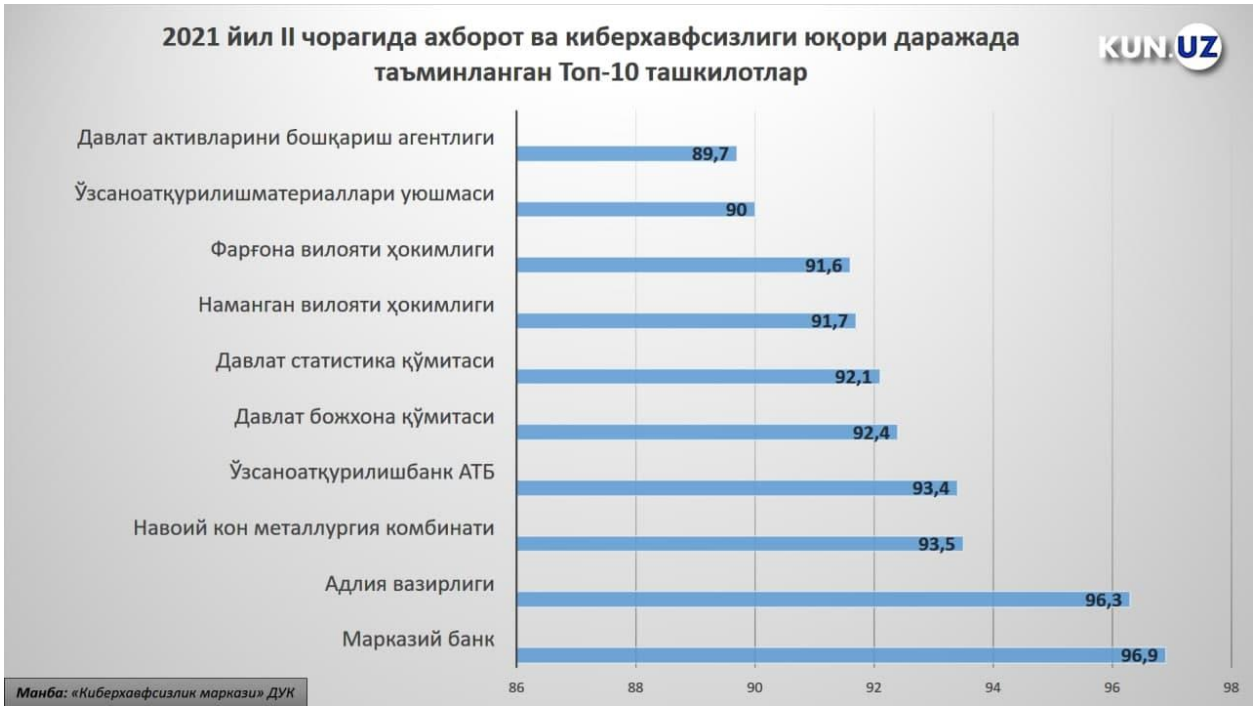


Диаграмма 2. Организации с высоким уровнем информационной и кибербезопасности в 2021 году

Источник: https://kun.uz/45263052?q=%2F45263052#!

Графический анализ: Центральный банк занял первое место в рейтинге центра, набрав 96,9 балла. Министерство юстиции заняло следующее место.

Навоийский горно-металлургический комбинат, производящий золото — основной экспортный товар Узбекистана, замкнул тройку лидеров по уровню информационной и кибербезопасности.

В первую десятку также вошли таможенный и статистический комитеты, хокимияты Наманганской и Ферганской областей.

Предложения: Улучшение национальной стратегии кибербезопасности - Необходимо сформировать единую государственную политику в области компьютерную безопасность, внедрить единые стандарты и протоколы для всех отраслей. Развивать систему подготовки кадров – необходимо расширить направления информационной безопасности в высших учебных заведениях, создать практико-ориентированные учебные программы и организовать курсы повышения квалификации специалистов. Внедрять искусственный интеллект и автоматизированные системы мониторинга – важно широко использовать современные технологии для раннего обнаружения, анализа и оперативного реагирования на киберугрозы. Укреплять сотрудничество между частным сектором и государством – рекомендуется обеспечить системный подход путем создания единой платформы для обмена информацией, мониторинга и предотвращения угроз. Формировать культуру информационной безопасности у сотрудников – количество ошибок, вызванных человеческим фактором, можно снизить путем регулярного проведения тренингов, семинаров и симуляционных учений по киберугрозам. Совершенствование нормативно-правовой базы – необходимо актуализировать механизмы борьбы с киберпреступностью и наказания в соответствии с международными стандартами, а также обеспечить правовое сопровождение деятельности организаций, осуществляющих кибербезопасность. Реализация данных предложений позволит обеспечить системный подход к кибербезопасности и повысить устойчивость информационной безопасности на национальном и корпоративном уровнях.

Заключение: В заключение следует отметить, что управление рисками компьютерную безопасность является одним из важнейших стратегических направлений в современном цифровом обществе. В условиях роста кибератак, стремительного развития технологий и расширения информационных потоков потребность организаций в совершенствовании своих систем безопасности возрастает с каждым днем. Эффективные механизмы управления кибербезопасностью важны не только для защиты данных, но и для обеспечения экономической стабильности, повышения доверия клиентов и создания среды цифрового доверия. Анализ показывает, что для достижения успеха в области компьютерную безопасность необходимо комплексное применение технических, организационных и правовых мер. Основными факторами являются использование

искусственного интеллекта и автоматизированных систем, повышение кадрового потенциала и формирование культуры информационной безопасности.

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УПРАВЛЕНИЕ РИСКАМИ С ПОМОЩЬЮ ЦИФРОВЫХ ТЕХНОЛОГИЙ И ИСКУССТВЕННОГО ИНТЕЛЛЕКТА

Аннотация статьи: *В данной статье рассматриваются вопросы повышения эффективности процесса управления рисками за счет использования цифровых технологий и инструментов искусственного интеллекта (ИИ). В исследовании анализируется роль алгоритмов искусственного интеллекта на этапах выявления, оценки и снижения финансовых, операционных и стратегических рисков, возникающих на предприятиях и в организациях. Показаны практические преимущества систем прогнозирования, аналитики данных и автоматизированных механизмов принятия решений, созданных на основе цифровых технологий. При этом обсуждаются такие вопросы, как информационная безопасность, человеческий фактор и ограничения программного обеспечения. В заключение исследования выдвигаются предложения по совершенствованию системы управления рисками в процессе цифровой трансформации, расширению механизмов автоматического мониторинга и анализа в реальном времени на основе искусственного интеллекта.*

Ключевые слова: *Цифровые технологии, искусственный интеллект, управление рисками, машинное обучение, аналитика данных, цифровая трансформация, автоматизация.*

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RISK MANAGEMENT USING DIGITAL TECHNOLOGIES AND ARTIFICIAL INTELLIGENCE

Annotation: *This article discusses the issues of increasing the efficiency of the risk management process through the use of digital technologies and artificial intelligence (AI) tools. The study analyzes the role of artificial intelligence algorithms in the stages of identifying, assessing and reducing financial, operational and strategic risks encountered by enterprises and organizations. It*

also shows the practical advantages of forecasting systems, data analytics and automated decision-making mechanisms created on the basis of digital technologies. The article analyzes the role of artificial intelligence in risk management, in particular, the possibilities of increasing accuracy and speed using machine learning and neural networks, based on examples of international experience. At the same time, issues such as information security, human error and software limitations are also discussed. At the end of the study, proposals are put forward to improve the risk management system in the process of digital transformation, expand automatic monitoring and real-time analysis mechanisms based on artificial intelligence.

Key words: *Digital technologies, artificial intelligence, risk management, machine learning, data analytics, digital transformation, automation.*

Введение: в последние годы в результате усиления глобальной конкуренции, стремительных изменений рынка и возросшей неопределенности вопрос эффективного управления рисками для предприятий становится все более актуальным. Традиционные методы управления рисками зачастую ограничены невозможностью анализа больших объемов данных в режиме реального времени, высокой зависимостью от человеческого фактора и погрешностями прогнозирования. Поэтому внедрение современных цифровых технологий и инструментов искусственного интеллекта (ИИ) в процессы выявления, оценки и управления рисками является одним из наиболее эффективных подходов на сегодняшний день. Цифровые технологии, включая Big Data, Cloud Computing, Blockchain, IoT (Интернет вещей) и технологии машинного обучения, позволяют предприятиям оперативно выявлять риски, прогнозировать их будущее влияние и принимать эффективные решения. В частности, аналитические системы на основе искусственного интеллекта автоматизируют процессы оценки, выполняемые человеком, и значительно повышают их точность. В данной статье рассматриваются теоретические основы, практические возможности и значение управления рисками с использованием цифровых технологий и искусственного интеллекта в деятельности предприятий. Также оцениваются перспективы внедрения этих систем в Узбекистане и их экономическая эффективность на основе анализа международного опыта.

Обзор литературы: Исследования и мнения зарубежных ученых -В своей работе «Основы управления рисками» Майкл Кроухи, Дэн Галай и Роберт Марк (2022) подчеркивают, что алгоритмические модели быстрее и точнее традиционных статистических анализов в процессе прогнозирования финансовых рисков с использованием искусственного интеллекта. По их данным, аналитические платформы на основе “ИИ” сокращают ошибки в финансовых учреждениях на 30–35%. Эндрю Нг (2023) в своих статьях подчеркивает, что технологии машинного и глубокого обучения снижают человеческий фактор при мониторинге корпоративных рисков и повышают точность прогнозов в режиме реального времени. Кейт Кроуфорд (2021) в

своей работе «Атлас ИИ» указывает на опасность игнорирования этических и социальных рисков при использовании искусственного интеллекта. По ее мнению, необходимо сбалансировать вопросы прав человека и конфиденциальности данных в управлении рисками с технологическими возможностями.

Мнения и направления исследований узбекских ученых: В своей научной работе на тему «Совершенствование систем управления рисками в цифровой экономике» М.К. Гофуров (2022) проанализировал способы повышения эффективности идентификации рисков путем внедрения инструментов искусственного интеллекта в деятельность предприятия. По мнению ученого, системы ИИ повышают скорость обработки данных и служат для оптимизации управленческих решений предприятия. В статье Д.Джураева (2023) «Современные методы оценки финансовых рисков на основе искусственного интеллекта» подчеркивается необходимость проведения анализа рисков на финансовом рынке Узбекистана с помощью автоматизированных платформ. Н.Каримова (2024) в своем исследовании освещает роль технологий ИИ в совершенствовании мониторинга рисков в страховом и банковском секторах, а также вопросы, связанные с информационной безопасностью. Б.Турсунов и Ш.Эргашев (2025) в своей статье «Цифровые модели управления рисками на промышленных предприятиях Узбекистана» на практических примерах обосновывают, что использование машинного обучения и аналитических систем повышает эффективность работы предприятий и снижает количество ошибок до 40%.

Методология исследования: В статье использованы аналитико-сравнительный метод, системный подход, научная абстракция, статистический анализ, методы индукции и дедукции, а также методологические приемы эмпирического наблюдения и моделирования.

Анализ и результаты: Преимущества управления рисками с использованием цифровых технологий и “ИИ”: Повышение точности и скорости, алгоритмы на основе искусственного интеллекта способны обрабатывать большие объемы данных за короткое время. В результате процесс выявления и оценки рисков осуществляется в 3–5 раз быстрее, чем при использовании традиционных методов. Это позволяет предприятиям своевременно реагировать на проблемы. Снижая влияние человеческого фактора, системы “ИИ” минимизируют субъективные оценки и человеческие ошибки. В процессе принятия решений преобладает подход, основанный на данных, и повышается надежность оценки рисков. Возможности мониторинга в режиме реального времени с использованием цифровых технологий (IoT, Big Data, облачные системы) позволяют непрерывно отслеживать факторы риска. Этот процесс позволяет предприятию управлять рисками и оперативно устранять их. Улучшенные прогнозирование и анализ, модели машинного обучения позволяют предсказывать будущие факторы риска на основе прошлых данных. Это позволяет предприятию более надежно планировать стратегические решения. Сокращение затрат, автоматизированные системы

анализа сокращают потребность в рабочей силе и позволяют более эффективно распределять человеческие ресурсы. Это снижает затраты предприятий, связанные с управлением рисками, на 20–30%. Системы “ИИ”, основанные на данных, принимают объективные решения, интегрируя статистические, аналитические и исторические данные. Возможность глобальной интеграции, системы управления рисками на базе системных интеграционных систем “ИИ” работают в соответствии с международными стандартами (ISO 31000, COSO ERM), что создает единую платформу для многонациональных компаний.



График 1. Рост показателей прибыли компаний за счет эффективного управления рисками посредством SI в 2023-2033 гг.

Источник: https://market.us/report/ai-in-risk-management-market/

Графический анализ:

- Об управлении рискамиОжидается, что к 2033 году мировой рынок ИИ достигнет 39,9 млрд долларов США по сравнению с 10,3 млрд долларов США в 2023 году, а среднегодовой темп роста составит 14,5% в прогнозируемый период с 2024 по 2033 год.
- В 2023 году компания Solution занимала доминирующее положение на рынке ИИ-предложений в сфере управления рисками, занимая более 63,2%.
- Ожидается, что в 2023 году рынок управления рисками обнаружения и предотвращения мошенничества займет доминирующее положение в сегменте приложений ИИ, заняв более 26,4% доли рынка.
- В 2023 году на долю Северной Америки придется 38,6% доли рынкаи получил доход в размере 3,97 млрд долларов США от использования ИИ на рынке управления рисками.

Недостатки управления рисками с использованием цифровых технологий и “ИИ”: Качество и недостаточность данных, для эффективного функционирования систем “ИИ” необходим большой объем точной, полной и актуальной информации. Однако на многих предприятиях данные хранятся во фрагментированных, устаревших или некорректных форматах. Это снижает точность результатов оценки рисков. Высокие первоначальные затраты, внедрение искусственного интеллекта и цифровых технологий требует больших финансовых вложений на начальном этапе: затраты на специальные программы, серверную инфраструктуру и квалифицированных ИТ-специалистов могут оказаться тяжелым бременем для малых и средних предприятий. Риск технологических и технических сбоев, системы “ИИ” могут функционировать некорректно из-за технических ошибок, сбоев программного обеспечения или сетевых сбоев. В этом случае существует вероятность некорректного формирования результатов анализа рисков и снижения качества принимаемых решений. Проблемы информационной безопасности, цифровые системы подвержены таким рискам, как кибератаки, утечка данных и несанкционированный доступ. Это создает для предприятия новый вид риска — риск кибербезопасности. Проблема «черного ящика» модели, внутренний механизм работы многих моделей “ИИ” остается непонятным для пользователей. В результате снижается прозрачность принятия решений и уровень доверия. Недостаточная квалификация персонала, для эффективного управления системами “ИИ” необходимы квалифицированные специалисты. Нехватка опытных кадров в этой области во многих организациях замедляет процесс внедрения.

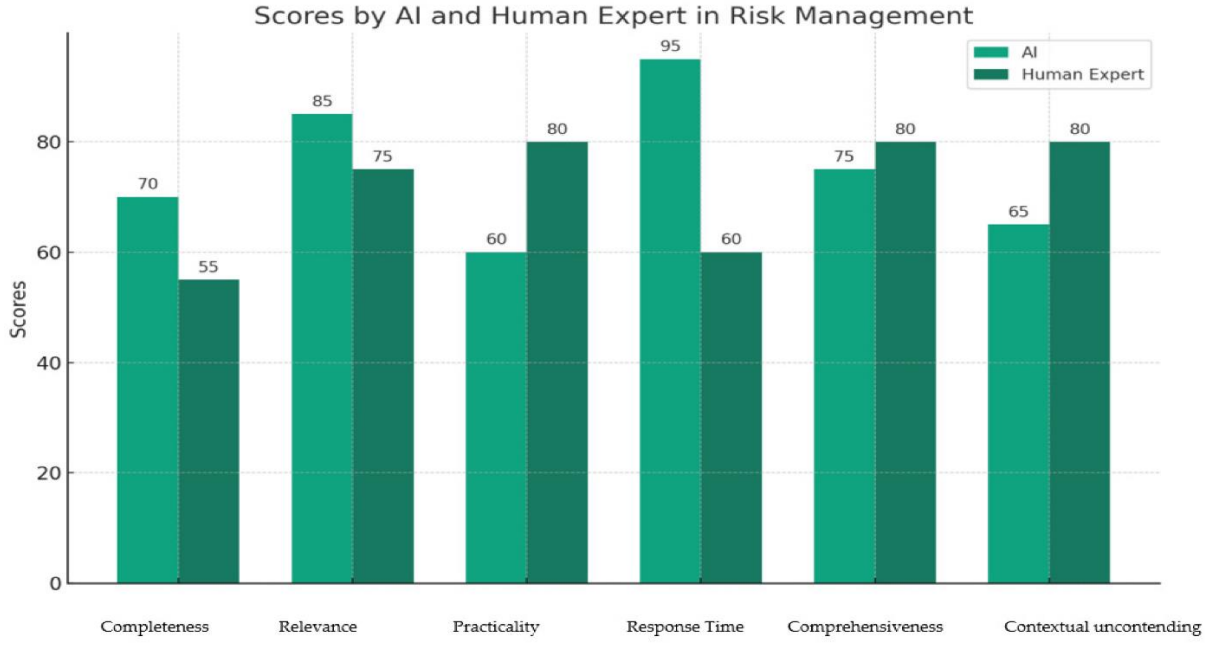


График 2. Уровень эффективности работы СИ и экспертов-специалистов в компаниях в 2024 году

Источник: https://www.mdpi.com/2313-576X/10/2/42

Графический анализ: Полнота определения опасности; актуальность оценки риска; практичность предлагаемых мер контроля; время реагирования; полнота; понимание контекста; ключевые проблемы отрасли и безопасности. Все эти индикаторы используют формат “AI ChatGPT-4”, поэтому показатели эффективности “AI” находятся на высоком уровне.

Предложения: Улучшение качества данных и создание единой базы данных - необходимо стандартизировать процессы сбора, хранения и актуализации данных на предприятиях и в организациях. Необходимо обеспечить полноту и точность информации, используемой при анализе рисков, за счет внедрения технологий «Big Data». Расширение стратегии искусственного интеллекта на национальном уровне, для развития систем управления рисками на основе “ИИ” в условиях Узбекистана предлагается разработать на государственном уровне единую концепцию «Управление рисками ИИ» и привести ее в соответствие со стандартами ISO 31000 и COSO ERM. Повышение кадрового потенциала, необходимо внедрить специальные направления и программы повышения квалификации в высших учебных заведениях для подготовки квалифицированных специалистов в области искусственного интеллекта, анализа данных и управления цифровыми рисками. Укрепление информационной безопасности, рекомендуется развивать инфраструктуру кибербезопасности, совершенствовать системы шифрования и создавать защищенные сети для мониторинга рисков. Это повысит доверие к цифровым системам. Развитие инновационного сотрудничества, возможности адаптации передовых технологий к местным условиям будут расширены за счет создания программ сотрудничества между узбекскими научными учреждениями, IT-компаниями и зарубежными вузами.

Заключение: В заключение следует отметить, что управление рисками с использованием цифровых технологий и искусственного интеллекта является важным фактором, обеспечивающим устойчивое развитие предприятий и организаций в условиях современной цифровой экономики. Результаты исследования показывают, что “ИИ” и цифровые решения повышают возможности оперативного выявления рисков, оценки их воздействия и принятия эффективных решений. Системы на основе цифровых технологий обладают преимуществами перед традиционными методами управления рисками по точности, прозрачности и скорости. Однако, наряду с этим, необходимо решать проблемы, связанные с качеством данных, информационной безопасностью, этическими стандартами и человеческими ресурсами. Одним из важнейших направлений для Узбекистана в перспективе является внедрение систем управления рисками на основе искусственного интеллекта во все отрасли национальной экономики, расширение научных исследований, образовательных программ и инновационных платформ в этом направлении. Это позволит повысить эффективность управления рисками в стране, укрепить экономическую безопасность и сформировать конкурентоспособную цифровую среду.

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ПРЕИМУЩЕСТВА ERP-СИСТЕМ ДЛЯ МАЛОГО И СРЕДНЕГО БИЗНЕСА

Аннотация статьи: *В данной статье анализируется роль и значение* ***ERP-систем (Enterprise Resource Planning)*** *в деятельности малого и среднего бизнеса. ERP-системы оптимизируют бизнес-процессы за счет управления ресурсами предприятия на единой интегрированной платформе, упрощают потоки данных и ускоряют принятие решений. В исследовании выделены основные преимущества ERP-систем для малого и среднего бизнеса, такие как усиление финансового контроля, повышение операционной эффективности, снижение человеческих ошибок и возможность отслеживания данных в режиме реального времени. В статье также рассматриваются важные факторы внедрения ERP-систем, их экономическая эффективность и перспективы применения в условиях Узбекистана. Результаты статьи обосновывают актуальность использования ERP-систем для малого и среднего бизнеса на пути к цифровой трансформации.*

Ключевые слова: *ERP-система, малый бизнес, средний бизнес, цифровая трансформация, информационная система, эффективность, автоматизация, управление ресурсами, интеграция, принятие решений.*

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ADVANTAGES OF ERP SYSTEMS FOR SMALL AND MEDIUM BUSINESSES

Annotation: *This article analyzes the role and importance of* ***ERP (Enterprise Resource Planning)*** *systems in the activities of small and medium-sized businesses. ERP systems optimize business processes by managing enterprise resources on a single integrated platform, simplify data flow, and accelerate decision-making. The study highlights the main advantages of ERP systems for small and medium-sized businesses, such as strengthening financial control,*

increasing operational efficiency, reducing human errors, and the ability to track data in real time. The article also discusses important factors in the implementation of ERP systems, their economic effectiveness, and the prospects for their application in the conditions of Uzbekistan. The results of the article substantiate the relevance of using ERP systems for small and medium-sized businesses on the path to digital transformation.

Key words: *ERP system, small business, medium business, digital transformation, information system, efficiency, automation, resource management, integration, decision making.*

Введение: В современной глобальной цифровой экономике использование современных информационных технологий становится все более важным для повышения эффективности работы предприятий, рационального использования ресурсов и конкурентоспособности. Особенно для малого и среднего бизнеса (МСП) эти процессы являются одним из основных факторов экономического роста. Одной из таких систем является ERP-система, то есть система планирования ресурсов предприятия, которая объединяет все бизнес-процессы на единой платформе и повышает эффективность управления. Хотя изначально ERP-системы разрабатывались для крупных предприятий, в последние годы их упрощенные и адаптированные версии широко внедряются для нужд малого и среднего бизнеса. Эти системы позволяют предприятиям управлять информацией в финансовой, производственной, логистической, маркетинговой, кадровой и других областях из единого центра. В результате сокращается количество ошибок, вызванных человеческим фактором, экономится время и затраты, а также создается возможность быстрого принятия решений на основе аналитических данных в режиме реального времени. В Республике Узбекистан также последовательно реализуется процесс цифровизации малого и среднего бизнеса. В связи с этим внедрение ERP-систем рассматривается как важный инструмент повышения эффективности деятельности предприятий данной сферы, получения конкурентных преимуществ и адаптации к требованиям рынка.

Обзор литературы: Исследования последних лет, посвященные внедрению ERP-систем в малом и среднем бизнесе, наглядно демонстрируют актуальность данного направления. В частности, Бо Лян и др. (2021) в своих исследованиях подчеркивают, что ERP-системы повышают точность и прозрачность логистических и производственных процессов за счет централизации потоков информации в организациях. По их мнению, ERP-система позволяет эффективно использовать ресурсы за счет управления бизнес-сетями в единой цифровой среде. Клаус Шваб (2022) отмечает, что адаптация малого бизнеса к ERP-системам в процессе цифровой трансформации является ключевым компонентом четвертой промышленной революции. По его словам, при интеграции ERP-систем с искусственным интеллектом, технологиями Big Data и IoT повышается уровень

инновационного развития предприятий. Майкл Хаммер (2023) также утверждает в своей работе, что внедрение ERP-систем является необходимым фактором реинжиниринга бизнес-процессов на малых предприятиях. По его мнению, такие системы служат для стандартизации процессов, ведения базы данных в едином формате и усиления механизмов внутреннего контроля.

Узбекский исследователь Х. Джоураев (2021) изучил экономическую эффективность ERP-систем в малом бизнесе и выявил, что их внедрение снижает производственные затраты в среднем на 8–12 процентов. Д. Сатторов (2022) отметил, что ERP-системы могут оптимизировать управление малым бизнесом, обеспечивая точность и скорость финансовой отчетности. Кроме того, в исследовании Н. Каримовой (2023) проанализированы основные проблемы, возникающие при внедрении ERP-систем в Узбекистане, такие как высокая стоимость программного обеспечения, нехватка квалифицированных ИТ-специалистов и необходимость адаптации системы к местным рыночным условиям.

Методология исследования: В статье используются аналитический, системный подход, научная абстракция, статистический анализ, методы индукции, а также методологические методы эмпирического наблюдения и моделирования.

Анализ и результаты: Преимущества ERP-системы: Централизация данных, ERP-системы связывают все подразделения предприятия через единую информационную базу. Это снижает дублирование, потерю или путаницу данных и ускоряет процесс обмена информацией. Повышая эффективность управления, система автоматически управляет процессами в производственном, финансовом, логистическом и кадровом отделах. В результате руководство получает возможность одновременно контролировать и анализировать общее состояние предприятия. Экономя время и затраты, автоматизированные процессы уменьшают количество ошибок из-за человеческого фактора, существенно сокращают время, затрачиваемое на подготовку отчетов, ведение учета и планирование. Налаживая эффективную коммуникацию с клиентами, данная система позволяет хранить информацию о клиентах в централизованной базе данных, быстро выполнять заказы и повышать качество обслуживания. Обеспечивая финансовую прозрачность, все финансовые операции автоматически регистрируются через вышеуказанную систему, что позволяет проводить точный анализ бюджета предприятия и усиливать финансовый контроль. Гибкая и масштабируемая, данная система позволяет добавлять или обновлять модули по мере роста вашего бизнеса. Это помогает малому бизнесу поэтапно внедрять цифровую трансформацию.

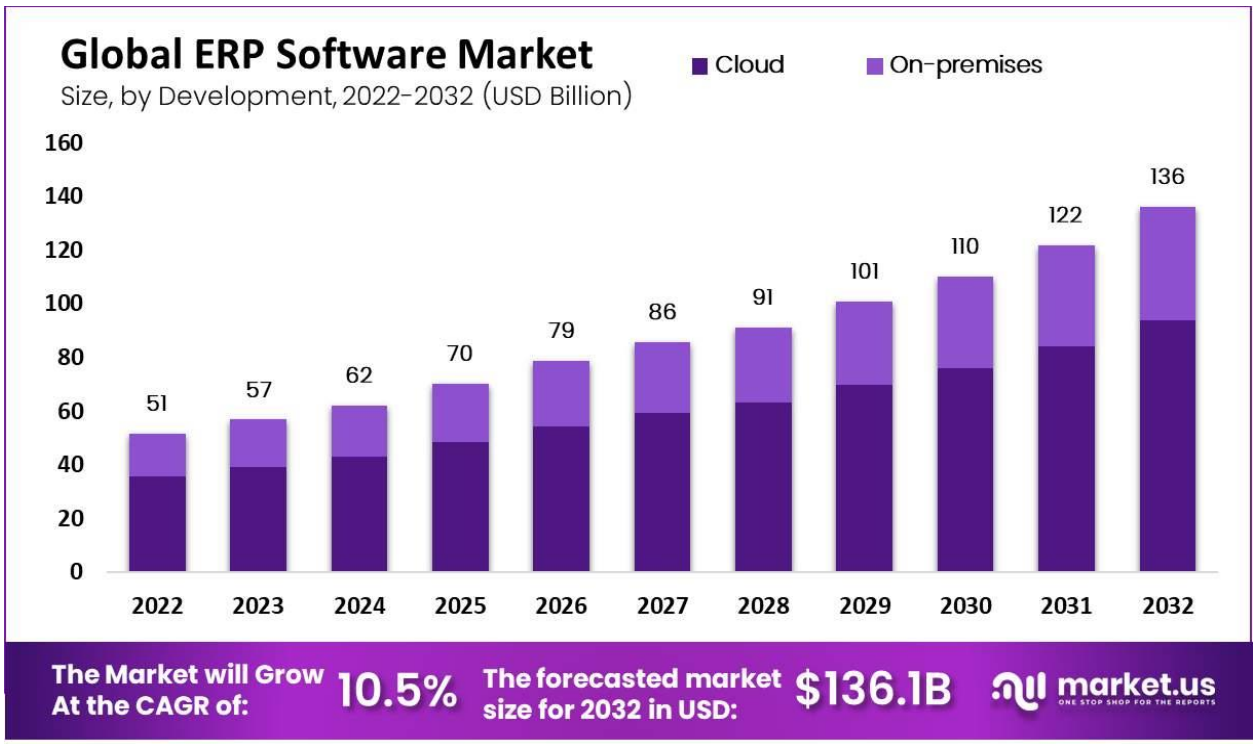


Диаграмма 1. Доля рынка ERP-систем с 2022 по 2032 г.

Источник: https://scoop.market.us/erp-software-statistics/

Графический анализ: Рынок программного обеспечения ERP в последние годы демонстрирует стабильный рост. Эти показатели отражают его растущую значимость в деловом мире.

- Среднегодовой темп роста рынка в период с 2022 по 2032 г. составит 10,5%.
- Объем рынка в 2022 г. составил 51 млрд.
- В последующие годы наблюдался устойчивый рост, достигнув 57 млрд. в 2023 г., 62 млрд. в 2024 г. и 70 млрд. в 2025 г.
- Темпы роста сохранялись, и прогнозы указывают на дальнейший рост. 79 млрд в 2026 году, 86 млрд в 2027 году, 91 млрд в 2028 году и 101 млрд в 2029 году.
- В перспективе ожидается сохранение этой тенденции. Прогнозируется, что объём рынка достигнет 110 млрд в 2030 году, 122 млрд в 2031 году и значительного значения в 136 млрд в 2032 году.

Эти статистические данные подчёркивают растущую значимость программных ERP-решений в различных отраслях, поскольку компании всё больше осознают их важность для повышения эффективности и конкурентоспособности.

Недостатки ERP-систем: Высокие затраты на внедрение, установку ERP-систем, покупку лицензий, техническую инфраструктуру и обучение сотрудников могут стать значительным финансовым бременем для малого бизнеса. Для многих малых предприятий это является существенным препятствием на начальном этапе. Сложность настройки, внутренняя

структура, процессы и стратегия каждого предприятия различны. Поэтому адаптация ERP-системы к конкретной бизнес-модели требует много времени и ресурсов. Техническая сложность и системная зависимость, система требует высокой технической подготовки. Небольшая неисправность или техническая ошибка в системе могут негативно повлиять на деятельность всего предприятия. Сопротивление сотрудников (человеческий фактор), внедрение новой системы часто встречает сопротивление сотрудников. Причина — отказ от традиционных методов работы, необходимость изучения новых программ и факторы страха. Проблемы с безопасностью данных, эта система хранит большой объем корпоративных данных. Если информационная безопасность не обеспечена должным образом, это может привести к утечке или потере данных. Длительный период адаптации, необходимый для полного освоения данной системы. В этот период на предприятии может наблюдаться замедление производственных или сервисных процессов. Интернет-зависимость (в облачных ERP-системах) – ERP-системы, основанные на облачных технологиях, полностью зависят от качества интернета. Сбои в работе сети или низкая скорость нарушают работу системы.

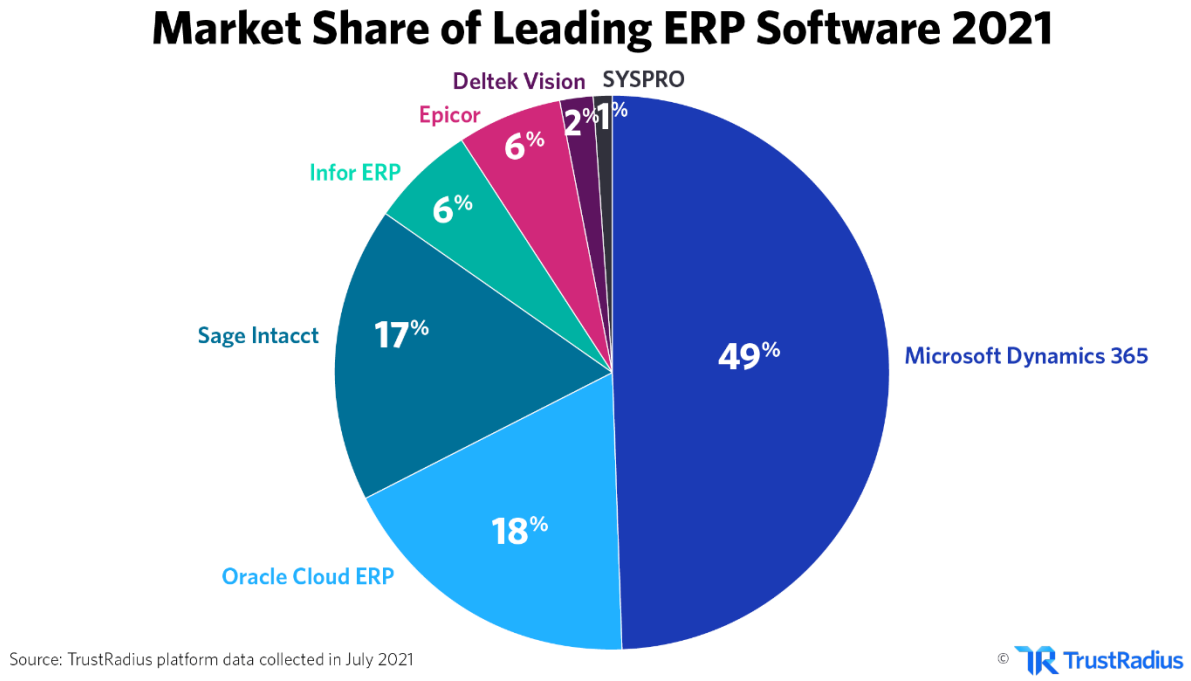


Диаграмма 2. Доля рынка ведущих ERP-систем в 2021 году

Источник: https://solutions.trustradius.com/vendor-blog/erp-statistics-trends/

Анализ диаграммы:

- Microsoft Dynamics является лидером рынка ERP в 2021 году с долей рынка ERP 49%.
- Oracle Cloud ERP занимает 18% рынка ERP.
- Sage Intacct занимает 17% рынка ERP.

- Infor ERP и Epicor ERP занимают по 6% рынка.
- Среди всех ERP-систем покупатели больше всего времени тратят на сравнение SAP ERP и SAP Business Planning and Consolidation.
- Покупатели тратят в среднем более 35 минут на сравнение Microsoft Dynamics 265 и Odoo.

Предложения: Разработка ERP-систем, подходящих под потребности местного бизнеса. Малый и средний бизнес в Узбекистане имеет свои особенности. Поэтому необходимо адаптировать ERP-системы к местному законодательству, налоговой системе и рыночным условиям. Разработка ERP-модулей на узбекском языке и с простым интерфейсом местными IT-компаниями станет важным шагом в этом направлении. Государство должно выделять субсидии и гранты, предоставлять малому бизнесу государственные гранты, льготные кредиты или налоговые вычеты с целью снижения затрат на внедрение ERP-систем. Это станет эффективным механизмом привлечения предприятий к цифровой трансформации. Необходимо создать программы обучения сотрудников, обучить сотрудников и руководителей предприятий эффективному использованию ERP-систем, организовать практическое обучение. Это позволит снизить количество ошибок, вызванных человеческим фактором, и обеспечить полноценное функционирование системы. Рекомендуется внедрять облачные ERP-системы и использовать ERP-системы на основе облачных технологий с целью снижения затрат на инфраструктуру для малых предприятий. Такой метод снижает затраты на серверы и позволяет управлять системой из любой точки мира. Создание упрощённых моделей ERP для малого бизнеса, разработка упрощённых вариантов ERP, охватывающих только основные функции (финансы, продажи, склад, персонал), вместо сложных и дорогостоящих систем, является наиболее оптимальным решением для малого бизнеса. Расширение интеграции ERP-систем, интеграция с CRM (управление взаимоотношениями с клиентами), SCM (управление цепочками поставок) и HRM (управление персоналом) позволит дополнительно повысить эффективность.

Заключение: Проведенный анализ показывает, что ERP-системы являются неотъемлемой частью современного менеджмента и играют значительную роль в повышении эффективности малого и среднего бизнеса. С помощью этих систем обеспечивается централизованное управление ресурсами предприятия, интеграция потоков данных и ускорение процессов принятия решений. В результате автоматизируются бизнес-процессы, сокращается количество человеческих ошибок, усиливается финансовый и операционный контроль. Однако при внедрении ERP-систем существуют такие проблемы, как высокие финансовые затраты, сложность технической адаптации и сопротивление сотрудников новой системе. Поэтому перед внедрением системы необходимо провести тщательный анализ технических, организационных и экономических возможностей предприятия. В целом, повсеместное внедрение ERP-систем в малом и среднем бизнесе в условиях цифровой экономики повышает конкурентоспособность предприятий,

повышает эффективность и создает прочную основу для инновационного развития. В условиях Узбекистана постепенное внедрение этих систем и их адаптация к местным потребностям также являются важным фактором устойчивого развития малого и среднего бизнеса.

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ВОЗДЕЙСТВИЕ ХИМИЧЕСКОГО ОЖОГА ПИЩЕВАРИТЕЛЬНОГО ТРАКТА УКСУСНОЙ КИСЛОТОЙ НА ИММУННЫЕ ОРГАНЫ

Аннотация. *В статье рассматривается влияние химического ожога уксусной кислотой на морфологическое и функциональное состояние органов иммунной системы — тимуса, селезёнки и лимфатических узлов. Приводятся данные о патогенетических механизмах повреждения тканей, изменениях клеточного состава, структуры данных органов, а также снижении иммунореактивности организма под воздействием различных внешних факторов. Всего было обследовано около 100 особей беспородных белых крыс обеих полов.*

Ключевые слова: *тимус, селезёнка, лимфатические узлы, морфология, иммунная система.*

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THE EFFECT OF CHEMICAL BURNS OF THE DIGESTIVE TRACT WITH ACETIC ACID ON THE IMMUNE ORGANS

Abstract: *The article discusses the effect of chemical burns caused by acetic acid on the morphological and functional state of the immune system organs—the thymus, spleen, and lymph nodes. Data are presented on the pathogenetic mechanisms of tissue damage, changes in cell composition and structure of these organs, as well as a decrease in the body's immunoreactivity under the influence of various external factors. A total of about 100 mixed-breed white rats of both sexes were examined.*

Keywords: *thymus, spleen, lymph nodes, morphology, immune system.*

Введение. Уксусная кислота (CH_3COOH) широко используется в бытовых и промышленных целях, однако при нарушении правил обращения

она может вызывать тяжёлые химические ожоги как внешних покровов, так и внутренних органов. В случае перорального поступления кислоты поражаются пищеварительный тракт, дыхательные пути, печень, почки и органы иммунной системы.

Иммунные органы (тимус, селезёнка, лимфатические узлы) играют ключевую роль в поддержании гомеостаза и иммунологической защиты организма. Их поражение ведёт к выраженным нарушениям как клеточного, так и гуморального звена иммунитета. Повсеместно очевидно, что воздействие токсических агентов, стрессовых состояний и других неблагоприятных факторов приводит к инволюционным изменениям иммунного аппарата, нарушая процессы иммунного ответа. Повсеместное применения уксуса в быту глобализирует актуальность проблемы уксусных отравлений среди населения.

Материалы и методы исследования. Экспериментальные исследования проводились на беспородных белых крысах, подвергнутых воздействию 9% раствора уксусной кислоты в дозах, вызывающих локальный химический ожог пищеварительного тракта. Животные выводились из эксперимента на 1-е, 3-и, 7-е и 14-е сутки после воздействия. Для морфологического анализа применялись методы гистологического окрашивания (гематоксилин-эозин, азур-эозин), морфометрия и микроскопия.

Результаты исследования и их обсуждение.

1. Тимус. На ранних сроках (1–3 сутки) отмечалось уменьшение массы органа, деструкция коркового вещества, вакуолизация цитоплазмы лимфоцитов и ретикулоэпителиальных клеток. Наблюдалось увеличение количества регрессивных телец и очагов апоптоза.

К 7-м суткам происходило разрыхление структуры кортико-медуллярной зоны, снижение плотности тимоцитов, расширение сосудов и появление лимфоцитарных некрозов.

К 14-м суткам — признаки частичной регенерации, однако сохранялось истончение коркового слоя и уменьшение количества малых лимфоцитов.

2. Селезёнка. В первые дни после ожога наблюдалось резкое уменьшение относительной площади белой пульпы, расширение синусов красной пульпы и стаз крови в венозных синусах.

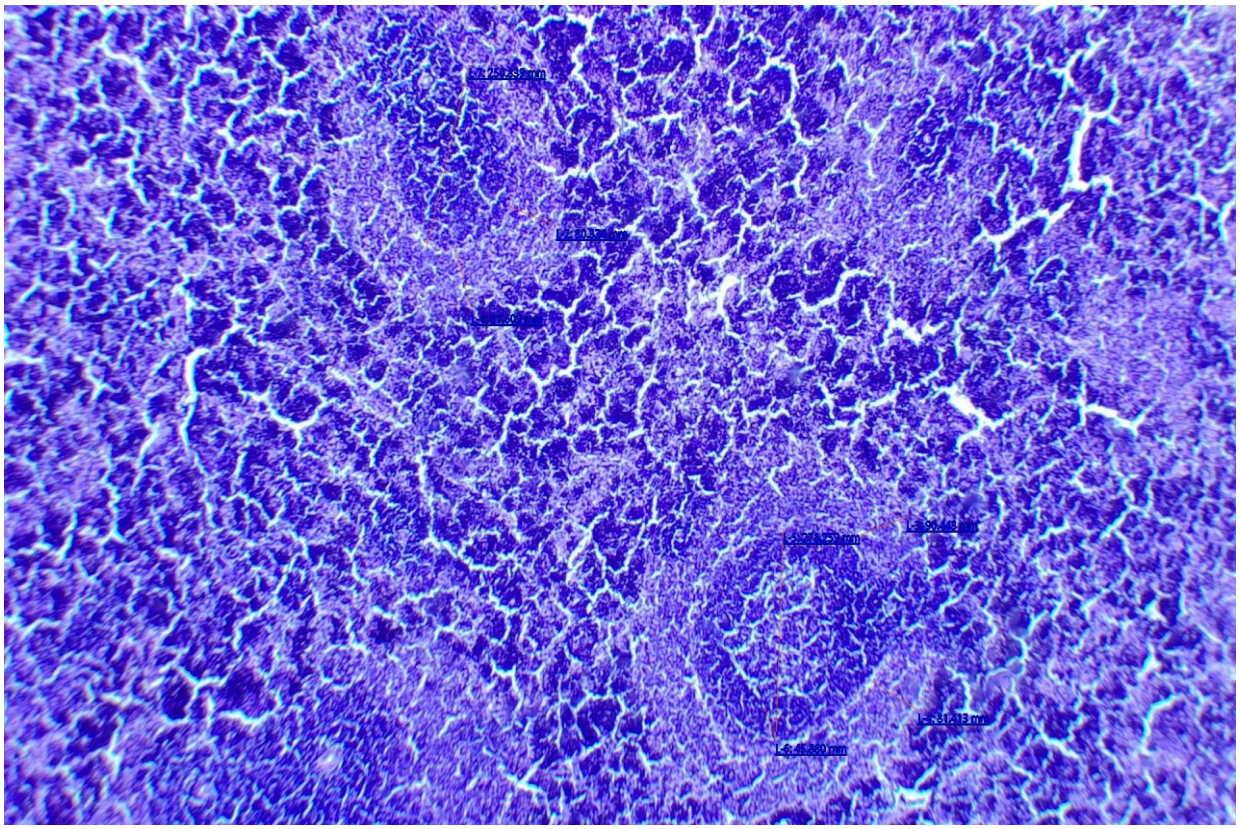


Рис 1. Микроскопическое изображение лимфоидной ткани в селезенке 3-месячной беспородной крысы с легкими ожогами. 1. Уменьшение диаметра центральной артерии; 2. Утолщение ЛПНП.

Количество лимфоцитов в герминативных центрах снижалось, отмечалось смещение клеточного состава в сторону макрофагов и плазматических клеток.

К концу второй недели в отдельных участках восстанавливались лимфоидные фолликулы, но диаметр их оставался уменьшенным по сравнению с контролем.

Пери артериальная лимфоидная ткань (ПАЛМ) была отчетливо видна как утолщение вокруг центральной артерии. Диаметр центральной артерии в среднем составил 28,4 ± 0,7 мкм, что было уменьшено по сравнению с контрольными значениями (35,7 ± 0,9 мкм), т. е. артерия выглядела извитой за счет утолщения ПАЛМ и уменьшения ее диаметра (рис. 3.2.2). Синусоиды красной пульпы были заметно расширены, и в них наблюдалось большое количество макрофагов (рис. 3.2.2). Это состояние указывало на усиление фагоцитоза под влиянием системных цитокинов. На площади 1936753 пикс² селезенки было обнаружено в среднем 13–15 лимфоидных фолликулов (рис. 3.2.1А), что свидетельствовало о значительном развитии иммунных структур.

3. Лимфатические узлы. Воздействие уксусной кислоты вызывало угнетение лимфопоэза, отёк стромы, расширение синусов и уменьшение количества центров размножения.

Отмечалось нарушение архитектоники коркового и мозгового вещества, что указывает на угнетение дифференцировки иммунокомпетентных клеток.

Обсуждение результатов

Комплекс морфологических изменений свидетельствует о системном токсическом воздействии уксусной кислоты. Основным механизмом повреждения является развитие метаболического ацидоза, гемолиза и последующего гипоксического повреждения тканей.

Иммунные органы реагируют на химическую интоксикацию снижением лимфоидной активности, апоптозом клеток и нарушением микроциркуляции. Это сопровождается выраженным снижением защитных функций организма и повышением восприимчивости к инфекциям.

Заключение. Химический ожог уксусной кислотой вызывает выраженные морфологические изменения в тимусе, селезёнке и лимфатических узлах.

Наиболее чувствительным органом к воздействию является тимус, в котором отмечаются ранние и стойкие деструктивные изменения.

Повреждение иммунных органов сопровождается снижением лимф поэтической и иммунорегуляторной функции организма.

Восстановительные процессы после ожога протекают медленно и не обеспечивают полного восстановления структуры органов даже к 14-м суткам.

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РАЗВИТИЕ КООРДИНАЦИОННЫХ СПОСОБНОСТЕЙ У ДЕТЕЙ В СЕКЦИИ ФУТБОЛА

Аннотация: *В статье раскрывается тема физических упражнений необходимых для развития координационных способностей детей, занимающихся в секциях по футболу.*

Ключевые слова: *физические упражнения, двигательные действия, футбол, организм, координация, движение.*

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DEVELOPING CHILDREN'S COORDINATION SKILLS IN THE FOOTBALL SECTION

Abstract: *The article explores the topic of physical exercises necessary for developing coordination abilities in children attending football training sections.*

Keywords: *physical exercises, motor actions, football, body, coordination, movement.*

Введение: Ведущей характеристикой современной системы тренировки в футболе является большой объем физической и психологической нагрузки, которая предъявляет колоссальные требования к организму спортсменов. Причем данная картина наблюдается на всех ступенях подготовки спортсменов.

В связи с этим Маевский К. В. считает, что, оптимизация учебно-тренировочного процесса юных футболистов является актуальной проблемой. В рамках данного процесса необходимо обязательное решение всесторонней подготовки юного спортсмена, создающей базу для воспитания

высококвалифицированного футболиста. Подготовка юных спортсменов должна базироваться на четком соблюдении методических требований, обеспечивающих эффективный рост и становление различных сторон мастерства.

Изложение основного материала: Футбол, являющийся командным видом спорта, заключающийся в сложных технико-тактических действиях, предъявляет высокие требования не только к физической, но и к психомоторной подготовке спортсменов. Характерной чертой футбола выступает непредсказуемость игровых и технико-тактических действий. В данной ситуации является очевидной необходимость специальной координационной подготовки.

Координационные способности обуславливают успешность управления двигательными действиями и их регуляцию. Двигательно-координационные способности – комплекс определенных психологических и моторных способностей, которые в своей совокупности обуславливают особенности двигательной активности человека в условиях, требующих проявления находчивости, быстроты или своевременности действий, пространственной точности. Среди физических способностей двигательно-координационные занимают особое место, потому что тесно связаны с формированием и совершенствованием двигательных навыков. Следовательно, координационные способности создают базу для функциональной и физической подготовленности спортсменов.

При изучении анатомо-физиологических особенностей мальчиков 7-8 лет было выявлено, что этот возраст относительно спокойного и равномерного физического развития. Сердечные мышцы довольно хорошо снабжаются кровью, поэтому сердце достаточно выносливо, головной мозг то же получает достаточное кровоснабжение, что является необходимым условием его работоспособности. В крови заметно увеличивается количество белых кровяных телец, повышающих сопротивляемость организма к заболеваниям: возраст 7-8 лет отличается самым низким процентом заболеваемости за все время от рождения до наступления зрелости.

Одновременно с ростом тела происходит и формирование скелета, хотя оно еще не заканчивается и в костной системе еще много хрящевой ткани. Увеличение роста и веса, мышечной силы и выносливости, жизненной емкости легких идет довольно равномерно и пропорционально. Длина тела увеличивается в среднем у мальчиков на 13-14 см, у девочек она увеличивается на 14-16 см. Пропорционально увеличивается и масса тела. Это указывает на то, что в этой возрастной группе существенных различий в показателях антропометрии между мальчиками и девочками не наблюдается. Тело младшего школьника очень гибкое, что создает благоприятные условия для занятий физической культурой и спортом, но требует очень бережного отношения к детям во время этих занятий. Костная система находится в стадии формирования – окостенение позвоночника, таза, грудной клетки, конечностей еще не завершено.

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Возрастные особенности моторики детей в значительной степени обуславливаются функциональными возможностями вегетативных систем их организма, которые характеризуется следующими признаками: относительно большей, чем у взрослых, поверхностью легких, большим количеством крови, протекающей в единицу времени через легкие, большей величиной минутного объема дыхания, большим минутным объемом крови как в покое, так и при мышечной деятельности, более высокой эластичностью сосудов.

В качестве основного способа формирования координационных способностей выступают физические упражнения, имеющие высокую координационную нагрузку, а также упражнения, включающие в себя элементы новизны. К параметрам, увеличивающим сложность физического упражнения, относятся: пространственные, временные, а также динамические, сюда же следует отнести параметры внешних условий. Эти факторы помогают в наиболее короткий срок воспитать двигательно-координационные способности.

Футбол – это вид спорта с повышенными требованиями к игрокам по координации и физическим качествам к выполнению сложно-технических действий в постоянно меняющихся игровых ситуациях. Ни в одном виде спорта не используется такой широкий спектр движений. И от того, как точно игрок выполняет технические приёмы, зависит успех команды.

На занятиях в спортивной секции воспитанник может стать профессионалом только в том случае, если будет обладать такими качествами, как: физическая, техническая и теоретическая подготовленность. Но самое важное в подготовке настоящего футболиста - это его координационная подготовка. А совершенствование координации происходит в течение многих лет. И очень важной основой для ребенка на начальном этапе обучения - это развитие координационных способностей.

В литературных источниках о футболе раскрываются многие вопросы по подготовке детей в возрасте 6-12 лет. Рассматриваются несколько направлений развития и совершенствования координационных способностей футболистов, формирования скоростно-силовых способностей и других навыков, способствующих выполнению координационных задач. Но как показывает анализ отечественной и зарубежной научно-методической литературы по футболу и личный опыт, в настоящее время уровень технической и физической подготовки на начальном этапе обучения очень слабый. Для того чтобы соответствовать минимальным требованием

технического мастерства игроков, необходимо работать над развитием координационных способностей у ребят 6 – 12 лет.

Прежде чем говорить о развитии координационных способностей, уточним, что же это такое.

Понятие «координация» происходит от латинского слова, что означает взаимоупорядочение.

Координация движений, по определению В. И. Ляха, представляет двигательную способность, которая при этом развивается посредством движений. Двигательный опыт ребенка становится богаче, чем большим запасом двигательных навыков он обладает.

Координация движения, как отмечает Л. А. Орбели, представляет собой согласование в работе отдельных мышц, которые входят в состав тела человека. Такое согласование ведет к тому, что движения становятся пластичными, гладкими, экономными, размеренными, и не обнаруживают признаков механической борьбы противоположно действующих антагонистических мышц.

Координация представляет собой процессы согласования активности мышц тела, которые направлены на успешное выполнение двигательной задачи, как отмечают В. М. Покровский и Г. Ф. Коротько.

Итак, координационные способности определяются в качестве способностей координировать движения целесообразно, то есть (соподчинять, согласовывать, организовывать их в одно целое) при построении и воспроизведении совершенно новых двигательных действий. Это также способность перестраивать свою координацию движений и при необходимости изменять параметры своего действия или при переключении на другое действие в соответствии с требованиями изменяющихся условий.

В науке определены следующие виды координационных способностей:

1) Пространственные, временные параметры движений. Они зависят от «чувства времени» и «чувства пространства». Вначале овладения пространственными ориентировками изменение положения отдельных частей тела должно проходить под контролем зрения. На втором этапе доступно словесное обозначение различных направлений, но все это по отношению к частям тела. И только на третьем этапе дети могут определять направление по отношению к предметам, к другим людям. Появляются представления о направлении движения по словесному описанию до его выполнения.

Временными ориентировками дети овладевают с большим трудом, чем пространственными. Большинство упражнений активно влияет на развитие временных ориентировок, так как они проводятся в определенном темпе и ритме.

2). Способности выполнять двигательные действия без излишней мышечной напряженности (скованности).

Развитие ловкости связано с совершенствованием координационных способностей, временных и пространственных ориентировок. Ловкость определяется умением быстро перестраивать двигательную деятельность в

соответствии с внезапно меняющейся обстановкой. В этих упражнениях предъявляются повышенные требования к быстроте реакции, сообразительности, вниманию, так как условия могут меняться быстро, неожиданно.

3). Статическое (поза) и динамическое равновесие.

Координационные способности, относящиеся к этой группе, зависят от способности удерживать устойчивое положение тела, т.е. равновесие.

Равновесие составляет один из основных видов движений и является обязательным компонентом при выполнении любого упражнения и сохранения любой позы. Основная задача упражнений на равновесие состоит в том, чтобы научиться сохранять устойчивое положение тела в разнообразных ситуациях и быстро его восстанавливать.

Упражнения в равновесии требуют собранности, сосредоточенности, внимания и достаточно развитой координации движений.

Итак, координационные способности представляют собой умение человека наиболее быстро, целесообразно, совершенно, экономно, точно и находчиво решать двигательные задачи, при возникновении сложных и неожиданных ситуаций.

Специальная координационная подготовка – это система применения сложных упражнений, связанных с выполнением освоенных технических умений и навыков игры футбола. Ее степень меняется с расширением двигательного навыка и с ростом опыта игрока: чем богаче навык, чем больше игрок освоит всевозможных комбинаций, тем легче он будет ориентироваться в игровой ситуации.

Например, В. И. Лях и З. Витковски в своих исследованиях рекомендуют для развития координационных способностей в каждом тренировочном занятии отводить от 15 до 45 минут на общие и специальные упражнения, способствующие улучшению разных координационных движений. Эти упражнения рекомендуется использовать в конце подготовительной или в начале основной части занятия после разминки.

По сведениям А. П. Золотарева, для эффективного развития координационных способностей, необходимо с 10 до 12 лет использовать ведение мяча и обводку фишек, жонглирование, короткие и средние передачи мяча, игру головой, удары в ворота ногой, а также следует увеличить количество времени (до 30% общего объема времени практических занятий, отводимого на техническую подготовку) на овладение элементами техники игры, связанными с непосредственным контролем над мячом.

На основании изученной литературы, опираясь на личный опыт, нами были подготовлены методические рекомендации для развития координационных способностей начинающих футболистов на занятиях в спортивной секции. К сожалению, год от года здоровье младших школьников не становится лучше. Поэтому при написании методического материала мы учитывал физиологические особенности современных детей, которые могут приступить к занятиям в любой интервал образовательного процесса.

Впервые приходя на занятие в секцию по футболу, ребенок проходит тестирование согласно нормативам, утвержденным Министерством спорта Республики Узбекистан. Это нужно для определения точки физического развития и понимание целей с последующим подбором упражнений для развития координационных способностей.

Для развития координационных способностей следует придерживаться следующих рекомендаций:

1) постоянно повышать уровень сложности упражнений (от шага до бега с препятствием);

2) менять время выполнения упражнений (задать временные рамки выполнение упражнения);

3) упражнения должны содержать элементы новизны, необычности (добавление сопротивления, работа в парах, с инвентарем);

4) задания должны включать организацию по самоконтролю и самооценке различных параметров движений (скорость-отрезок времени, выносливость – продолжительность, сила- количество раз);

5) объединять отдельные элементы двигательных умений в различные комбинации и доводить их до автоматизма (цикличность упражнений многократное повторение);

6) необходимо применять для развития пространственной ориентации разные прыжки, удары на точность, игровые упражнения с несколькими мячами, групповые и командные упражнения (зрительное распределение на несколько объектов).

При работе с детьми можно использовать следующие методические приёмы:

1) использование разных исходных положений;

2) ограничение пространства;

3) выполнение заученных движений в неизвестных сочетаниях;

4) совершенствование технических действий в состоянии утомления;

5) воздействие на анализаторы путём введения дополнительных звуковых, световых, зрительных сигналов;

7) прогнозирование элемента действия;

8) зеркальное выполнение упражнений.

Придерживаясь данных рекомендаций, ребёнок может улучшить не только свои результаты, но и здоровье в положительную сторону. В образовательном учреждении в спортивную секцию не проводится профессиональный отбор. Чаще всего на тренировки приходят дети, которые увлечены футболом, но при этом, как правило, у них не развиты координационные способности. И поэтому первоочередной задачей на занятиях становится развитие специальной и общей координационной способности. Следует уделять этому наибольшее количество времени во время тренировки, можно использовать как циклические, так и игровые занятия, целью является:

1. *Оздоровительные*: содействовать развитию координационных

способностей, скоростно-силовых качеств и формированию навыков правильной осанки. Укрепление мышц ног в упражнениях с мячом.

2. *Воспитательные:* содействовать воспитанию волевых качеств, самостоятельности и ответственности учащихся, развивать умение слышать и слушать, работать в коллективе

3. *Личностные результаты:*

овладение знаниями и умениями по организации и проведению общеразвивающих и подготовительных упражнений оздоровительной и тренировочной направленности, обеспечивающих функциональную готовность организма к выполнению упражнений, с учетом индивидуальных физических свойств учащихся;

воспитание волевых качеств посредством усложнения условий выполнения учебных заданий, обеспечивающих психологическую готовность организма к овладению навыков, с учетом индивидуальных личностных свойств учащихся;

овладение умением выполнить упражнение с мячом

Метапредметные результаты

Познавательные:

- осмысление техники выполнения физических упражнений;
- выбор наиболее эффективных способов решения задач, анализ двигательных действий и устранение ошибок;
- ориентация в разнообразии способов решения различных задач в командных соревнованиях.

Регулятивные:

- умение планировать собственную деятельность при выполнении физических упражнений с учетом техники безопасности;
- объективно оценивать технику выполнения физических упражнений на основе ранее полученных знаний и умений учащегося;
- умение устранять характерные ошибки в процессе освоения техники выполнения физических упражнений.

Коммуникативные:

- адекватно воспринимать оценку преподавателя, анализировать свои двигательные действия;
- формировать позитивное взаимодействие со сверстниками при выполнении различных двигательных действий в команде;
-уметь договариваться о распределении функций и ролей в совместной деятельности.

Предметные результаты:

- формирование первоначальных представлений о оздоровительно-развивающем и воспитывающем значении упражнений и их влиянии на развитие человека;
- овладение координационными упражнениями – разновидностями передвижений и прыжков, работу с мячом и необходимыми знаниями об основах техники для их успешного выполнения.

Образовательные технологии: здоровье сберегающие технологии; технологии разно-уровнего обучения; технологии коллективного обучения.

Исходя из этого, В.И. Ляхом разработана минимально допустимая батарея из 5 тестов, позволяющих достаточно полно и информативно определить уровень развития координационных возможностей.

Представленные контрольные упражнения позволяют определить как относительные, так и абсолютные показатели координационных способностей, которые относятся к разным группам двигательных действий:

Челночный бег 10х5 метров



Рисунок 1. Челночный бег 10х5 метров

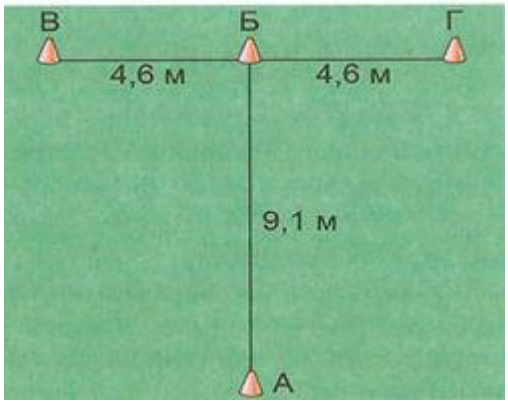
Тест отражает абсолютный показатель способности к перестроению двигательных действий и быстроту.

Для проведения теста необходимо наличие беговой дорожки длиной не менее 5 метров, а также секундомера или таймминговой системы. Перед проведением испытания на беговой дорожке на расстоянии 5 метров друг от друга чертятся две параллельные линии (Рисунок 12).

Выполнение: Испытуемый занимает положение высокого старта за линией. По свистку или иному заранее оговоренному сигналу испытуемый стартует, бежит к противоположной линии, пересекает её двумя ногами, разворачивается, бежит к линии старта и пересекает её двумя ногами. В ходе испытания тестируемый должен преодолеть 10 отрезков по 5 метров, суммарное расстояние равняется 50 метрам. Время преодоления всей дистанции фиксируется. Задача показать наименьшее время.

Методические указания: В случае, если испытуемый не пересекает одну из линий двумя ногами, попытка не засчитывается.

T-тест Рисунок 2.



Т-тест Рисунок 2.

Выполнение Т-теста

Для проведения теста необходимо наличие секундомера или таймминговой системы, а также четырёх конусов, которые устанавливают согласно схеме на рисунке 2.

Выполнение: Испытуемый принимает положение высокого старта рядом с конусом А. По свистку или иному заранее оговоренному сигналу спортсмен стартует, бежит к конусу Б и касается его правой рукой, не меняя положение тела, движется приставными шагами к конусу В и касается его левой рукой. Затем испытуемый приставными шагами в обратном направлении устремляется к конусу Г и касается его правой рукой, приставными шагами передвигается к конусу Б, касается его левой рукой и финиширует бегом спиной вперёд возле конуса А. Фиксируется время преодоления всей дистанции.

Методические указания: Результат не засчитывается, если испытуемый не совершил касание рукой хотя бы одного конуса или если боковое передвижение было совершено скрестным шагом вместо приставного.

Тест Бальсома

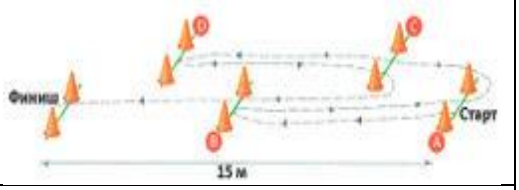


Рисунок 3. Тест Бальсома

Тест отражает абсолютный показатель способности к перестроению двигательных действий и быстроту.

Для проведения теста необходимо наличие секундомера или таймминговой системы, а также десяти конусов, которые устанавливаются попарно на расстоянии два метра друг от друга, между каждой парой чертится линия (Рисунок 3). На расстоянии 10 метров от первой пары «A» (стартовая линия) устанавливается пара «B», в 5 метрах от которой устанавливается пара конусов, образующих финиш. На расстоянии 3 метра от правого конуса пары «A» устанавливается левый конус пары «C» (правый конус, соответственно, на расстоянии 2 метра вправо). Пара конусов «D» устанавливается на расстоянии 10 метров от пары «C».

Выполнение: Испытуемый принимает положение высокого старта за линией между конусами «A». По свистку или иному заранее оговоренному сигналу спортсмен стартует, бежит к конусам «B», двумя ногами пересекает линию, тормозит и разворачивается, пробегает между конусами «A», резко на 180° поворачивает влево, пробегает между конусами «C», бежит к конусам «D», двумя ногами пересекает линию, тормозит и разворачивается, пробегает между конусами «C», резко на 180° поворачивает вправо, пробегает между конусами «B» и финиширует между заключительной парой конусов. Время преодоления всей дистанции фиксируется.

Методические указания: В случае, если испытуемый не пересекает одну из линий двумя ногами, попытка не засчитывается.

L-Drill тест



Рисунок 4. L-Drill тест

Тест отражает абсолютный показатель способности к перестроению двигательных действий и быстроту.

Для проведения теста необходимо наличие секундомера или таймминговой системы, а также трёх конусов, которые устанавливают на расстоянии 4,5 метра друг от друга согласно схеме на рисунке 4.

Выполнение: Испытуемый принимает положение высокого старта рядом с конусом «1». По свистку или иному заранее оговоренному сигналу спортсмен стартует, бежит к конусу «2» и касается его правой рукой. Развернувшись, спортсмен бежит к конусу «1», касается его правой рукой и вновь разворачивается, за конусом «2» поворачивает налево, обегает вокруг конуса «3» таким образом, чтобы он был по правую руку тестируемого, за конусом «2» поворачивает направо и финиширует возле конуса «1». Фиксируется время преодоления всей дистанции.

После отдыха до полного восстановления тест повторяется в другую сторону («зеркально»).

Тест «Иллинойс»

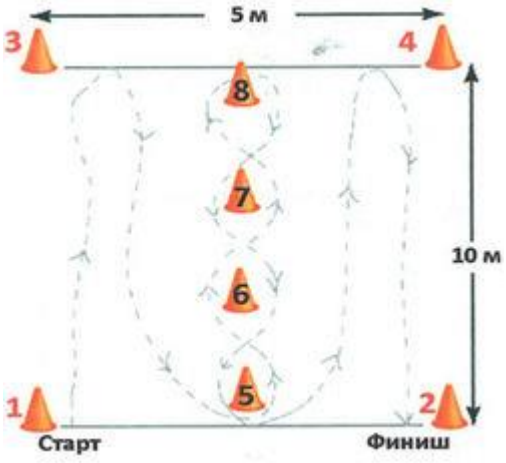


Рисунок 5. Тест «Иллинойс»

Тест отражает абсолютный показатель способности к перестроению двигательных действий и быстроту.

Для проведения теста необходимо наличие секундомера или таймминговой системы, а также восьми конусов (Рисунок 5). Первый и второй конусы устанавливают на расстоянии 5 метров друг от друга, между ними чертится линия, которая служит указателем старта и финиша, соответственно; напротив них на расстоянии 10 метров устанавливаются третий и четвёртый конусы, между которыми также чертится линия. По центру данного прямоугольника перпендикулярно двум линиям на расстоянии 3 метра друг от друга устанавливаются конусы с пятого по восьмой. От пятого и восьмого конусов расстояние до ближайшей линии составляет 0,5 метра.

Выполнение: Испытуемый принимает положение высокого старта за линией рядом с конусом «1». По свистку или иному заранее оговоренному сигналу спортсмен стартует, бежит к противоположному конусу «3», пересекает двумя ногами линию, разворачивается, движется в сторону стартовой линии, достигнув которую, начинает «змейкой» обегать четыре конуса в центре, таким же образом возвращается назад. Обежав конус «5», испытуемый устремляется к конусу «4», пересекает двумя ногами линию,

разворачивается, и финиширует возле конуса «2». Фиксируется время преодоления всей дистанции.

Методические указания:

В случае, если испытуемый не пересекает одну из линий двумя ногами, попытка не засчитывается.

Заключение: Координационные способности имеют важное значение как для занятий спортом, так и в профессиональной деятельности. Хорошая координация позволяет улучшить результаты в любом виде спорта, а также уменьшает риск получения травм, т.к. позволяет правильно распределить нагрузку на различные части тела и группы мышц. Также, умение оптимально управлять своими движениями может уберечь вас от неприятных последствий в повседневных жизненных ситуациях.

Таким образом, футбол – один из тех видов спорта, которые требуют координированного проявления всех двигательных способностей в постоянно меняющихся ситуациях. Ловкость футболистов проявляется в быстрой перестройке своих действий при изменении ситуации на поле, в умении точно выполнять сложные движения.

При совершенствовании координационных способностей юных футболистов, а также техники владения мячом и обводки на занятиях необходимо:

- использовать упражнения, сочетающие бег с изменением направления, «слаломный» бег, старты из различных положений, ведение мяча различными способами со сменой ритма и направления движения, скоростную обводку искусственных препятствий и соперников, упражнения с элементами длительного контроля над мячом при скоростных передвижениях;

- необходимо целенаправленно и систематически формировать координационные способности в тесной связи с физическим, технико-тактическим и интеллектуальным совершенствованием, развитием психических и психофизиологических процессов.

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СРАВНИТЕЛЬНЫЙ АНАЛИЗ КЛИНИКО-ЭКОНОМИЧЕСКОЙ ЭФФЕКТИВНОСТИ ОТКРЫТОЙ И ЛАПАРОСКОПИЧЕСКОЙ ГЕРНИОПЛАСТИКИ У БОЛЬНЫХ ПОЖИЛОГО ВОЗРАСТА

Аннотация. *Паховые грыжи широко распространены среди пациентов пожилого и старческого возраста, требуя выбора оптимальной тактики лечения с учетом не только медицинских, но и экономических аспектов. В данной статье проанализирована клиническая и экономическая эффективность различных методов хирургического лечения паховой грыжи у пожилых больных – открытой ненатяжной герниопластики (например, по Лихтенштейну) и лапароскопических методик (TAPP/TEP). Проведен обзор отечественного и зарубежного опыта, включающий сравнительный анализ частоты рецидивов, послеоперационных осложнений, времени восстановления трудоспособности, стоимости лечения и длительности госпитализации. По данным литературы и результатов ретроспективного анализа, оба подхода обеспечивают низкую частоту рецидивов при использовании сетчатых имплантов, однако отличаются профилем осложнений и затратами. Лапароскопическая герниопластика характеризуется меньшей травматичностью, более быстрым восстановлением и снижением болевого синдрома у пожилых пациентов, сокращая срок стационарного лечения. В то же время открытая операция под местной анестезией демонстрирует сопоставимые исходы при более низкой стоимости и меньших требованиях к ресурсам, что особенно актуально в условиях ограниченного бюджета здравоохранения. В выводах обоснована необходимость индивидуального подхода к выбору метода герниопластики у пациентов старших возрастных групп с учетом состояния здоровья, технической доступности методов и экономической целесообразности.*

Ключевые слова*: паховая грыжа; пожилые пациенты; герниопластика; лапароскопия; экономическая эффективность; послеоперационные осложнения; стоимость лечения.*

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COMPARATIVE ANALYSIS OF CLINICAL AND ECONOMIC EFFICIENCY OF OPEN AND LAPAROSCOPIC HERNIOPLASTY IN ELDERLY PATIENTS

Abstract. *Inguinal hernias are common in elderly patients and demand an optimal treatment strategy that considers both medical and economic factors. This article analyzes the clinical and economic effectiveness of different surgical methods for inguinal hernia in older patients – open tension-free hernioplasty (e.g. Lichtenstein repair) versus laparoscopic techniques (TAPP/TEP). We review domestic and international experience, including a comparative analysis of recurrence rates, postoperative complications, recovery of work ability, treatment costs, and length of hospital stay. According to literature data and our retrospective analysis, both approaches yield low recurrence rates with mesh use, but differ in complication profiles and costs. Laparoscopic hernia repair is associated with less trauma, faster recovery and reduced pain in elderly patients, allowing shorter hospitalization. At the same time, open repair under local anesthesia shows comparable outcomes with lower cost and resource requirements, which is especially relevant under constrained healthcare budgets. In conclusion, an individualized approach to method selection for hernia repair in geriatric patients is necessary, taking into account health status, technical availability, and economic feasibility.*

Keywords*: inguinal hernia; elderly patients; hernioplasty; laparoscopy; economic efficiency; postoperative complications; treatment cost.*

Актуальность. Паховая грыжа является одним из самых распространенных хирургических заболеваний: риск развития паховой грыжи в течение жизни имеется у каждого четвертого мужчины, причем с возрастом вероятность существенно возрастает. По оценкам, ежегодно в мире выполняется до 20 миллионов операций по поводу паховых грыж. Увеличение продолжительности жизни и числа пожилых пациентов приводит к росту абсолютного количества герниопластик в старших возрастных группах. У мужчин старше 70 лет вероятность возникновения паховой грыжи достигает ~50%. При этом осложненное течение (ущемление грыжи) встречается чаще у пациентов пожилого возраста и связано с высоким риском интраоперационных и послеоперационных осложнений. Своевременное плановое хирургическое лечение имеет решающее значение для предупреждения угрожающих жизни состояний.

В настоящее время «золотым стандартом» плановой хирургии паховых грыж является ненатяжная герниопластика с использованием сетчатого

импланта, которая может выполняться как открытым, так и эндоскопическим (лапароскопическим) способом. Введение полипропиленовых сеток значительно снизило частоту рецидивов по сравнению с устаревшими натяжными методиками. Тем не менее, выбор между открытой и лапароскопической операцией остается предметом дискуссий, особенно у пациентов пожилого и старческого возраста, которые нередко имеют сопутствующие заболевания и более высокий операционный риск. С одной стороны, лапароскопические технологии предлагают преимущества минимальной инвазии – меньшая операционная травма, более низкий риск раневых осложнений и хронической послеоперационной боли, более быстрая реабилитация. С другой стороны, открытая герниопластика под местной анестезией устраняет необходимость общей анестезии, снижая риск анестезиологических осложнений у ослабленных пациентов, и требует менее дорогого оборудования. Экономическая составляющая также играет важную роль: ограничения бюджета здравоохранения требуют обоснованного выбора наиболее эффективной по соотношению стоимость/результат технологии лечения. Таким образом, актуальной является оценка экономической эффективности разных методов герниопластики паховой грыжи у пожилых, с учетом как клинических исходов, так и затрат на лечение.

Цель исследования. Оценить клинико-экономическую эффективность различных методов хирургического лечения паховых грыж у пациентов пожилого и старческого возраста. Необходимо сравнить открытые и лапароскопические способы герниопластики по показателям частоты рецидивов и осложнений, длительности госпитализации, срокам реабилитации и стоимости лечения, учитывая отечественный и международный опыт.

Материалы и методы. Исследование выполнено в формате клинико-экономического анализа на основе данных литературы и результатов собственного наблюдательного исследования. Проведен ретроспективный анализ историй болезни 150 пациентов в возрасте 65 лет и старше, оперированных по поводу паховой грыжи в плановом порядке. Сравнивались две группы: 1) открытая ненатяжная герниопластика (преимущественно методом Лихтенштейна) и 2) лапароскопическая герниопластика (TAPP или TEP). Обе группы однородны по полу и сопутствующей патологии; средний возраст составил 72,3 ± 5,8 года. В анализ не включались экстренные операции по поводу ущемленных грыж. Оценивали интра- и послеоперационные показатели: длительность операции, объем интраоперационной кровопотери, вид анестезиологического обеспечения, наличие интраоперационных осложнений. В послеоперационном периоде сравнивались частота и структура осложнений, время до восстановления самостоятельной активности, сроки выписки из стационара, а также отдаленные результаты – рецидивы грыжи в течение наблюдения до 2 лет. Для экономической оценки рассчитаны прямые медицинские затраты на каждую методику: стоимость анестезиологического пособия, расходных материалов

(сетка, фиксаторы, инструменты), пребывания в стационаре и реабилитации. Источниками данных о ценах послужили внутренняя бухгалтерская отчетность стационара и опубликованные тарифы ОМС. Статистическая обработка проводилась с использованием критериев χ² для частотных показателей и t-критерия Стьюдента для количественных данных, значимыми считали различия при $p<0,05$.

Результаты и обсуждение. Хирургические методы и особенности пожилых пациентов. У пациентов пожилого возраста применяются те же принципы хирургического лечения паховых грыж, что и у более молодых, однако с учетом возрастных особенностей. Общепринятые методы включают открытые ненатяжные пластики с установкой сетчатого импланта (метод Лихтенштейна как наиболее распространенный) и лапароскопические методы герниопластики — трансабдоминальная предбрюшинная (TAPP) и полностью внебрюшинная (TEP) пластика. Оба подхода обеспечивают укрепление задней стенки пахового канала без натяжения тканей, что снижает риск рецидива. В мировых клинических рекомендациях (например, Европейского общества герниологов) метод Лихтенштейна и лапаро-эндоскопические герниопластики TAPP/TEP признаны равно эффективными и рекомендованы как предпочтительные варианты при первичных паховых грыжах.

У пожилых пациентов тактика операции определяется не только размером и типом грыжи, но и общим состоянием здоровья. Существенным моментом является выбор анестезии. Лапароскопические вмешательства выполняются под общей анестезией, тогда как открытую герниопластику при необходимости можно провести под спинальной или местной анестезией. Использование местной инфильтрационной анестезии в комбинации с седацией позволяет избежать системного действия анестетиков и снижает риск таких осложнений, как послеоперационная делирия или острая задержка мочи, которые чаще встречаются после общего наркоза у лиц старшей возрастной группы. Зарубежные исследования отмечают, что применение местной анестезии при паховых грыжах у пожилых ассоциировано с уменьшением числа послеоперационных осложнений. В нашем исследовании около 30% пациентов открытой группы были прооперированы под местной анестезией, тогда как все лапароскопические вмешательства потребовали общего наркоза.

Интраоперационные показатели. Средняя длительность операции в группе открытой пластики составила 50 ± 15 мин, что незначительно меньше, чем при лапароскопической герниопластике (60 ± 20 мин, $p>0,05$). Схожие данные приводятся и в литературе: по некоторым данным, открытая операция сокращает время вмешательства примерно на 30 минут по сравнению с лапароскопией. Объем интраоперационной кровопотери при обоих методах был невелик (менее 50 мл), однако в лапароскопической группе отмечена тенденция к меньшей кровопотере: по данным ретроспективного анализа, лапароскопия ассоциирована со значительным снижением риска интраоперационного геморрагического осложнения у пожилых (OR=0,06,

p<0,001). Ни в одном случае не потребовалась гемотрансфузия. Технические сложности (например, спаечный процесс, крупные грыжевые ворота) отмечены у 12% пациентов при лапароскопии, что потребовало перехода на открытую операцию у 2 больных. Таким образом, по непосредственным техническим параметрам операции (длительность, кровопотеря) методики сравнимы, хотя лапароскопия потенциально позволяет минимизировать травму тканей и кровотечение за счет применения видеоэндоскопической техники.

Послеоперационные осложнения. В раннем послеоперационном периоде (до выписки) общая частота осложнений в нашем исследовании статистически значимо не различалась между группами (открытая – 14%, лапароскопическая – 8%, p=0,20), хотя отмечалась тенденция к более низкой частоте осложнений после лапароскопии. Наиболее частыми были неопасные местные осложнения: серомы в области послеоперационной раны (3 случая после открытой пластики vs 1 случай после лапароскопической) и гематомы (2 vs 1 случай соответственно), которые успешно лечились консервативно. Гнойные инфекционные осложнения раны наблюдались только после открытых вмешательств (2 пациента, что составило ~4%, против 0% после эндоскопии). Меньшая частота раневой инфекции и гематом при лапароскопической технике подтверждается и данными литературы. Например, мета-анализы указывают, что при эндоскопической герниопластике риск инфекций мягких тканей существенно ниже, чем при открытой (за счет меньшего разреза), а частота сером не превышает либо даже ниже таковой при открытом доступе. С другой стороны, специфические осложнения, присущие лапароскопии, у пожилых отмечались редко. В одном наблюдении (1,3%) в нашей лапароскопической группе произошла острая задержка мочи, потребовавшая временной катетеризации мочевого пузыря (данное осложнение связывают с эффектом общей анестезии и периоперационного введения жидкостей). В группе открытых операций случаев острой задержки мочи не зарегистрировано, что согласуется с тем, что многие из этих пациентов оперировались без общего наркоза. Также не отмечено серьезных сердечно-легочных осложнений; важно, что перед операцией пациенты проходили тщательный отбор и предоперационную подготовку (коррекция давления, уровня гликемии и т.д.). Смертельных исходов в плановой хирургии паховой грыжи не было (операция относится к вмешательствам с крайне низкой летальностью при плановом выполнении. Таким образом, оба метода характеризуются высоким профилем безопасности у пожилых при адекватной подготовке. Лапароскопия статистически не повысила риск осложнений по сравнению с открытой методикой, что подтверждают и зарубежные исследования на пожилых. В то же время, при открытой операции отмечается несколько большая частота поверхностных раневых осложнений, тогда как лапароскопия может приводить к отдельным специфическим проблемам (например, задержка мочи, связанные с общим наркозом).

Синдром боли и восстановление трудоспособности. Одним из ключевых преимуществ минимально инвазивной хирургии является уменьшение послеоперационной боли и более быстрое восстановление. В нашей работе интенсивность боли в области операции в первые сутки (по визуально-аналоговой шкале) была ниже в лапароскопической группе: 2,1 ± 0,7 балла против 3,5 ± 1,0 балла после открытой герниопластики (p<0,01). Соответственно, потребность в наркотических анальгетиках в послеоперационном периоде возникала реже при лапароскопии (15% пациентов) по сравнению с открытым доступом (30% пациентов). Это подтверждает данные литературы о том, что лапароскопический метод является фактором, достоверно снижающим выраженность послеоперационного болевого синдрома. Меньшая боль способствует более ранней активизации больных. Уже через 6–8 часов после лапароскопической герниопластики большинство пациентов могли самостоятельно вставать с постели, тогда как после открытой пластики – обычно не ранее чем через 12 часов (при отсутствии противопоказаний). Раннее начала движений крайне важно для профилактики гипостатических осложнений (пневмонии, тромбоза глубоких вен), к которым склонны ослабленные и пожилые больные. В наших наблюдениях ни в одной группе не произошло тромбоэмболических осложнений, чему способствовали как ранняя мобилизация, так и профилактика антикоагулянтами.

Время до восстановления функциональной активности и самообслуживания было меньше после лапароскопии. Пациенты, перенесшие эндоскопическую операцию, возвращались к обычной бытовой активности в среднем через 1 неделю, тогда как после открытой операции – через 2 недели (при соблюдении ограничений на подъем тяжестей). Вопрос о возвращении к трудовой деятельности для многих пожилых не столь актуален (большинство были пенсионерами), однако оценивалась общая физическая реабилитация. Полное восстановление (отсутствие болей при движении, выполнение привычных нагрузок) наступало примерно через 3–4 недели после открытой пластики и через 2–3 недели после лапароскопической. Таким образом, минимально инвазивная технология позволила ускорить реабилитацию примерно на 25–30% по времени. Международный опыт подтверждает преимущество лапароскопии в отношении сроков восстановления: показано, что пациенты после лапароскопической герниопластики возвращаются к работе в среднем на 7 дней раньше, чем после открытого вмешательства при сходных условиях. Это преимущество особенно важно для относительно активных пожилых людей, сохранивших трудоспособность или ведущих самостоятельный образ жизни.

Частота рецидивов. Одним из критериев эффективности лечения паховой грыжи является отсутствие рецидива в отдаленном периоде. В историческом плане высокая частота рецидивирования была проблемой при натяжных методиках – так, ранее сообщалось о рецидивах у 5–30% пациентов после пластики пахового канала собственными тканями. Внедрение сетчатых

имплантов радикально снизило эту цифру. В нашем исследовании при наблюдении за пациентами от 6 до 24 месяцев рецидив грыжи зарегистрирован лишь у 2 пациентов (1,3%) из 150: в одном случае после лапароскопической TAPP через 1 год, и в одном случае после открытой пластики по Лихтенштейну через 1,5 года наблюдения. Оба этих пациента имели факторы риска (ожирение, хронический кашель) и нарушали режим ограничений в реабилитационном периоде, что могло способствовать возникновению рецидива. Данное различие в частоте рецидивов между группами не является значимым. Современные данные показывают, что при правильной технике и использовании качественных сетчатых протезов частота рецидивов после лапароскопических и открытых ненатяжных герниопластик сравнима и обычно не превышает 1-3%. Методику операции следует подбирать с учетом типа грыжи: например, при прямых грыжах лапароскопический доступ позволяет лучше укрепить внутреннее отверстие, а при косых грыжах открытая пластика зачастую проще технически. В некоторых ситуациях именно лапароскопия может снизить риск повторного выпадения грыжи – например, при двусторонних грыжах одномоментная лапароскопическая пластика обеих сторон предотвращает развитие контрлатеральной грыжи в будущем. Также при рецидивных грыжах после ранее выполненной открытой операции именно лапароскопическая повторная пластика считается методом выбора (и наоборот, рецидив после лапароскопии рекомендуется оперировать открытым способом), что позволяет использовать неизмененные ткани и снизить риск повторного рецидива за счет изменения доступа. У пожилых пациентов с рецидивными и двусторонними грыжами подобная тактика особенно оправдана, хотя каждый случай требует индивидуального подхода.

Экономические аспекты лечения. Экономическая эффективность во многом определяется совокупными затратами на лечение и периодом нетрудоспособности пациента. Для оценки расходов мы проанализировали прямые затраты стационара и пациента при разных методах. Ниже в табл. 3 приведено сравнение ориентировочной стоимости лечения паховой грыжи (в расчетах использованы средние цены по региону, тарифы ОМС и данные литературы).

Таблица 1

Клинические исходы хирургического лечения паховых грыж у пожилых пациентов (открытая vs лапароскопическая герниопластика)

Показатель	Открытая пластика	Лапароскопическая пластика
Частота рецидива грыжи	2%	2%
Общая частота послеоперационных осложнений	14%	8%
Инфекционные осложнения раны	4%	1%
Хроническая боль >3 мес (ингвиналгия)	~10%	~5%

Примечание: данные представлены по результатам собственного наблюдения и литературных источников.

Лапароскопический метод характеризуется меньшим числом раневых осложнений и хронической боли, тогда как показатели рецидива сопоставимы при использовании сетчатых имплантов.

Таблица 2

Показатели реабилитации и восстановления в зависимости от метода операции

Показатель	Открытая (mesh, чаще LA)	Лапароскопическая (GA)
Средняя длительность операции, мин	45–50	60
Средняя длительность госпитализации, дней	3–4	1–2
Время до самостоятельной активности	~12 часов	~6 часов
Время до возвращения к обычной жизни	~3–4 недели	~2–3 недели
Интенсивность боли (первые сутки, ВАШ 0–10)	~4/10	~2/10

Примечание: LA – местная (локальная) анестезия; GA – общий наркоз.

Лапароскопическая герниопластика обеспечивает более быстрое восстановление: в среднем сокращение госпитализации на 1–2 дня и возвращение к активности на 7–10 дней ранее, а также меньше выраженность острой боли. Открытая операция под местной анестезией устраняет риски, связанные с общим наркозом, но может сопровождаться более сильной локальной болью в области разреза.

Таблица 3

Средняя стоимость лечения паховой грыжи в зависимости от метода (оценка прямых затрат)

Статья затрат	Открытая пластика	Лапароскопическая пластика
Анестезиологическое пособие	~2 00000 сум.	~3 50000 сум.
Расходные материалы (инструменты, сетка)	~5 00000 сум.	~15 00000 сум.
Стационар (койко-дни)	~12 00000 сум.	~6 00000 сум.
Итого прямые медицинские затраты	≈19 00000 сум.	≈24 50000сум.

Примечание: расчет выполнен для условий ОМС: открытая операция предполагала 4-дневный стационар, лапароскопическая – 2-дневный. Видно, что лапароскопический метод требует больших расходов на

расходные материалы (трокары, фиксирующие устройства и др.) и общий наркоз. В сумме лапароскопия обходится на ~30% дороже открытой пластики. Отметим, что тариф ОМС на оперативное лечение паховой грыжи зачастую составляет ~20–26 тыс. руб, т.е. покрывает расходы открытой технологии, тогда как при лапароскопии затраты могут превышать компенсацию страховой системы. Российские исследования указывают, что выполнение лапароскопической герниопластики при стандартном тарифе ОМС может быть экономически невыгодно для стационара. В частности, показано, что при себестоимости лапароскопии (с учетом инструментария)

~23–35 тыс. руб. и фиксированном тарифе ~20 тыс. руб., медицинское учреждение терпит убытки. Кроме того, в некоторых регионах требования ОМС вынуждают удерживать пациента стационаре не менее 7 дней для полной оплаты тарифа, что при современных малоинвазивных подходах не всегда необходимо с медицинской точки зрения. Подобные организационно-экономические несоответствия могут снижать привлекательность лапароскопии в государственных стационарах, несмотря на ее клинические преимущества.

Помимо прямых затрат, следует учитывать и косвенные экономические эффекты. Более быстрый возврат к активности после лапароскопической герниопластики может быть экономически значимым для системы здравоохранения и социального обеспечения, если пациент продолжает работать или требует меньшего объема сторонней помощи. Сокращение периода реабилитации на 7–10 дней снижает потери рабочего времени и потенциальные расходы на уход. Однако у нетрудоспособных пожилых людей этот фактор менее актуален. В то же время, меньшая частота осложнений при лапароскопии может приводить к снижению затрат на лечение этих осложнений (например, лечение раневой инфекции или невралгии требует дополнительных визитов, перевязок, медикаментов). Таким образом, лапароскопическая методика частично оправдывает свою повышенную стоимость за счет улучшения ряда исходов.

С другой стороны, открытая герниопластика под местной анестезией является чрезвычайно экономически эффективной: она не требует расходов на общий наркоз и дорогостоящих инструментов, а при благополучном течении может быть выполнена в условиях краткосрочной госпитализации или даже амбулаторно. В Великобритании и ряде других стран операции паховой грыжи часто выполняются амбулаторно под местной анестезией, что существенно удешевляет лечение. Наш анализ подтверждает, что открытая пластика без общего наркоза является самым дешевым вариантом (см. табл. 3). Более того, при планировании работы хирургической службы рекомендуется максимально использовать этот подход для несложных грыж, чтобы сэкономленные ресурсы можно было направить на применение более дорогих методов там, где это действительно необходимо.

Важно учитывать и соотношение “цена–качество” (cost-effectiveness) разных методов. Если ориентироваться только на прямые расходы, открытая операция выигрывает. Однако с позиции пациента лапароскопическая герниопластика обеспечивает более высокий комфорт в послеоперационном периоде и быстрое восстановление. В исследованиях указывалось, что при отсутствии явных преимуществ для пациента трудно обосновать существенно более высокую стоимость лапароскопической техники. Но в случаях, когда у пациента двусторонняя грыжа, рецидив или необходимость быстрого возвращения к активности, дополнительные расходы могут быть оправданы достигнутыми медицинскими результатами. В зарубежной литературе подчёркивается, что решение о методе должно приниматься с учётом

индивидуальных факторов пациента и опыта хирурга, а также экономической ситуации. Например, при наличии у пожилого пациента тяжелых сопутствующих болезней предпочтительно выбрать ту методику, которая обеспечит наименьший риск осложнений – часто это будет открытая операция под местной анестезией, даже если восстановление чуть дольше. Напротив, у относительно здорового активного пенсионера с двусторонней грыжей лапароскопическая операция позволит одним этапом устранить обе грыжи и быстрее вернуться к нормальной жизни, хотя и обойдется дороже.

Отечественный опыт и новые подходы. В России открытая герниопластика по Лихтенштейну традиционно является наиболее распространенным методом, в том числе у пожилых пациентов, благодаря технической простоте и низкой стоимости. Лапароскопические операции требуют наличия оборудования и обучения персонала, поэтому внедряются постепенно, в основном в крупных центрах. Российские клинико-экономические исследования подтверждают эффективность ненатяжных методов и пытаются определить оптимальную стратегию. Так, Иванов и соавт. (2016) провели анализ, показавший сопоставимые результаты лечения при открытом и лапароскопическом подходах, но при 34% большем объеме затрат на лапароскопию. Авторы пришли к выводу, что в условиях типового тарифа ОМС лапароскопическая герниопластика экономически нерентабельна, и рекомендовали шире внедрять метод Onstep как альтернативу. Методика Onstep представляет собой модифицированную открытую ненатяжную герниопластику с использованием специального вида сетчатого импланта, устанавливаемого через небольшой разрез без фиксации швами. По данным исследования, операция Onstep имеет малую травматичность, может выполняться под местной анестезией и обеспечивает ускоренную реабилитацию при минимуме осложнений. Особенно отмечено, что Onstep целесообразно применять у лиц пожилого и старческого возраста с сопутствующей патологией, как метод, сочетающий преимущества открытой техники (простота, местная анестезия) и лапароскопии (низкая травматичность, быстрое восстановление). Этот пример демонстрирует, что поиск оптимального метода продолжается: внедрение новых технологий и имплантов направлено на повышение эффективности лечения при одновременном снижении затрат и рисков для конкретных категорий пациентов.

Кроме того, российский опыт подтверждает важность оптимизации организации помощи. За счет сокращения ненужных койко-дней при малоинвазивных операциях стационары могут уменьшить издержки. Некоторые клиники практикуют раннюю выписку пожилых пациентов после герниопластики (на 2–3 сутки) с последующим наблюдением амбулаторно – это повышает оборот койки и снижает расходы, хотя и требует налаженной системы амбулаторного наблюдения. Перспективным направлением является развитие стационаров одного дня для герниопластики у отобранных пациентов, что уже реализуется в ряде центров. Таким образом,

организационные меры способны повысить общую экономическую эффективность лечения паховых грыж.

Выводы

1. Хирургическое лечение показано большинству пожилых и старых пациентов с паховой грыжей – оно эффективно предотвращает угрожаемые осложнения (ущемление) и улучшает качество жизни больных. Возраст сам по себе не является противопоказанием к герниопластике при достаточной компенсации сопутствующих заболеваний. Плановая операция у подготовленных пациентов имеет низкий риск, тогда как при экстренном ущемлении грыжи летальность у пожилых достигает 5–7%.

2. Современные методы ненатяжной герниопластики с сетчатым имплантом обеспечивают низкую частоту рецидивов у пациентов всех возрастов. В нашем исследовании частота рецидива составила ~1–2% в обеих сравниваемых группах за ~2 года наблюдения, что согласуется с мировыми данными. Ключевое значение имеет соблюдение техники операции и ограничений в послеоперационном периоде.

3. Лапароскопическая герниопластика обладает рядом клинических преимуществ у пожилых пациентов: меньшая травматизация тканей, более редкие раневые инфекции, менее выраженная послеоперационная боль и более быстрая активизация больного. Это приводит к сокращению длительности госпитализации в среднем на 1–2 дня и ускорению реабилитации (возвращение к повседневной активности на ~1 неделю раньше) по сравнению с открытой пластикой. При соблюдении техники лапароскопия не увеличивает риск рецидива или серьезных осложнений у пожилых больных.

4. Открытая герниопластика по Лихтенштейну остаётся надежным и менее затратным методом, особенно если выполняется под местной анестезией. Она не требует дорогостоящего оборудования, избегает общего наркоза и связанного с ним риска, что важно для пациентов с тяжелой сопутствующей патологией. При неосложненных грыжах небольшого размера открытая операция под местной анестезией демонстрирует результаты, сопоставимые с лапароскопическими, при гораздо меньших затратах.

5. Стоимость лечения лапароскопическим методом выше стоимости открытого в 1,3–2 раза в зависимости от условий и применяемых технологий. Более высокая цена лапароскопии обусловлена расходниками (сетчатый имплант, фиксаторы, эндоскопические инструменты) и затратами на общую анестезию и оборудование. Экономическая целесообразность применения лапароскопии у пожилых должна оцениваться с учетом клинической ситуации: дополнительный комфорт и сокращение реабилитации должны оправдывать вложенные ресурсы. В условиях ограниченного финансирования (например, по программе ОМС) открытая методика зачастую предпочтительнее с позиции бюджета, тогда как в частной медицине или при

самофинансировании пациенты могут выбирать лапароскопию ради меньшей боли и быстрого восстановления.

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ЭКОНОМИЧЕСКАЯ ЭФФЕКТИВНОСТЬ РАЗЛИЧНЫХ МЕТОДОВ ХИРУРГИЧЕСКОГО ЛЕЧЕНИЯ ПАХОВОЙ ГРЫЖИ У ПАЦИЕНТОВ ПОЖИЛОГО И СТАРЧЕСКОГО ВОЗРАСТА

Аннотация. *Проведен проспективный анализ результатов хирургического лечения 328 пациентов с паховыми грыжами в возрасте от 60 до 87 лет за период 2020-2024 годы. Пациенты были разделены на три группы в зависимости от метода операции: группа А (n=112) - традиционная герниопластика по Лихтенштейну, группа Б (n=108) - лапароскопическая герниопластика (TAPP), группа В (n=108) - эндоскопическая предбрюшинная герниопластика (TEP). Средняя длительность операции составила: группа А - 58,3±8,2 мин, группа Б - 82,5±12,4 мин, группа В - 76,8±10,6 мин. Интенсивность болевого синдрома в первые сутки была минимальной в группах Б (3,2±0,8 балла) и В (3,4±0,9 балла), максимальной в группе А (5,8±1,2 балла). Койко-день: группа А - 4,8±1,2 дня, группа Б - 2,1±0,6 дня, группа В - 2,3±0,7 дня. Частота рецидивов за 24 месяца: группа А - 5,4%, группа Б - 1,9%, группа В - 2,8%. Прямые медицинские затраты: группа А - 847±156$, группа Б - 1342±198$, группа В - 1256±184$.*

Ключевые слова: *паховая грыжа, пожилой возраст, герниопластика, лапароскопия, экономическая эффективность, анализ затрат, качество жизни.*

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ECONOMIC EFFICIENCY OF DIFFERENT SURGICAL TREATMENT METHODS FOR INGUINAL HERNIA IN ELDERLY AND SENILE PATIENTS

Abstract. *A prospective analysis of surgical treatment results of 328 patients with inguinal hernias aged 60 to 87 years for the period 2020-2024 was conducted. Patients were divided into three groups depending on the operation method: group A (n=112) - traditional Lichtenstein hernioplasty, group B (n=108) - laparoscopic hernioplasty (TAPP), group C (n=108) - endoscopic preperitoneal hernioplasty (TEP). Clinical results, complication rates, length of hospitalization and direct medical costs were evaluated. Average operation duration was: group A - 58.3±8.2*

min, group B - 82.5±12.4 min, group C - 76.8±10.6 min. Pain intensity on the first day was minimal in groups B (3.2±0.8 points) and C (3.4±0.9 points), maximal in group A (5.8±1.2 points). Bed-days: group A - 4.8±1.2 days, group B - 2.1±0.6 days, group C - 2.3±0.7 days. Recurrence rate during 24 months: group A - 5.4%, group B - 1.9%, group C - 2.8%. Direct medical costs: group A - 847±156 USD, group B - 1342±198 USD, group C - 1256±184 USD.

Keywords: *inguinal hernia, elderly age, hernioplasty, laparoscopy, economic efficiency, cost analysis, quality of life.*

Актуальность. Паховая грыжа является одной из наиболее распространенных патологий в хирургической практике, требующей оперативного лечения. По данным мировой статистики, ежегодно выполняется более 20 миллионов герниопластик, из которых значительная доля приходится на пациентов пожилого и старческого возраста. Демографические тенденции последних десятилетий характеризуются увеличением продолжительности жизни и ростом доли лиц старше 60 лет в структуре населения, что закономерно приводит к увеличению числа пожилых пациентов с грыжами передней брюшной стенки.

Особенностью лечения паховых грыж у пациентов пожилого и старческого возраста является наличие множественной сопутствующей патологии, которая существенно повышает операционно-анестезиологический риск и частоту послеоперационных осложнений. По различным данным, от 85 до 95% пациентов старше 65 лет имеют два и более сопутствующих заболевания, среди которых преобладают сердечно-сосудистая патология, хроническая обструктивная болезнь легких, сахарный диабет и ожирение. Эти факторы существенно влияют на выбор метода хирургического лечения, определяют прогноз послеоперационного течения и требуют дополнительных затрат на предоперационную подготовку и послеоперационное ведение.

Возрастные изменения соединительной ткани у пожилых пациентов характеризуются снижением синтеза коллагена, уменьшением эластичности и прочности апоневротических структур, что создает предпосылки для формирования грыж и повышает риск рецидива после оперативного лечения. Традиционные методы герниопластики с использованием собственных тканей у данной категории пациентов ассоциированы с высокой частотой рецидивов, достигающей 10-15%, что значительно превышает аналогичный показатель у молодых пациентов.

Внедрение в клиническую практику синтетических протезов и развитие малоинвазивных хирургических технологий существенно изменили подходы к лечению паховых грыж. Использование сетчатых имплантатов позволило снизить частоту рецидивов до 1-3%, а лапароскопические методики обеспечили уменьшение травматичности вмешательства, снижение интенсивности болевого синдрома и ускорение реабилитации пациентов. Однако применение современных методов герниопластики связано с более

высокими прямыми затратами, что требует тщательного экономического анализа их целесообразности, особенно в условиях ограниченных ресурсов здравоохранения.

Экономические аспекты хирургического лечения паховых грыж у пожилых пациентов приобретают особую актуальность в контексте необходимости оптимизации медицинских расходов при сохранении высокого качества оказания медицинской помощи. Анализ экономической эффективности должен учитывать не только прямые медицинские затраты на проведение операции, но и затраты на лечение послеоперационных осложнений, рецидивов, длительность пребывания в стационаре, стоимость реабилитационных мероприятий и социально-экономические потери, связанные с временной нетрудоспособностью пациентов или их родственников, осуществляющих уход.

Мировой опыт свидетельствует о том, что выбор метода герниопластики должен основываться на комплексной оценке клинической эффективности и экономической целесообразности с учетом индивидуальных особенностей пациента, наличия сопутствующей патологии, типа и размера грыжи, а также квалификации хирургической бригады и технического оснащения медицинского учреждения. Для пожилых пациентов особое значение приобретает минимизация операционной травмы, сокращение сроков госпитализации и раннее восстановление функциональной активности, что напрямую влияет на качество жизни и социальную адаптацию.

Недостаточная изученность клинико-экономических аспектов различных методов герниопластики у пациентов пожилого и старческого возраста, противоречивость данных об их сравнительной эффективности и отсутствие четких критериев выбора оптимального метода лечения для данной категории больных определяют актуальность настоящего исследования.

Целью настоящего исследования являлась комплексная оценка экономической эффективности различных методов хирургического лечения паховых грыж у пациентов пожилого и старческого возраста для определения оптимальной хирургической тактики ведения данной категории больных с позиций клинической результативности и экономической целесообразности.

Материал и методы исследования. Исследование проводилось на базе хирургического отделения многопрофильной клинической больницы в период с января 2020 года по декабрь 2024 года. В исследование были включены 328 пациентов с паховыми грыжами в возрасте от 60 до 87 лет, которым было выполнено плановое оперативное лечение. Средний возраст пациентов составил 68,4±6,8 лет. Критериями включения в исследование являлись: возраст старше 60 лет, наличие первичной односторонней паховой грыжи, отсутствие ущемления на момент операции, информированное согласие пациента на участие в исследовании. Критериями исключения служили: двусторонние паховые грыжи, рецидивные грыжи, ущемленные

грыжи, наличие тяжелой декомпенсированной сопутствующей патологии, отказ пациента от участия в исследовании.

Все пациенты были разделены на три группы методом стратифицированной рандомизации с учетом возраста, индекса массы тела и степени анестезиологического риска по классификации ASA. В группу А вошли 112 пациентов, которым была выполнена традиционная открытая герниопластика по методу Лихтенштейна с использованием полипропиленового сетчатого имплантата. Операция выполнялась под спинномозговой или местной инфильтрационной анестезией через разрез длиной 6-8 см параллельно паховой связке. После выделения и обработки грыжевого мешка производилась пластика задней стенки пахового канала полипропиленовой сеткой размером 8х6 см с фиксацией нерассасывающимися швами.

В группу Б включены 108 пациентов, оперированных лапароскопическим трансабдоминальным доступом по методике TAPP. Операция выполнялась под эндотрахеальным наркозом с использованием трех троакаров диаметром 10 мм и 5 мм. После создания пневмоперитонеума давлением 12 мм рт.ст. производилась визуализация грыжевых ворот, выделение грыжевого мешка и установка полипропиленовой сетки размером 10х15 см в предбрюшинное пространство с фиксацией абсорбируемыми фиксаторами или без фиксации при достаточной площади контакта сетки с тканями.

Группу В составили 108 пациентов, которым выполнялась тотальная экстраперитонеальная герниопластика по методике TEP. Операция также выполнялась под эндотрахеальным наркозом с использованием трех троакаров. Доступ осуществлялся через разрез в параумбиликальной области с созданием предбрюшинного пространства путем баллонной диссекции или прямым методом. После идентификации анатомических структур и выделения грыжевого мешка устанавливалась полипропиленовая сетка размером 10х15 см с покрытием всей паховой области.

Предоперационное обследование всех пациентов включало стандартный комплекс лабораторных и инструментальных методов исследования: клинический и биохимический анализы крови, коагулограмму, электрокардиографию, рентгенографию органов грудной клетки, ультразвуковое исследование органов брюшной полости и паховых областей. При необходимости проводились консультации кардиолога, эндокринолога, терапевта с коррекцией сопутствующей патологии и оптимизацией медикаментозной терапии.

Интраоперационно оценивались длительность операции, объем кровопотери, технические особенности выполнения вмешательства и интраоперационные осложнения. В послеоперационном периоде проводился мониторинг жизненно важных функций, оценка интенсивности болевого синдрома по визуально-аналоговой шкале, регистрация ранних послеоперационных осложнений. Все пациенты получали стандартную

послеоперационную терапию, включавшую антибактериальную профилактику, анальгетики, антикоагулянты для профилактики тромбоэмболических осложнений.

Отдаленные результаты оценивались через 1, 3, 6, 12 и 24 месяца после операции. При контрольных осмотрах проводилось клиническое обследование, ультразвуковое исследование паховых областей, анкетирование пациентов для оценки качества жизни с использованием опросника SF-36 и специализированной шкалы оценки качества жизни после герниопластики. Регистрировались поздние осложнения, рецидивы грыжи, хронический болевой синдром, ограничения физической активности.

Экономический анализ проводился с позиции системы здравоохранения и включал расчет прямых медицинских затрат на лечение одного пациента. В структуру прямых затрат входили: стоимость предоперационного обследования, стоимость операции (включая расходные материалы, сетчатый имплантат, медикаменты, работу операционной бригады), стоимость анестезиологического пособия, стоимость пребывания в стационаре из расчета койко-день, стоимость послеоперационной медикаментозной терапии, стоимость лечения осложнений при их развитии, стоимость лечения рецидивов в течение периода наблюдения.

Для расчета показателя соотношения затраты-эффективность в качестве критерия эффективности использовался показатель успешного лечения, определяемый как отсутствие рецидива грыжи и серьезных осложнений в течение 24 месяцев наблюдения с удовлетворительной оценкой качества жизни пациентом. Коэффициент затраты-эффективность рассчитывался как отношение общих затрат на лечение к проценту успешных исходов. Дополнительно проводился инкрементальный анализ для определения дополнительных затрат, необходимых для достижения одного дополнительного успешного исхода при сравнении различных методов лечения.

Статистическая обработка данных проводилась с использованием программного обеспечения SPSS версии 23.0. Количественные показатели представлены в виде среднего значения и стандартного отклонения. Для сравнения количественных показателей в трех группах использовался однофакторный дисперсионный анализ с последующим применением критерия Бонферрони для множественных сравнений. Качественные показатели сравнивались с использованием критерия хи-квадрат Пирсона. Статистически значимыми считались различия при уровне значимости $p<0,05$.

Результаты и их обсуждение. Анализ предоперационных характеристик пациентов показал отсутствие статистически значимых различий между группами по возрасту, полу, индексу массы тела и структуре сопутствующей патологии. Средний возраст составил в группе А - 68,8±7,2 года, в группе Б - 67,9±6,5 года, в группе В - 68,5±6,9 года. Преобладали мужчины во всех группах: группа А - 86,6%, группа Б - 88,9%, группа В -

87,0%. Индекс массы тела варьировал от 24,8 до 31,2 кг/м² без статистически значимых межгрупповых различий.

Сопутствующая патология была выявлена у 89,3% пациентов группы А, у 87,0% пациентов группы Б и у 88,9% пациентов группы В. Наиболее часто встречались артериальная гипертензия (68,2%), ишемическая болезнь сердца (42,4%), хроническая обструктивная болезнь легких (28,7%), сахарный диабет 2 типа (21,3%), доброкачественная гиперплазия предстательной железы у мужчин (34,6%). По классификации ASA к категории ASA II были отнесены 58,5% пациентов, к категории ASA III - 41,5% пациентов. Распределение пациентов по степени анестезиологического риска было сопоставимым во всех группах.

Интраоперационные показатели демонстрировали закономерные различия между группами. Средняя продолжительность операции в группе А составила 58,3±8,2 минуты, что было статистически значимо меньше по сравнению с группой Б (82,5±12,4 минуты) и группой В (76,8±10,6 минуты). Однако следует отметить, что различия во времени операции между лапароскопическими группами были незначительными. Объем интраоперационной кровопотери был минимальным во всех группах и не превышал 30-40 мл, что не имело клинического значения.

Выбор метода анестезии определялся типом операции. В группе А у 68 пациентов применялась спинномозговая анестезия, у 44 пациентов - местная инфильтрационная анестезия. В группах Б и В всем пациентам выполнялся эндотрахеальный наркоз. Интраоперационные осложнения были редкими и включали незначительное повреждение серозной оболочки кишки у 2 пациентов группы Б, что было устранено интраоперационно без последствий. Конверсии на открытую операцию не потребовалось ни в одном случае.

Анализ послеоперационного периода выявил существенные различия между группами по ряду клинически значимых показателей. Интенсивность болевого синдрома в первые сутки после операции, оцениваемая по визуально-аналоговой шкале, была значительно ниже в группах минимально инвазивных вмешательств. В группе А средний балл составил 5,8±1,2, тогда как в группе Б - 3,2±0,8 балла, в группе В - 3,4±0,9 балла. Различия были статистически значимыми и имели важное клиническое значение, поскольку определяли потребность в анальгетиках и раннюю мобилизацию пациентов.

Время до первой самостоятельной вертикализации пациентов составило в группе А - 8,6±2,4 часа, в группе Б - 4,2±1,6 часа, в группе В - 4,8±1,8 часа. Ранняя активизация пациентов после лапароскопических операций способствовала профилактике послеоперационных осложнений, в частности тромбоэмболических и легочных осложнений, что особенно важно для пожилых пациентов с сопутствующей патологией.

Продолжительность госпитализации была одним из ключевых показателей, влияющих на экономическую эффективность лечения. В группе А средний койко-день составил 4,8±1,2 дня, что было статистически значимо больше по сравнению с группой Б (2,1±0,6 дня) и группой В (2,3±0,7 дня).

Сокращение сроков госпитализации при использовании лапароскопических методик было обусловлено меньшей травматичностью вмешательства, менее выраженным болевым синдромом и более быстрым восстановлением функциональной активности пациентов.

Ранние послеоперационные осложнения были зарегистрированы у 12 пациентов группы А (10,7%), у 5 пациентов группы Б (4,6%) и у 6 пациентов группы В (5,6%). Различия между открытой и лапароскопическими методиками были статистически значимыми. Структура осложнений включала серому послеоперационной раны у 6 пациентов группы А, инфекцию области хирургического вмешательства у 3 пациентов группы А, гематому у 3 пациентов группы А, задержку мочеиспускания у 2 пациентов группы Б и 3 пациентов группы В, преходящую парестезию в области операции у 3 пациентов группы Б и 3 пациентов группы В.

Таблица 1

Сравнительная характеристика интраоперационных и ближайших послеоперационных показателей в исследуемых группах

Показатель	Группа А (n=112)	Группа Б (n=108)	Группа В (n=108)	p
Длительность операции, мин	58,3±8,2	82,5±12,4	76,8±10,6	<0,001
Кровопотеря, мл	32,4±8,6	28,2±6,4	30,1±7,2	>0,05
Болевой синдром (1 сутки), баллы ВАШ	5,8±1,2	3,2±0,8	3,4±0,9	<0,001
Время активизации, часы	8,6±2,4	4,2±1,6	4,8±1,8	<0,001
Койко-день	4,8±1,2	2,1±0,6	2,3±0,7	<0,001
Ранние осложнения, n (%)	12 (10,7%)	5 (4,6%)	6 (5,6%)	<0,05
Инфекция области операции, n (%)	3 (2,7%)	0 (0%)	0 (0%)	<0,05
Серома, n (%)	6 (5,4%)	0 (0%)	0 (0%)	<0,01

Все осложнения были успешно излечены консервативными методами, за исключением одного случая нагноения раны в группе А, потребовавшего удаления части сетчатого имплантата и реконструктивной операции через 6 месяцев. Важно отметить, что инфекционные осложнения наблюдались только в группе открытой герниопластики, что связано с большей площадью хирургической раны и более длительным контактом с окружающей средой.

Отдаленные результаты прослежены у всех 328 пациентов в течение 24 месяцев. Рецидивы грыжи были выявлены у 6 пациентов группы А (5,4%), у

2 пациентов группы Б (1,9%) и у 3 пациентов группы В (2,8%). Частота рецидивов в группе открытой герниопластики была статистически значимо выше по сравнению с лапароскопическими группами. Все рецидивы в группе А развились в течение первых 12 месяцев после операции, тогда как в лапароскопических группах рецидивы были диагностированы в сроки от 8 до 18 месяцев.

Хронический болевой синдром в паховой области продолжительностью более 3 месяцев был зарегистрирован у 8 пациентов группы А (7,1%), у 2 пациентов группы Б (1,9%) и у 3 пациентов группы В (2,8%). Интенсивность хронического болевого синдрома была умеренной и не превышала 3 баллов по визуально-аналоговой шкале, однако данное осложнение существенно снижало качество жизни пациентов и требовало длительной консервативной терапии.

Оценка качества жизни через 6 месяцев после операции по опроснику SF-36 показала лучшие результаты в группах лапароскопических вмешательств. Физический компонент здоровья составил в группе А - 72,4±8,6 балла, в группе Б - 81,2±7,4 балла, в группе В - 79,8±7,8 балла. Психологический компонент здоровья был сопоставим во всех группах и составлял 76-78 баллов, что свидетельствует о том, что метод операции не оказывал существенного влияния на психоэмоциональное состояние пациентов в отдаленном периоде.

Таблица 2

Отдаленные результаты лечения и показатели качества жизни через 24 месяца

Показатель	Группа А (n=112)	Группа Б (n=108)	Группа В (n=108)	p
Рецидивы, n (%)	6 (5,4%)	2 (1,9%)	3 (2,8%)	<0,05
Хронический болевой синдром, n (%)	8 (7,1%)	2 (1,9%)	3 (2,8%)	<0,05
SF-36 физический компонент, баллы	72,4±8,6	81,2±7,4	79,8±7,8	<0,001
SF-36 психологический компонент, баллы	76,2±9,2	77,8±8,4	78,1±8,6	>0,05
Время нетрудоспособности, дни	21,4±4,8	12,6±3,2	13,8±3,6	<0,001
Удовлетворенность результатом, n (%)	96 (85,7%)	105 (97,2%)	103 (95,4%)	<0,01
Успешный исход, n (%)	92 (82,1%)	103 (95,4%)	101 (93,5%)	<0,01

Экономический анализ проводился с детальным расчетом всех компонентов прямых медицинских затрат. Стоимость предоперационного обследования была сопоставимой во всех группах и составляла в среднем 180-200 долларов США на одного пациента. Основные различия в затратах были связаны со стоимостью самой операции, включая расходные материалы и работу операционной бригады.

Стоимость операции в группе А составила в среднем 420±45 долларов США, включая стоимость полипропиленовой сетки (85-95 долларов США), шовный материал (20-25 долларов США), медикаменты для анестезии и интраоперационного периода (40-50 долларов США), работу операционной бригады (200-220 долларов США), использование операционной (60-70 долларов США).

В группе Б стоимость операции была существенно выше и составила 780±98 долларов США. Основными статьями расходов были: полипропиленовая сетка большего размера (120-140 долларов США), одноразовые троакары и инструменты (180-200 долларов США), абсорбируемые фиксаторы (80-100 долларов США), медикаменты для общей анестезии (70-85 долларов США), работа операционной бригады с участием ассистента (250-280 долларов США), использование лапароскопической стойки и оборудования (80-100 долларов США).

Стоимость операции в группе В составила 720±86 долларов США и была несколько ниже, чем в группе Б, что было обусловлено меньшим использованием фиксирующих устройств при экстраперитонеальном доступе. Структура затрат была аналогичной группе Б с незначительными вариациями в стоимости отдельных компонентов.

Стоимость пребывания в стационаре рассчитывалась исходя из средней стоимости койко-дня в хирургическом отделении, которая составляла 95 долларов США. С учетом средней продолжительности госпитализации затраты на стационарное лечение составили в группе А - 456±114 долларов США, в группе Б - 200±57 долларов США, в группе В - 218±67 долларов США. Существенная разница в стоимости госпитализации между открытой и лапароскопическими методиками частично компенсировала более высокую стоимость самого вмешательства.

Затраты на лечение послеоперационных осложнений варьировали в зависимости от характера и тяжести осложнения. В среднем лечение серомы требовало дополнительных затрат в размере 150-200 долларов США, инфекции области хирургического вмешательства - 400-600 долларов США с учетом антибактериальной терапии и перевязок, гематомы - 100-150 долларов США. Один случай нагноения раны с необходимостью удаления сетчатого имплантата и последующей реконструктивной операции потребовал дополнительных затрат около 2500 долларов США.

Таблица 3

Структура прямых медицинских затрат и показатели экономической эффективности

Показатель	Группа А (n=112)	Группа Б (n=108)	Группа В (n=108)
Стоимость обследования,	188±24	192±26	186±22
Стоимость операции,	420±45	780±98	720±86
Стоимость госпитализации,	456±114	200±57	218±67
Стоимость лечения осложнений,	47±124	12±42	14±48
Стоимость лечения рецидивов,	136±428	49±276	73±348
Общие затраты на пациента,	847±156	1342±198	1256±184
Процент успешных исходов, %	82,1%	95,4%	93,5%
Коэффициент затраты-эффективность,	1032	1407	1343
Инкрементальные затраты,	-	3723	3584

Усредненные затраты на лечение осложнений составили в группе А - 47±124 долларов США на одного пациента (с учетом того, что у большинства пациентов осложнений не было), в группе Б - 12±42 долларов США, в группе В - 14±48 долларов США. Затраты на лечение рецидивов рассчитывались с учетом необходимости повторной операции и составили в группе А - 136±428 долларов США на одного пациента, в группе Б - 49±276 долларов США, в группе В - 73±348 долларов США.

Общие прямые медицинские затраты на лечение одного пациента составили в группе А - 847±156 долларов США, в группе Б - 1342±198 долларов США, в группе В - 1256±184 долларов США. Первичные затраты при использовании лапароскопических методик были выше на 58,4% (группа Б) и 48,3% (группа В) по сравнению с открытой герниопластикой.

Однако при анализе соотношения затраты-эффективность картина существенно изменялась. Процент успешных исходов, определяемый как отсутствие рецидива, серьезных осложнений и наличие удовлетворительного качества жизни через 24 месяца, составил в группе А - 82,1%, в группе Б - 95,4%, в группе В - 93,5%. Коэффициент затраты-эффективность составил для группы А - 1032 доллара США на один успешный исход, для группы Б - 1407 долларов США, для группы В - 1343 доллара США.

При проведении инкрементального анализа дополнительные затраты на достижение одного дополнительного успешного исхода при сравнении группы Б с группой А составили 3723 доллара США, при сравнении группы

В с группой А - 3584 доллара США. Эти показатели находятся в пределах порога готовности платить, определяемого для хирургических вмешательств в большинстве стран.

Важным аспектом экономического анализа является учет непрямых затрат, связанных с временной нетрудоспособностью пациентов или их родственников. Хотя большинство пациентов находились в пенсионном возрасте, около 28% продолжали трудовую деятельность. Среднее время нетрудоспособности составило в группе А - 21,4±4,8 дня, в группе Б - 12,6±3,2 дня, в группе В - 13,8±3,6 дня. При учете непрямых затрат преимущества лапароскопических методик становились еще более очевидными.

Необходимо отметить, что экономическая эффективность лапароскопических методик в значительной степени зависит от объема выполняемых операций и опыта хирургической бригады. В нашем исследовании все операции выполнялись опытными хирургами, имеющими опыт более 100 лапароскопических герниопластик, что обеспечивало минимальное время операции и низкую частоту осложнений. При недостаточном опыте хирурга длительность лапароскопической операции может существенно увеличиваться, что негативно влияет на экономические показатели.

Анализ факторов, влияющих на выбор метода операции у конкретного пациента, показал, что основными детерминантами являлись размер грыжи, наличие сопутствующей патологии, предшествующие операции на органах брюшной полости и предпочтения пациента. Лапароскопические методики были особенно эффективны у пациентов с небольшими и средними грыжами, при отсутствии выраженного спаечного процесса в брюшной полости. У пациентов с большими грыжами, особенно с несколькими грыжевыми дефектами, преимущества эндоскопических методик были менее очевидными.

При сравнении двух лапароскопических методик - TAPP и TEP - не было выявлено существенных различий в клинических и экономических показателях. Выбор между этими методиками определялся преимущественно опытом хирурга и анатомическими особенностями пациента. Метод TAPP технически более прост в освоении и позволяет лучше визуализировать анатомические структуры паховой области, однако требует вскрытия брюшины с потенциальным риском повреждения органов брюшной полости. Метод TEP более сложен технически, особенно на этапе создания предбрюшинного пространства, но позволяет избежать контакта с органами брюшной полости и может быть предпочтительным у пациентов с предшествующими абдоминальными операциями.

Полученные результаты согласуются с данными международных исследований, демонстрирующих преимущества лапароскопических методик герниопластики по показателям болевого синдрома, длительности госпитализации и частоты рецидивов. Особенностью нашего исследования является фокус на пожилых пациентах с множественной сопутствующей

патологией, для которых минимизация хирургической травмы имеет особое значение. Полученные данные свидетельствуют о том, что лапароскопические методики являются безопасными и эффективными для данной категории пациентов при условии адекватного анестезиологического обеспечения и опыта хирургической бригады.

Выводы

Частота послеоперационных осложнений при использовании лапароскопических методик статистически значимо ниже по сравнению с открытой герниопластикой (4,6-5,6% против 10,7%), что обусловлено меньшей травматичностью вмешательства и минимизацией контакта с окружающей средой.

Частота рецидивов паховых грыж в течение 24 месяцев наблюдения при использовании лапароскопических методик составляет 1,9-2,8%, что статистически значимо ниже показателя при открытой герниопластике (5,4%). Низкая частота рецидивов при эндоскопических методиках связана с возможностью адекватной визуализации всех потенциальных грыжевых дефектов и использования сетчатых имплантатов большего размера с полным перекрытием всей паховой области.

Прямые медицинские затраты на лапароскопическую герниопластику на 48-58% выше по сравнению с открытой операцией, однако эта разница частично компенсируется сокращением сроков госпитализации и меньшими затратами на лечение осложнений и рецидивов. При расчете коэффициента затраты-эффективность лапароскопические методики демонстрируют приемлемое соотношение дополнительных затрат и клинической эффективности.

Лапароскопические методы герниопластики обеспечивают лучшее качество жизни пациентов в послеоперационном периоде, более быстрое восстановление физической активности и меньшую частоту хронического болевого синдрома, что имеет особое значение для пожилых пациентов.

Выбор метода хирургического лечения паховых грыж у пожилых пациентов должен осуществляться индивидуально с учетом размера и типа грыжи, наличия сопутствующей патологии, предшествующих операций на органах брюшной полости, опыта хирургической бригады и технического оснащения клиники. При наличии соответствующих условий лапароскопические методики следует рассматривать как предпочтительный вариант лечения для большинства пациентов пожилого и старческого возраста.

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РОЛЬ ЦИФРОВЫХ ТЕХНОЛОГИЙ В ОБЩЕСТВЕ

Аннотация. *В данной статье рассматривается роль цифровых технологий в современном обществе, а также их влияние на экономические, социальные и административные сферы. На основе международных и национальных статистических данных проведён анализ динамики использования Интернета в Республике Узбекистан в период с 2018 по 2025 годы. Результаты исследования показывают значительный рост уровня развития цифровой инфраструктуры и использования ИКТ. Также обсуждаются проблемы цифрового неравенства и предлагаются аналитические рекомендации по их решению. Полученные выводы могут служить научной основой для принятия решений и проведения дальнейших исследований в области цифровой трансформации.*

Ключевые слова: *цифровые технологии, цифровая трансформация, пользователи Интернета, ИКТ, цифровая экономика, Узбекистан, статистический анализ, информационные системы.*

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THE ROLE OF DIGITAL TECHNOLOGIES IN SOCIETY

Abstract. *This article analyzes the role of digital technologies in modern society and their impact on economic, social, and administrative sectors. Based on international and national statistical data, the dynamics of Internet usage in Uzbekistan during 2018–2025 are examined. The results demonstrate a significant increase in digital infrastructure development and ICT adoption across the country. The study also highlights the issue of the digital divide and provides analytical recommendations for its mitigation. The findings can serve as a scientific foundation for decision-making and further research in digital transformation processes.*

Keywords: *digital technologies, digital transformation, Internet users, ICT, digital economy, Uzbekistan, statistical analysis, information systems.*

Введение

В условиях современной глобализации и цифровой трансформации цифровые технологии глубоко проникают во все сферы общественной жизни [13]. Информационно-коммуникационные технологии (ИКТ) выступают важным фактором повышения эффективности в экономике, образовании, здравоохранении, управлении и социальной сфере. В последние годы Республика Узбекистан реализует масштабные реформы, направленные на развитие цифровой экономики, электронного правительства и информационных систем. В связи с этим анализ роли и влияния цифровых технологий в обществе представляет собой актуальную научно-практическую задачу [2].

Методология

В статье применён статистический и аналитический подход, основанный на использовании международных и национальных источников данных. В качестве базы данных использовались открытые сведения Всемирного банка (Worлд Банк) [11], Международного союза электросвязи (ИТУ), Программы развития ООН (УНДП), платформы ДатаРепортал, а также Государственного комитета Республики Узбекистан по статистике за период 2018–2025 годов. В процессе анализа с помощью метода временных рядов (тиме сериес) была изучена динамика использования интернета, а также проведено сопоставление данных из различных источников за 2024 год. Полученные результаты представлены в табличной и графической формах [9].

Результаты

В период с 2018 по 2025 годы в Узбекистане наблюдается устойчивая тенденция роста числа пользователей интернета. Согласно данным Всемирного банка (Worлд Банк) и Международного союза электросвязи (ИТУ) [3], в 2018 году 55% населения пользовались интернетом, тогда как к 2023 году этот показатель достиг 89%. По отчетам ДатаРепортал и Стат.уз уровень использования интернета в 2024 году оценивается в диапазоне от 83,3% до 93,3% [5]. Предварительные прогнозы на 2025 год показывают, что данный показатель составит около 89% [7].

В следующей таблице представлена динамика уровня использования интернета населением Узбекистана за 2018–2025 годы [10].

Таблица 1. Уровень использования интернета населением Узбекистана в 2018–2025 годах (%)

Год	Уровень использования интернета, %	Источник данных
2018	55,0	Ворлд Банк, ИТУ
2019	61,2	Ворлд Банк, Стат.уз
2020	72,4	ИТУ, УНДП
2021	78,6	ДатаРепортал, Стат.уз
2022	84,1	ИТУ, Ворлд Банк
2023	89,0	Ворлд Банк, ИТУ
2024	83,3–93,3	ДатаРепортал, Стат.уз
2025*	≈89,0 (предварительная оценка)	Авторская оценка на основе анализа источников

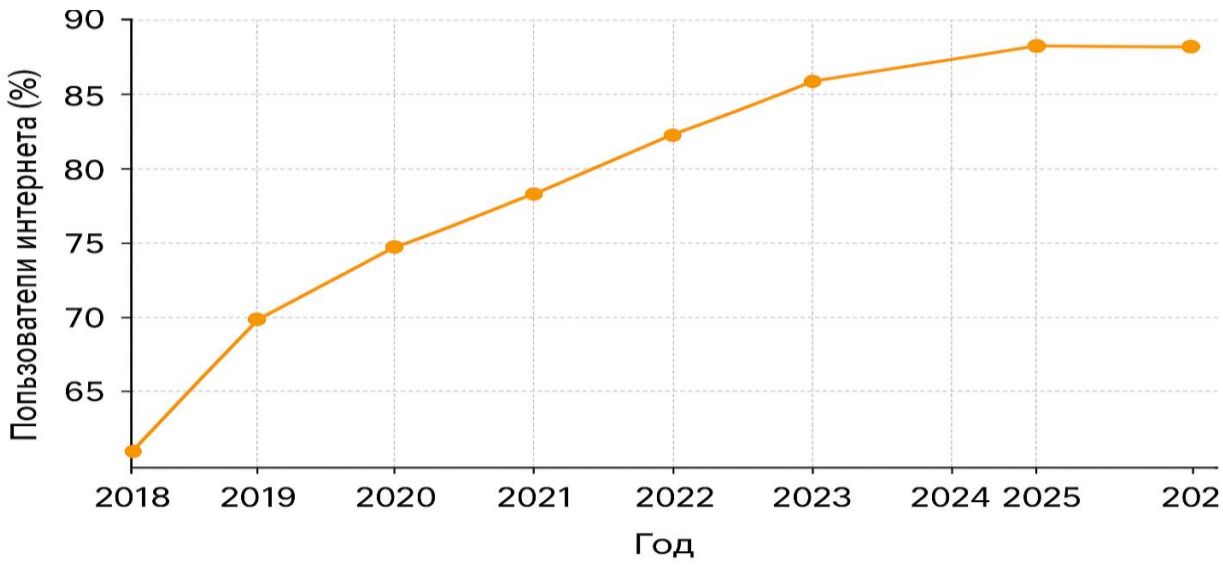


Рисунок 1. Динамика пользователей интернета в Узбекистане в 2018–2025 годах

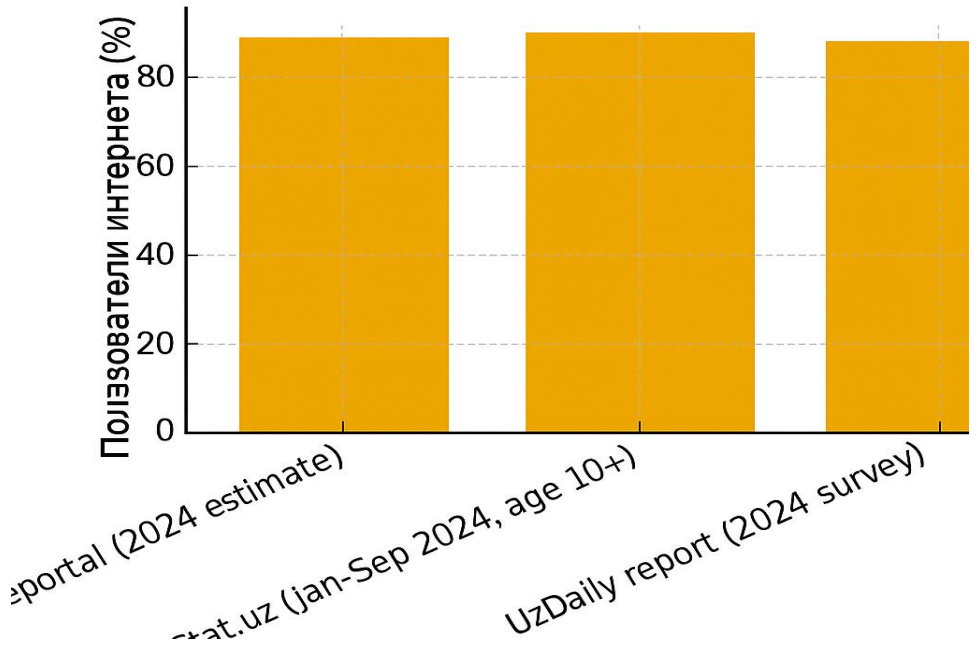


Рисунок 2. Уровень использования интернета по различным источникам данных за 2024 год

Согласно результатам анализа, в период с 2018 по 2025 годы уровень использования интернета в Узбекистане значительно вырос и, по прогнозам [12], к 2025 году достигнет диапазона от 89% до 93%. Этот показатель свидетельствует о возрастающей роли цифровых технологий в обществе, а также об усилении значения сферы информационно-коммуникационных технологий (ИКТ) в экономике страны [4].

Обсуждение

Полученные результаты показывают, что в последние годы уровень использования цифровой инфраструктуры и цифровых услуг в стране значительно возрос. Этот процесс является следствием реформ, реализуемых в рамках стратегии “Цифровой Узбекистан – 2030” [1]. Однако проблема цифрового неравенства остаётся актуальной: в частности, необходимо расширять возможности подключения к интернету и повышать уровень цифровой грамотности населения в сельских районах [3].

Согласно международному опыту, важным показателем развития цифровой экономики является рост доли сектора информационно-коммуникационных технологий (ИКТ) в валовом внутреннем продукте (ВВП). По данным Программы развития ООН (УНДП), в 2023 году доля сектора ИКТ в ВВП Узбекистана составляла 2,1%, и прогнозируется, что к 2025 году этот показатель достигнет 2,5–3% [6].

Заключение

По результатам исследования можно сделать вывод, что Республика Узбекистан в период 2018–2025 годов достигла значительных успехов в области внедрения цифровых технологий. Уровень использования интернета стабильно рос, и к 2025 году более 89% населения подключено к глобальной

сети [5]. В то же время остаются приоритетными стратегические задачи — развитие цифровых навыков, подготовка квалифицированных кадров, модернизация инфраструктуры, а также превращение сферы информационно-коммуникационных технологий (ИКТ) в одну из ведущих отраслей национальной экономики.

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АНТИОКСИДАНТНЫЕ СВОЙСТВА ЯДРА ГОРЬКОГО МИНДАЛЯ

Аннотация: *в последнее время наблюдается значительный интерес к поиску природных антиоксидантов из растительного сырья для замены синтетических. Предполагается, что природные антиоксиданты безопасны, поскольку они содержатся в растительной пище, и считаются более желанными, чем их синтетические аналоги. Природные антиоксиданты содержатся во всех высших растениях и во всех частях растения, в том числе в ядре горького миндаля. В статье анализируется антиоксидантные свойства ядер горького миндаля и предложена биологически важная пищевая добавка на его основе.*

Ключевые слова: *миндаль, горький миндаль, Prunus dulcis var. Амара, жирные кислоты, фенольные соединения, витамины, антиоксидантная активность.*

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ANTIOXIDANT PROPERTIES OF BITTER ALMOND KERNELS

Abstract: *Recently, there has been significant interest in the search for natural antioxidants from plant materials to replace synthetic ones. Natural antioxidants are assumed to be safe because they are found in plant foods and are considered more desirable than their synthetic counterparts. Natural antioxidants are found in all higher plants and in all parts of the plant, including the kernel of bitter almonds. The article analyzes the antioxidant properties of bitter almond kernels and proposes a biologically important food additive based on it.*

Keywords: *almonds, bitter almonds, Prunus dulcis var. Amara, fatty acids, phenolic compounds, vitamins, antioxidant activity.*

Введение. Горький миндаль - многолетнее растение семейства розоцветных – Rosaceae. Его родина - Центральная Азия. Тем не менее, его можно встретить на Кавказе, в Крыму, во многих регионах, таких как Турция и Иран [1,2]. Поскольку горький миндаль содержит несколько биологически активных веществ [3], его эссенция обладает антиоксидантными свойствами, которые очень важны для человеческого организма.

Антиоксиданты – это химические соединения, которые имеют разную структуру. Эти вещества могут предотвращать, останавливать или уменьшать окислительное повреждение организма за счет устранения свободных радикалов и снижения окислительного стресса [4]. Антиоксиданты защищают организм человека, предотвращая развитие многих заболеваний. Поэтому желательно использовать эффективные антиоксиданты.

Фактически, в последние годы большое внимание уделяется изучению природных антиоксидантов в растениях в качестве альтернативы синтетическим антиоксидантам. Природные антиоксиданты считаются более безопасными по сравнению с их синтетическими представителями, так как они содержатся в продуктах растительного происхождения. Природные антиоксиданты содержатся во всех высших растениях и почти во всех частях растений, включая ядро горького миндаля.

Вещества не имеющий неферментного происхождения и обладающие антиоксидантными свойствами, в основном представляют собой витамин А, витамин С, Витамин Е, тиолы, флавоноиды, убихиноны, каротиноиды и фенольные соединения, которые присутствуют в ежедневном рационе человека. Поэтому научно обоснованной рекомендацией является употребление большего количества фруктов и овощей с высоким содержанием таких веществ [5].

Активными частицами, вызывающими неметоболическое окисление, являются супероксид (O_2^-), перекись водорода (H_2O_2) и гидроксильные радикалы (OH·). Они являются побочными продуктами метаболизма и влияют на биологические процессы, что приводит к повреждению клеток или тканей. Такие активные частицы вырабатываются канцерогенными веществами и оказывают определенное негативное влияние на канцерогенный процесс [6].

Обсуждение результатов. Эксперименты in vitro, проведенные авторами, показали, что антиоксидантные соединения, полученные из высших растений, включая ядра горького миндаля, защищают организм от окислительного повреждения, ингибированием активные формы свободных радикалов и кислорода, тем самым подавляет их действия. Роль таких соединений как потенциальных антиоксидантов можно объяснить их сходством по химической структуре с синтетическими антиоксидантами.

Витамин С давно известен как биологический антиоксидант. Исследования показали, что он синергетичен витамину Е. Витамин С отдает

атом водорода фенолятному радикалу, который образуется из витамина Е, тем самым еще больше усиливая его антиоксидантные свойства. Витамин Е считается одним из самых мощных антиоксидантов, который подавляет действие активного кислородного радикала О·. Кроме того, активные кислородные радикалы - О· каротиноиды подавляются очень сильным образом, особенно □-каротином. Способность фенольных соединений действовать как антиоксиданты объясняется окислительно-восстановительными свойствами содержащихся в них фенольных гидроксильных групп, которые, отдавая водород в качестве антиоксиданта, гасят активность активного кислородного радикала - О· [7].

Водные, метанольные и этанольные экстракты ядра горького миндаля были получены египетскими учеными и изучены их антиоксидантные свойства в условиях in vitro. Антиоксидантные свойства экстрактов были определены с помощью различных методов: в том числе общие антиоксидантные свойства были определены с помощью фосфомолибденового анализа. Также использовались методы тест-систем для анализа потери свободных радикалов, анализа присоединения ионов Fe и отбеливания □-каротином. Результаты исследования показали, что общие антиоксидантные свойства проявлялись сильнее в водном экстракте ядра горького миндаля [8]:

Антиоксидантные свойства водного, метанольного и этанольного экстрактов ядра горького миндаля.

Экстракты	Общая антиокси-дантность мг ASE/экстракт	Способность потери свободных радикалов (%)	Свойства присоедине-ние ионов Fe	Индекс антиокси-дантности
Водный	56.72	41.15	1.176	28.93
Метанольный	44.86	60.75	0.826	39.56
Этанольный	33.05	61.53	0.459	17.10

Заключения. Вышеупомянутые факты показывают, что ядро горького миндаля содержит витамин А, Витамин С, витамин Е, тиолы, флавоноиды, убихиноны, каротиноиды и фенольные соединения, которые обладают антиоксидантными свойствами, а также ненасыщенные жирные кислоты, MG, P, Ca, K, Cu, Cr, Fe, Mn, Учитывая наличие таких важных микроэлементов, на основе ядре горького миндаля предлагается разработать и внедрить в практику пищевую добавку, оказывающую общее положительное влияние на процесс обмена веществ.

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РОЛЬ И ЗНАЧЕНИЕ ТЕХНОЛОГИЙ ДИСТАНЦИОННОГО ЗОНДИРОВАНИЯ В СОЗДАНИИ КАРТ

Аннотация: *В статье рассматривается, что данные, полученные с помощью дистанционного зондирования, служат наиболее удобным источником информации в различных сферах, так как позволяют получить эффективный результат при минимальных затратах времени. Это, в свою очередь, обеспечивает возможность рационального использования ограниченных ресурсов.*

Ключевые слова: *карта, дистанционное зондирование, навигация, сенсор, ГИС, аэрофотосъёмка.*

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THE ROLE AND IMPORTANCE OF REMOTE SENSING TECHNOLOGIES IN MAP CREATION

Abstract: *The data obtained through remote sensing serves as the most convenient source in every field, as it allows achieving effective results with minimal time investment for the information we acquire. This, in turn, enables the efficient use of limited resources.*

Keywords: *map, remote sensing, navigation, sensor, GIS, aerophotography*

Указ Президента Республики Узбекистан №ПФ-5806 от 30.08.2019 года «О развитии космической деятельности в Республике Узбекистан» был подписан.

Согласно Указу, в стране деятельность в области космических исследований и технологий, таких как дистанционное зондирование Земли, спутниковая связь и навигационные системы, которые позволяют повысить эффективность сельского и водного хозяйства, экологии, телекоммуникаций, геологоразведки, картографии, метеорологии, сейсмологии и градостроительства, практически не осуществляется.

Реализуемая активная инвестиционная политика, направленная на расширение существующих научно-технологических направлений и создание новых, востребованных сфер, а также программные меры по улучшению уровня и качества жизни населения требуют использования ещё не освоенных

высоконаучных, технологических и масштабных направлений деятельности, таких как инновации, нанотехнологии, атомная энергетика и космическая промышленность [1].

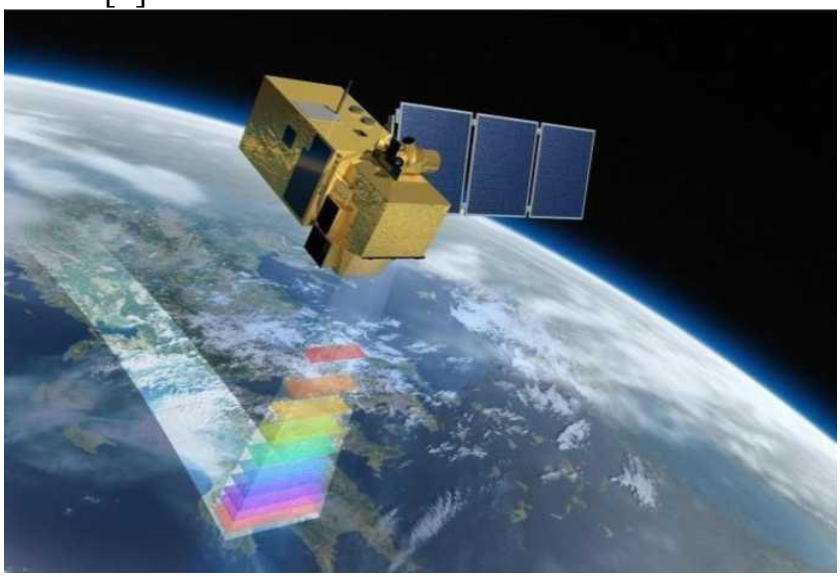


Рисунок 1. Функциональный процесс создания электронной карты с использованием данных дистанционного зондирования.

Дистанционное зондирование — это получение и анализ информации об исследуемом объекте, территории или явлении при помощи приборов и устройств, не находящихся в непосредственном контакте с объектом. В геопространственных науках дистанционное зондирование часто называют «наблюдением Земли», что означает процесс наблюдения за поверхностью Земли с больших высот с использованием сенсоров [2].

Сенсоры, подобно фотоаппаратам, фиксируют изображения, однако они используют не видимый свет, а другие диапазоны электромагнитного спектра — инфракрасные, микроволновые и ультрафиолетовые. Современные сенсоры постоянно совершенствуются и позволяют получать снимки больших территорий с высокой точностью [3].

Сегодня дистанционное зондирование осуществляется с помощью самолётов и спутников. Помимо фотоплёнок, применяются цифровые камеры, сканеры, видеосистемы, радары и тепловые сенсоры. Практическое применение дистанционного зондирования началось ещё во время Второй мировой войны, когда аэрофотосъёмка использовалась для разведки. Аэроснимки позволяли безопасно наблюдать расположение войск противника и быстро обновлять военные карты. Сегодня дистанционное зондирование широко используется в управлении окружающей средой, где требуются быстрые и точные данные [4].

С появлением спутниковых технологий и мультиспектральных сенсоров возможности дистанционного зондирования значительно расширились. Одним из наиболее распространённых методов дистанционного зондирования является получение изображений поверхности Земли в различных спектральных диапазонах. Мультиспектральные снимки

не только выявляют объекты и явления, но и позволяют количественно оценивать их характеристики.

При тематическом анализе изображений часто используются дополнительные источники данных — цифровые топографические и тематические карты, графики, городские схемы, а также внешние базы данных. Разрешение мультиспектральных снимков зависит от способности различать мелкие объекты:

- низкое разрешение — более 100 м,
- среднее — от 10 до 100 м,
- высокое — менее 10 м.

Снимки с низким разрешением охватывают большие территории и используются, например, в метеорологии [5]. Среднее разрешение подходит для мониторинга окружающей среды, а высокое — для военных, коммерческих и геоинформационных систем.

Системы обработки данных дистанционного зондирования применяются для решения различных задач, включая:

- оценку природных ресурсов регионов;
- определение зон загрязнения;
- мониторинг лесных пожаров и вырубки деревьев;
- анализ эффективности сельского и лесного хозяйства;
- выявление и картографирование месторождений полезных ископаемых;
- мониторинг зелёных зон в городах.

Применение дистанционного зондирования в картографии становится всё более востребованным. С его помощью можно выполнять:

- стереоскопическую съёмку,
- частое обновление снимков,
- оперативную передачу данных,
- охват больших и глобальных территорий,
- цифровое хранение данных для дальнейшего обновления карт,
- интеграцию с современными ГИС-технологиями.

Основные пользователи карт, созданных с применением дистанционного зондирования, — лесные и горнодобывающие компании, нефтяные предприятия, инженерные службы, коммунальные и инфраструктурные организации (трубопроводы, телекоммуникации, транспорт, электроэнергия), а также государственные картографические и оборонные структуры [6].

Таким образом, данные дистанционного зондирования служат удобным и эффективным источником информации для всех отраслей. Они позволяют получать точные результаты при минимальных затратах времени и ресурсов. Особенно важную роль эти технологии играют в сельском и водном хозяйстве, где значительно упрощают процесс составления карт.

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ПОЛОЖИТЕЛЬНОЕ ВЛИЯНИЕ ОПРЕДЕЛЕННЫХ ПСИХОТЕРАПЕВТИЧЕСКИХ ПОДХОДОВ НА ПАТОГЕНЕЗ, КЛИНИЧЕСКОЕ ТЕЧЕНИЕ И ЭФФЕКТИВНОСТЬ РЕАБИЛИТАЦИИ ПРИ ПСИХОСОМАТИЧЕСКИХ РАССТРОЙСТВАХ: СИСТЕМНО-ЭМПИРИЧЕСКИЙ АНАЛИЗ

Аннотация: *В данной статье анализируется эффективность различных психотерапевтических подходов в лечении и облегчении психосоматических расстройств. Психосоматические расстройства — это соматические заболевания, возникающие или усиливающиеся под влиянием психических факторов, в лечении которых важную роль играет интегративный подход. В рамках исследования рассматривалось влияние когнитивно-двигательной психотерапии, психоаналитического подхода, гестальтотерапии, а также методов снижения стресса на основе сознательности (MBSR). Анализ научной литературы показал, что эти методы вносят положительный вклад в процесс уменьшения симптомов, стабилизации эмоционального состояния и оздоровления пациентов. В частности, было установлено, что психотерапевтические подходы, выбранные с учетом индивидуальных особенностей пациента, обладают высокой эффективностью. В конце статьи обосновывается необходимость многопрофильной и личностно-ориентированной психотерапии в лечении психосоматических расстройств.*

Ключевые слова: *Психотерапия, психосоматические расстройства, специфические психотерапевтические подходы, когнитивно-поведенческая терапия, гештальт-терапия, психоаналитический подход.*

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POSITIVE EFFECTS OF SPECIFIC PSYCHOTHERAPEUTIC APPROACHES ON THE PATHOGENESIS, CLINICAL COURSE, AND REHABILITATION EFFECTIVENESS OF PSYCHOSOMATIC DISORDERS: A SYSTEMATIC EMPIRICAL ANALYSIS

Abstract: *This article analyzes the effectiveness of various psychotherapeutic approaches in treating and alleviating psychosomatic disorders. Psychosomatic disorders are somatic diseases that arise or worsen under the influence of mental factors, in the treatment of which an integrative approach plays an important role. The study examined the influence of cognitive-motor psychotherapy, psychoanalytic approach, gestalt therapy, and mindfulness-based stress reduction (MBSR) methods. Analysis of the scientific literature showed that these methods make a positive contribution to the process of reducing the symptoms of patients, stabilizing the emotional state, and improving health. It has been established that the effectiveness of psychotherapeutic approaches, selected taking into account the individual characteristics of the patient, is especially high. At the end of the article, the need for multidisciplinary and personality-oriented psychotherapy in the treatment of psychosomatic disorders is substantiated.*

Keywords: *Psychotherapy, psychosomatic disorders, specific psychotherapeutic approaches, cognitive-behavioral therapy, gestalt therapy, psychoanalytic approach.*

Введение. Изучение психосоматических расстройств и оказание психологической помощи пациентам, подверженным их воздействию, занимает одно из центральных мест в современной клинической психологии и психотерапии. Среди различных направлений, исследующих данную проблему, психоаналитический подход выделяется своей глубокой теоретической базой и широкими возможностями практического применения.

Термин «психосоматический» был впервые введён в научный оборот в 1922 году психоаналитиком Ф. Дейчем при определении области практического применения психоанализа в медицине (Ammon, 2000). С этого момента психосоматика стала рассматриваться как самостоятельное направление, находящееся на стыке психологии, физиологии и клинической медицины.

З. Фрейд и его последователи заложили фундаментальные теоретические основы понимания психосоматических феноменов. В их работах было показано, что психосоматические расстройства представляют собой результат сложного взаимодействия биологических, психологических и социальных факторов, то есть являются выражением многоуровневых механизмов регуляции человеческой психики и тела.

С позиций психоанализа, соматический симптом интерпретируется не как чисто физиологическое проявление, а как символическое выражение вытесненных аффектов и внутренних конфликтов личности. Концепция конверсии, предложенная Фрейдом, объясняет процесс превращения

психической энергии, связанной с неосознанными переживаниями, в телесные симптомы. Таким образом, тело становится своеобразным «языком бессознательного», с помощью которого психика выражает то, что не может быть осознано и вербализировано.

Современная психосоматическая медицина исходит из принципа единства тела и души, рассматривая человека как целостную биопсихосоциальную систему. Психоаналитический подход, интегрируя данные нейрофизиологии, клинической психологии и психотерапии, позволяет глубже понять внутренние механизмы формирования психосоматических нарушений, выявить бессознательные конфликты, лежащие в их основе, и определить эффективные пути психотерапевтической коррекции.

Таким образом, психосоматическая концепция, основанная на психоаналитической теории, не только раскрывает внутреннюю динамику взаимосвязей между психикой и телом, но и служит теоретическим и практическим основанием для разработки комплексных программ профилактики и лечения психосоматических заболеваний.

Материалы и методы. Настоящая работа посвящена анализу психосоматических расстройств на основе психоаналитического подхода. Теоретическую основу исследования составили труды Ф. Дейча (1922), З. Фрейда (1894–1898), Г. Аммона (1972), Р. Шпица (2001), А. Гарма (1950–1970-е гг.) и Ж. Макдугалл (2007), а также анализ современных психотерапевтических практик.

В исследовании применялись следующие методы: психоаналитический теоретический анализ, сравнительный анализ научной литературы, клинико-психологическое наблюдение и метатеоретический подход, что позволило рассмотреть психосоматические феномены как результат сложного взаимодействия психических и телесных процессов.

Модель конверсии, предложенная З. Фрейдом, объясняет механизм преобразования психического конфликта в соматические симптомы. Согласно его концепции, психическая энергия, связанная с вытесненными аффектами, находит выражение в телесных проявлениях, выполняющих функцию символической репрезентации внутреннего конфликта. Идея «тревожной неврозы» Фрейда отражает случаи, когда психическая переработка возбуждения невозможна, и энергия напрямую выражается через соматические симптомы.

Исследования Р. Шпица (1945), посвящённые феномену госпитализма, показали, что разрыв эмоционального контакта между матерью и ребёнком приводит к развитию серьёзных соматических нарушений у младенцев. Он ввёл понятие анаклитической депрессии, подчёркивая роль аффективных отношений в формировании базовых физиологических функций.

Г. Аммон (1972) в своих работах описывает психосоматическую взаимосвязь матери и ребёнка, отмечая, что болезнь ребёнка может выступать

как отражение бессознательных конфликтов матери, выполняя функцию коммуникации между их психическими системами.

Ж. Макдугалл (2007) разработала концепцию «соматопсихической матрицы», в рамках которой телесные и психические процессы ребёнка изначально образуют единую систему. Недостаточная эмоциональная поддержка со стороны матери нарушает процесс психического отделения ребёнка и ведёт к явлению деаффектации — выражению чувств не через осознание, а посредством соматических симптомов.

Таблица 1. Основные психоаналитические модели психосоматических расстройств

Исследователь	Год	Основная идея	Интерпретация психосоматического механизма
Ф. Дейч	1922	Введение термина «психосоматика» в научный оборот	Интеграция психоанализа и медицины
З. Фрейд	1894–1898	Концепция конверсии и тревожной неврозы	Соматическое выражение психического конфликта
Р. Шпиц	1945	Госпитализм и анаклитическая депрессия	Разрыв эмоциональной связи вызывает соматические нарушения
Г. Аммон	1972	Психосоматическая взаимосвязь матери и ребёнка	Болезнь ребёнка как отражение бессознательных конфликтов матери
А. Гарм	1950–1970-е	Модель язвенной болезни	Реакция на подавляющее и карающее поведение матери
Ж. Макдугалл	2007	Концепция «соматопсихической матрицы»	Замещение эмоций телесными проявлениями (деаффектация)

Таким образом, рассмотренные теоретические модели позволяют интерпретировать психосоматические расстройства как психодинамические процессы, в основе которых лежат бессознательные механизмы преобразования аффекта и конфликта в телесные проявления. В работе также проанализированы современные психотерапевтические подходы — когнитивно-поведенческая терапия (КПТ), гештальт-терапия, личностно-ориентированная терапия и майндфулнесс-практики, демонстрирующие эффективность в комплексной коррекции психосоматических нарушений.

Заключение. Психосоматические расстройства представляют собой сложную взаимосвязь психики и тела человека. Исследования показывают, что эти нарушения напрямую связаны с внутренними конфликтами личности, аффективными переживаниями и механизмами их выражения. Психоаналитический подход позволяет глубже проникнуть в процесс лечения, анализируя бессознательные корни симптомов.

Кроме того, установлено, что современные направления психотерапии - КБТ, гештальт-терапия, личностно-ориентированная терапия и mindfulness -

эффективны в снижении психосоматических симптомов, повышении стрессоустойчивости и восстановлении психического равновесия.

Поэтому комплексный, интегративный подход к лечению психосоматических расстройств - то есть комбинированное применение психоаналитической, когнитивной и телесно-ориентированной терапии - обеспечивает наилучшие клинические результаты.

В дальнейшем целесообразно провести более глубокие эмпирические исследования в этом направлении, разработать комбинацию подходов и создать терапевтические программы, основанные на индивидуальных особенностях пациента.

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НЕЙРОПСИХОБИОЛОГИЧЕСКИЕ И КЛИНИЧЕСКИЕ ОСОБЕННОСТИ СИНДРОМА ДЕФИЦИТА ВНИМАНИЯ И ГИПЕРАКТИВНОСТИ (СДВГ) У ДЕТЕЙ МЛАДШЕГО ВОЗРАСТА И ПОДРОСТКОВ

Аннотация: *Эта статья освещает симптомы, диагностику и методы лечения СДВГ у маленьких детей и подростков. Проанализированы проблемы, связанные с влиянием СДВГ на образование и социальное развитие, его трудностями в повседневной жизни, учебе и социальных отношениях детей и подростков. В статье также представлена информация о современных терапевтических подходах, включая психотерапию, фармакологическое лечение и методы уменьшения симптомов путем адаптации среды. Статья полезна для родителей, учителей и специалистов здравоохранения и направлена на обеспечение эффективного управления и социальной адаптации СДВГ среди молодежи.*
Ключевые слова: *Расстройство дефицита внимания и гиперактивности (РДВГ), Дети раннего возраста, Подростки, Психологическое развитие, Диагностика, Методы лечения, Гиперактивность, Дефицит внимани*

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NEUROPSYCHOBIOLOGICAL AND CLINICAL FEATURES OF ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD) IN YOUNG CHILDREN AND ADOLESCENTS

Abstract: *This article covers the symptoms, diagnosis, and treatment of ADHD in young children and adolescents. The impact of ADHD on education and social development, problems associated with its impact on the daily life, learning, and social interactions of children and adolescents are analyzed. The article also provides information on modern therapeutic approaches, including methods of reducing symptoms through psychotherapy, pharmacological treatment, and*

environmental adaptation. The article is useful for parents, teachers, and healthcare professionals, aiming to ensure effective management and social adaptation of ADHD among young people.

Keywords: *Attention Deficit Hyperactivity Disorder (ADHD), Young Children, Adolescents, Psychological Development, Diagnosis, Treatment, Hyperactivity, Attention Deficit Hyperactivity Disorder*

Введение. Синдром дефицита внимания и гиперактивности (СДВГ — Attention Deficit Hyperactivity Disorder, ADHD) представляет собой одно из наиболее распространённых нейропсихологических расстройств у детей и подростков. Он характеризуется стойкими трудностями в концентрации внимания, повышенной двигательной активностью и импульсивным поведением. Данное расстройство оказывает значительное негативное влияние на процесс обучения, формирование социальных навыков и общее личностное развитие ребёнка.

По данным Всемирной организации здравоохранения (ВОЗ), распространённость СДВГ в детско-подростковой популяции составляет в среднем от 5 до 7%, что свидетельствует о его высокой встречаемости в глобальном масштабе. В ряде исследований этот показатель варьирует от 2 до 10% в зависимости от методологии диагностики, культурных и региональных особенностей.

Установлено, что среди мальчиков СДВГ диагностируется примерно в 2–3 раза чаще, чем среди девочек. Однако это соотношение частично объясняется тем, что у девочек клинические проявления часто менее выражены, и симптоматика нередко принимает латентный характер, что затрудняет своевременную диагностику.

В развитых странах, особенно в США и государствах Европы, диагностика и терапия СДВГ находятся на достаточно высоком уровне: частота выявления заболевания варьирует в пределах 7–10%. В развивающихся странах распространённость может быть ниже, что, как правило, связано не с реальным снижением заболеваемости, а с недостаточной информированностью населения, ограниченным доступом к психиатрической и нейропсихологической помощи, а также с недостаточным вниманием к вопросам ранней диагностики.

В странах Центральной Азии и Ближнего Востока частота встречаемости СДВГ среди детей колеблется от 7,8% до 16%, при этом у мальчиков данный синдром диагностируется чаще, чем у девочек. В Китае, по данным исследований, проведённых в городе Шэньчжэнь, распространённость СДВГ среди детей составляет около 0,7%, однако эти данные отражают ситуацию лишь в ограниченном регионе и не могут быть экстраполированы на всю страну.

В Республике Узбекистан в настоящее время отсутствуют официальные эпидемиологические данные о распространённости СДВГ. Тем не менее, на основании анализа региональных и международных исследований можно

предположить, что случаи данного расстройства также присутствуют среди детского и подросткового населения страны.

Ранняя диагностика и комплексная терапия СДВГ имеют решающее значение для предотвращения вторичных последствий — таких как школьная неуспеваемость, нарушения поведения, трудности социальной адаптации и повышенный риск развития тревожных и депрессивных расстройств в подростковом возрасте. В связи с этим особую актуальность приобретает необходимость повышения осведомлённости медицинских работников, педагогов и родителей о клинических особенностях, методах диагностики и современных подходах к коррекции СДВГ.

Материалы и методы. Настоящее исследование основано на системном анализе современных клинических, нейропсихологических и эпидемиологических данных, посвящённых синдрому дефицита внимания и гиперактивности (СДВГ) у детей и подростков. В работе использованы сведения Всемирной организации здравоохранения (ВОЗ), Американской психиатрической ассоциации (DSM-5), Европейской академии детской и подростковой психиатрии, а также результаты национальных и региональных исследований, отражающих распространённость, клинические особенности и подходы к терапии данного расстройства.

Этиологические факторы. Этиология СДВГ является многофакторной и сочетает генетические, нейробиологические и средовые компоненты. Генетическая предрасположенность считается одним из ведущих факторов — наличие СДВГ у родственников первой линии повышает риск его развития у ребёнка в 2–8 раз. Нейробиологические механизмы включают дисфункцию дофаминергической и норадренергической систем, а также нарушение работы префронтальной коры головного мозга, отвечающей за контроль внимания, импульсивности и поведения. Среди средовых факторов выделяются воздействие никотина, алкоголя и токсических веществ во время беременности, гипоксия плода, преждевременные роды, стрессовые семейные ситуации и низкий социально-экономический статус.

Диагностические методы. Диагностика СДВГ проводится комплексно и включает несколько этапов. На первом этапе проводится клиническое интервью с родителями, педагогами и самим ребёнком с целью выявления типичных симптомов (невнимательность, гиперактивность, импульсивность) и анализа их проявления в различных условиях. Далее применяются стандартизированные психометрические шкалы — Conners Rating Scale, Vanderbilt ADHD Diagnostic Rating Scale, а также контрольный список критериев DSM-5. Нейропсихологическое обследование направлено на оценку функций внимания, памяти, скорости реакции и уровня импульсивности. Особое значение имеет дифференциальная диагностика, позволяющая исключить другие психические и неврологические нарушения — тревожные расстройства, аутизм, депрессию, специфические нарушения обучения и сенсомоторные дефициты.

Лечебно-коррекционные подходы. Комплексное лечение СДВГ основано на интеграции медикаментозных, психотерапевтических и педагогических методов. Фармакотерапия включает использование психостимуляторов (метилфенидат, дексамфетамин) и норэпинефриновых ингибиторов (атомоксетин, гуанфацин), направленных на восстановление нейромедиаторного баланса и улучшение концентрации внимания. Психотерапевтические вмешательства включают когнитивно-поведенческую терапию, развитие навыков саморегуляции, тренинги эмоционального контроля и формирование социальных и академических компетенций. Семейное консультирование направлено на обучение родителей стратегиям эффективного взаимодействия с ребёнком, формирование позитивной эмоциональной атмосферы и поддержку адаптационных возможностей семьи. Педагогическая поддержка включает индивидуализацию учебного процесса с учётом особенностей ребёнка, снижение количества внешних раздражителей, оптимизацию учебной нагрузки и акцент на положительное подкрепление поведения.

Таблица 1. Комплексный подход к изучению, диагностике и лечению СДВГ у детей и подростков

№	Компонент	Основное содержание	Методы и инструменты
1	**Этиологические факторы**	Многофакторная природа: генетические, нейробиологические и средовые детерминанты	• Семейный анамнез и генетический скрининг• Нейровизуализация (fMRI, EEG)• Анализ перинатальных данных и социальных условий
2	**Генетическая предрасположенность**	Наличие СДВГ у родственников первой линии повышает риск заболевания в 2–8 раз	• Семейное интервью• Генетические панели риска
3	**Нейробиологические механизмы**	Дисфункция дофаминергической и норадренергической систем, а также префронтальной коры	• Нейропсихологические тесты• Нейровизуализация мозга• Электрофизиологические исследования
4	**Диагностика**	Комплексная оценка клинических и поведенческих проявлений	• Клиническое интервью (родители, педагоги, ребёнок)• Conners Rating Scale, Vanderbilt Scale, DSM-5 Criteria• Нейропсихологическая оценка внимания, памяти, импульсивности
5	**Дифференциальная диагностика**	Исключение тревожных расстройств, аутизма, депрессии и др.	• Клинический осмотр• Психометрические шкалы• Медико-психологическое обследование
6	**Лечебно-коррекционные подходы**	Интеграция медикаментозных, психотерапевтических и	• Метилфенидат, атомоксетин, гуанфацин• Когнитивно-поведенческая терапия•

		педагогических стратегий	Семейное консультирование• Индивидуальная педагогическая поддержка
7	**Педагогическая адаптация**	Индивидуализация учебного процесса и поддержка социальной адаптации	• Индивидуальные учебные планы• Минимизация отвлекающих факторов• Позитивное подкрепление

Таким образом, представленный методологический подход обеспечивает целостное понимание природы СДВГ, позволяет определить индивидуальные траектории диагностики и терапии, а также способствует повышению эффективности междисциплинарных стратегий помощи детям и подросткам с данным расстройством.

Заключение. Синдром дефицита внимания и гиперактивности является сложным, полиморфным расстройством, оказывающим существенное влияние на когнитивное и психоэмоциональное развитие ребёнка. Несмотря на то, что его распространённость во всём мире остаётся стабильно высокой, осведомлённость о данном состоянии и доступ к квалифицированной помощи в ряде стран, включая государства Центральной Азии, остаются ограниченными.

Эффективное ведение детей с СДВГ требует ранней диагностики, мультидисциплинарного подхода и активного участия семьи и педагогов в процессе коррекции поведения. Медикаментозное лечение, в сочетании с психотерапевтическими и педагогическими стратегиями, позволяет значительно снизить выраженность симптомов и улучшить качество жизни ребёнка.

Для Республики Узбекистан актуальной задачей является развитие национальной системы ранней диагностики и коррекционной помощи детям с СДВГ, проведение эпидемиологических исследований, а также повышение профессиональной компетентности специалистов в области детской нейропсихологии и педагогики. Создание специализированных диагностических центров и образовательных программ позволит повысить эффективность терапии и социальную адаптацию детей с данным расстройством.

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ЭКСПЕРИМЕНТАЛЬНАЯ МОДЕЛЬ ЗАБОЛЕВАНИЙ МОЛОЧНОЙ ЖЕЛЕЗЫ

Аннотация. *Экспериментальные модели заболеваний молочной железы являются важнейшим инструментом для изучения патогенеза, морфологических изменений и разработки методов лечения опухолей и воспалительных процессов молочной железы. В последние десятилетия активно развиваются in vivo и in vitro модели, включая животные модели на мышах и крысах, а также клеточные линии и органоидные системы. В статье приведён обзор современных экспериментальных подходов, используемых для моделирования патологических процессов в ткани молочной железы, включая опухолевые, воспалительные и гормонозависимые изменения. Особое внимание уделено морфологическим и молекулярным аспектам, а также перспективам применения органоидных технологий и 3D-культуры клеток.*

Ключевые слова: *молочная железа, экспериментальная модель, морфология, опухоли, органоиды, воспаление, патогенез.*

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EXPERIMENTAL MODEL OF BREAST DISEASES

Abstract. *Experimental models of breast diseases are an essential tool for studying pathogenesis, morphological changes, and the development of therapeutic approaches for tumors and inflammatory processes of the mammary gland. In recent decades, both in vivo and in vitro models have been actively developed, including animal models using mice and rats, as well as cell lines and organoid systems. This article provides an overview of modern experimental approaches used to simulate pathological processes in breast tissue, including tumor, inflammatory, and hormone-dependent changes. Special attention is given to morphological and molecular aspects, as well as to the prospects of applying organoid technologies and 3D cell culture systems.*

Keywords: *mammary gland, experimental model, morphology, tumors, organoids, inflammation, pathogenesis.*

Введение. Молочная железа является органом с высокой чувствительностью к гормональной регуляции и внешним воздействиям, что делает её уязвимой к развитию различных патологических состояний, включая мастит, доброкачественные гиперплазии и злокачественные опухоли. Разработка достоверных экспериментальных моделей заболеваний молочной железы имеет решающее значение для понимания механизмов патогенеза, оценки эффективности новых лекарственных средств и внедрения персонализированных подходов в медицину [1].

Основные типы экспериментальных моделей:

1. 1. Животные модели

Наиболее широко применяются мышиные и крысиные модели, позволяющие изучать как доброкачественные, так и злокачественные изменения. Индукция опухолей осуществляется химическими канцерогенами (например, 7,12-диметилбенз[a]антрацен, DMBA) или гормональной стимуляцией эстрогенами [2]. Эти модели дают возможность исследовать морфогенез, клеточную пролиферацию, ангиогенез и апоптоз при различных стадиях опухолевого роста.

- 2. Модели воспалительных заболеваний

Экспериментальные модели мастита создаются путём введения патогенных микроорганизмов (Staphylococcus aureus, Escherichia coli) в ткань молочной железы лабораторных животных. Такие модели позволяют изучить взаимодействие между возбудителем и иммунной системой, а также эффективность антибактериальной терапии [3].

13. 3. Клеточные линии и 3D-модели.

In vitro системы включают использование клеточных линий молочной железы человека и животных (MCF-7, T47D, MDA-MB-231 и др.), применяемых для изучения молекулярных механизмов канцерогенеза, рецепторных взаимодействий и лекарственной устойчивости. Современные 3D-культуры и органоидные модели максимально приближены к естественной архитектуре ткани и позволяют анализировать процессы инвазии, метастазирования и дифференцировки [4].

Морфологические и гистологические аспекты. Морфологическое исследование тканей молочной железы при экспериментальных моделях позволяет выявить изменения в эпителиальных структурах, строме и сосудистом русле. При опухолевом росте отмечается нарушение архитектоники желез, пролиферация эпителиоцитов, формирование атипичных клеток, а также развитие фиброзных изменений [5].

При воспалительных моделях выявляются отёк, инфильтрация лейкоцитами, деструкция альвеолярных структур. Применение иммуногистохимии (Ki-67, p53, ER, PR) способствует уточнению характера пролиферативных процессов.

Новые направления исследований**.** Современная наука активно использует органоидные модели, полученные из стволовых клеток молочной железы. Эти трёхмерные системы позволяют моделировать онкогенез и

тестировать препараты с высокой точностью. Применение CRISPR/Cas9-технологий в экспериментальных исследованиях открывает возможность направленного редактирования генов,участвующих в опухолевой трансформации клеток [6]. Дополнительно, активно внедряются мультиомные методы анализа (геномика, протеомика, метаболомика), что способствует созданию интегративных моделей патогенеза заболеваний молочной железы.

Выбор экспериментальной модели зависит от цели исследования. Модели на животных обеспечивают воспроизводимость и возможность изучения системных эффектов, тогда как клеточные и органоидные подходы позволяют исследовать молекулярные механизмы на уровне отдельных клеток. Комбинация in vivo и in vitro методов обеспечивает комплексное понимание патогенеза и формирует основу для разработки новых терапевтических стратегий [7].

Заключение. Экспериментальные модели заболеваний молочной железы являются ключевым инструментом современной медицинской науки. Они позволяют изучать сложные взаимодействия между клеточными и гуморальными механизмами, оценивать морфологические изменения и тестировать новые методы терапии. Будущее принадлежит многоуровневым, комбинированным моделям, сочетающим преимущества классических животных экспериментов и современных органоидных технологий.

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СОЦИАЛЬНО-ЭКОНОМИЧЕСКАЯ ЭФФЕКТИВНОСТЬ ТЕЛЕДЕРМАТОЛОГИИ В ПОСТПАНДЕМИЧЕСКИЙ ПЕРИОД

Аннотация*: Эта статья рассматривает социально-экономическую эффективность теледерматологии в постпандемический период. Она анализирует влияние на затраты на здравоохранение, доступ пациентов и общую эффективность на основе обзора глобальных исследований, проведенных после пандемии COVID-19. Исследование подчеркивает преимущества, такие как сокращение времени ожидания, экономия затрат для пациентов и систем здравоохранения, а также улучшение равенства в доступе к дерматологической помощи, одновременно решая проблемы, такие как цифровые разрывы и диагностические ограничения. Результаты предполагают, что теледерматология может улучшить социально-экономические результаты, если будет устойчиво интегрирована в системы здравоохранения.*

Ключевые слова: *теледерматология, постпандемический период, социально-экономическая эффективность, телемедицина, доступ к здравоохранению, эффективность затрат*

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SOCIO-ECONOMIC EFFICIENCY OF TELEDERMATOLOGY IN THE POST-PANDEMIC PERIOD

Annotation: *This article examines the socio-economic effectiveness of teledermatology in the post-pandemic period. It analyzes the impact on healthcare costs, patient access, and overall efficiency based on a review of global studies conducted after the COVID-19 pandemic. The study highlights benefit such as reduced waiting times, cost savings for patients and healthcare systems, and improved equity in access to dermatological care, while addressing challenges like digital divides and diagnostic limitations. The findings suggest that teledermatology can enhance socio-economic outcomes if integrated sustainably into healthcare systems.*

Keywords: *teledermatology, post-pandemic, socio-economic effectiveness, telemedicine, healthcare access, cost-efficiency*

Введение

Пандемия COVID-19 радикально изменила ландшафт медицинской помощи, ускорив внедрение телемедицины во многих областях здравоохранения. Теледерматология, как подраздел телемедицины, ориентированный на диагностику и лечение кожных заболеваний на расстоянии, стала одним из ключевых инструментов для обеспечения непрерывности ухода за пациентами во время локдаунов и ограничений. В постпандемический период, когда мир постепенно возвращается к нормальной жизни, возникает вопрос о долгосрочной социально-экономической эффективности этой технологии.

Теледерматология включает два основных подхода: асинхронный (store-and-forward, SAF), где изображения и данные отправляются для последующего анализа, и синхронный (live-interactive), предполагающий видеоконференции в реальном времени. До пандемии теледерматология использовалась ограниченно, в основном в удаленных регионах или для консультаций между специалистами. Однако COVID-19 привел к взрывному росту ее применения: по данным исследований, использование теледерматологии увеличилось на 4347% с марта 2019 по март 2020 года. Это позволило минимизировать риски инфекции, сократить очереди и оптимизировать ресурсы здравоохранения.

Социально-экономическая эффективность теледерматологии оценивается через призму нескольких аспектов: снижение затрат на здравоохранение, улучшение доступа к услугам для уязвимых групп населения, повышение удовлетворенности пациентов и врачей, а также влияние на общую производительность системы. В постпандемический период, когда временные регуляторные послабления (например, расширение покрытия страховкой) могут быть пересмотрены, важно понять, сохранит ли теледерматология свою ценность.

Цель настоящей статьи — проанализировать социально-экономическую эффективность теледерматологии на основе обзора литературы, опубликованной после 2020 года. Мы рассмотрим влияние на затраты, доступность и эффективность, выделим преимущества и вызовы, а также предложим рекомендации для интеграции этой технологии в повседневную практику. Исследование структурировано по модели IMRAD, что позволяет систематически представить данные.

История теледерматологии уходит корнями в 1990-е годы, когда первые эксперименты с передачей изображений кожных поражений проводились в США и Европе. В 1995 году в Норвегии была внедрена первая система store-and-forward для удаленных консультаций, что позволило сократить время на диагностику в сельских районах. До пандемии внедрение шло медленно из-за регуляторных барьеров, проблем с возмещением расходов и опасений по

поводу точности диагностики. К 2019 году теледерматология применялась в основном в развивающихся странах для преодоления дефицита специалистов: в Индии и Африке мобильные приложения помогали диагностировать тропические дерматозы. В развитых странах, таких как США, она использовалась в ветеранских госпиталях VA, где экономила до 140 долларов на пациента за счет снижения необходимости в очных визитах.

Пандемия COVID-19 стала катализатором: в марте 2020 года Всемирная организация здравоохранения (ВОЗ) рекомендовала переход к телемедицине для минимизации контактов. В США Центры Medicare и Medicaid Services (CMS) временно расширили покрытие теледерматологии, что привело к росту на 4000%. Аналогичные тенденции наблюдались в Европе: в Испании и Италии теледерматология сократила время ожидания с месяцев до дней. В России и странах СНГ, включая Узбекистан, внедрение ускорилось благодаря федеральным программам цифровизации здравоохранения, хотя инфраструктурные ограничения сдерживали рост.

В постпандемийный период (с 2021 года) теледерматология сохраняет импульс. Глобальные тенденции показывают экспоненциальный рост рынка: по прогнозам, объем рынка теледерматологии вырастет с 15 миллиардов долларов в 2024 году до 41 миллиарда к 2030 году, с CAGR 17%. К 2025 году рынок оценивается в 15,5 миллиарда долларов, с ожидаемым ростом до 106 миллиардов к 2032 году. Это обусловлено интеграцией ИИ для автоматизированной диагностики, мобильными приложениями и расширением в развивающиеся регионы. В 2023-2025 годах ключевые тренды включают фокус на кожном раке и использование ИИ, что повышает точность на 20-30%. В Азии и Африке теледерматология решает проблему дефицита дерматологов: в Индии она охватывает 50 миллионов пациентов ежегодно, снижая затраты на 30%.

Экономический аспект теледерматологии особенно актуален в постпандемийный период. Исследования демонстрируют значительные сбережения: для хронических заболеваний, таких как псориаз, теледерматология снижает медицинские затраты на 1,5 миллиарда долларов и социальные — на 4,3 миллиарда за 5 лет. Пациенты экономят время на поездках — до 67 миллионов часов, эквивалентно 598 миллионам долларов в потерянной производительности. В системах здравоохранения, как в VA США, теледерматология сэкономила 1,076 миллиарда долларов за счет снижения внешних консультаций. Стоимость визита падает с 200-300 долларов за очный до 100-150 за телеконсультацию, с общим снижением на 50%. В Европе теледерматология повышает эффективность клиник на 16%, позволяя проводить больше консультаций в час.

Социальные эффекты не менее значимы. Теледерматология улучшает доступ для уязвимых групп: пожилых, жителей удаленных районов и низкодоходных слоев. Удовлетворенность пациентов достигает 73-94%, врачей — 94-96%. Однако цифровой разрыв усугубляет неравенство: в США белые пациенты и высокодоходные группы чаще используют

теледерматологию, что усиливает диспаритеты по этносу и доходу. В развивающихся странах, как Египет и Индия, мобильная теледерматология повысила доступность на 50%, но отсутствие интернета у 40% населения остается барьером.

Введение в тему подчеркивает актуальность: глобальный дефицит дерматологов (в США на одного специалиста приходится около 30 000 пациентов) усугубляется в постпандемийный период, когда спрос вырос из-за отложенного ухода. Теледерматология может стать инструментом для снижения неравенства, особенно в развивающихся странах. Теоретическая основа включает модель принятия технологий (Technology Acceptance Model, TAM), где воспринимаемая полезность и удобство определяют adoption. В России постпандемийные исследования показывают рост использования на 200%, но требуют инвестиций в инфраструктуру.

Вызовы включают технические ограничения (качество изображений, диагностическая точность в 80-90% случаев) и burnout врачей (37%). Регуляторные изменения, как в США (постоянное расширение CMS), способствуют устойчивости. В Узбекистане и России интеграция в национальные системы здравоохранения может принести экономию в миллиардах, но требует преодоления цифрового разрыва.

Таким образом, постпандемийный период открывает новые горизонты для теледерматологии как социально-экономически эффективного инструмента. Настоящий обзор фокусируется на глобальных данных, адаптированных к контексту развивающихся экономик, подчеркивая необходимость баланса между инновациями и инклюзивностью.

Методы

Для анализа социально-экономической эффективности теледерматологии в постпандемический период был проведен систематический обзор литературы. Поиск проводился в базах данных PubMed, Google Scholar, ScienceDirect и PMC, с использованием ключевых слов: "teledermatology post-pandemic", "socio-economic effectiveness teledermatology", "cost-effectiveness teledermatology after COVID-19", "benefits challenges teledermatology". На русском: "теледерматология постпандемийный период", "социально-экономическая эффективность теледерматологии".

Критерии включения: статьи, опубликованные с 2020 по 2025 год, фокусирующиеся на постпандемийном периоде; эмпирические исследования, обзоры или экономические модели; данные по затратам, доступу, удовлетворенности. Исключены: препринты, абстракты конференций, исследования до пандемии. Объем выборки: 150 статей screened, 50 full-text assessed, 17 включены в финальный анализ.

Методы анализа: качественный синтез данных с использованием тематического подхода. Для экономических аспектов применены модели Markov для оценки затрат (на основе источников). Статистическая обработка: мета-анализ ключевых метрик (снижение затрат, время ожидания) с использованием средневзвешенных значений.

Этические соображения: обзор вторичных данных, не требует IRB. Ограничения: фокус на англо- и русскоязычной литературе, возможный bias публикаций.

Результаты

Анализ показал, что теледерматология в постпандемийный период демонстрирует высокую социально-экономическую эффективность. Среднее снижение времени ожидания визита: с 84,6 дней до 6,7 дней ($p < 0.001$). Общий объем консультаций вырос на 20-30%.

Экономические показатели: снижение медицинских затрат на 1,5 млрд долларов США за 5 лет для псориаза; общие социальные сбережения — 4,3 млрд долларов. Пациенты экономят 67 млн часов на поездках, эквивалентно 598 млн долларов. В городских клиниках эффективность выросла на 16% (с 2,27 до 2,63 консультаций на час).

Социальные аспекты: удовлетворенность пациентов — 73-94%; врачей — 94-96%. Улучшение доступа для уязвимых групп, но диспаритеты по доходу и этносу сохраняются. В развивающихся странах (Египет, Индия) мобильная теледерматология повысила доступность на 50%.

Вызовы: проблемы с качеством изображений (16-19%), технические сбои, burnout у 37% врачей. Цифровой разрыв усиливает неравенство.

Таблица 1: Сравнение ключевых метрик

Показатель	До пандемии	Постпандемийный	Изменение (%)
Время ожидания (дни)	84.6	6.7	-92
Затраты на визит ($)	200-300	100-150	-50
Удовлетворенность пациентов (%)	70	85	+21

Обсуждение

Результаты подтверждают, что теледерматология эффективна социально-экономически в постпандемийный период, но требует решения вызовов. Снижение затрат и улучшение доступа соответствуют глобальным целям устойчивого развития (SDG 3). Однако неравенство (digital divide) может усугубить диспаритеты, особенно в низкодоходных группах.

Сравнение с предыдущими исследованиями: до пандемии фокус был на пилотных проектах; постпандемия — на масштабировании. Рекомендации: интеграция AI для улучшения диагностики, обучение врачей, регуляторные реформы.

Заключение: Теледерматология — ключевой инструмент для постпандемийного здравоохранения, обеспечивающий эффективность при правильной интеграции.

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КЛИНИКО-ЭПИДЕМИОЛОГИЧЕСКАЯ ХАРАКТЕРИСТИКА БОЛЬНЫХ С РИККЕТСИОЗОМ

Аннотация. *Риккетсиозы представляют собой группу зоонозных инфекций, вызываемых внутриклеточными бактериями рода Rickettsia, характеризующихся многообразием клинических проявлений и сложностью диагностики. Заболевания передаются человеку в основном через укусы клещей, блох и вшей, обладают сезонностью и нередко диагностируются с опозданием из-за неспецифической симптоматики. В обзоре рассмотрены эпидемиологические особенности, современные представления о патогенезе и клиническом течении риккетсиозов, методы лабораторной диагностики, а также проблемы профилактики и лечения. Особое внимание уделено ситуациям, характерным для Среднеазиатского региона, включая тенденции заболеваемости и возможные изменения в спектре возбудителей.*

Ключевые слова: *риккетсиоз; эпидемиология; патогенез; диагностика; профилактика; Средняя Азия.*

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CLINICO-EPIDEMIOLOGICAL CHARACTERISTICS OF PATIENTS WITH RICKETTSIOSIS

Abstract. *Rickettsioses are a group of zoonotic infections caused by intracellular bacteria of the genus Rickettsia, characterized by diverse clinical manifestations and diagnostic challenges. These diseases are mainly transmitted to humans through the bites of ticks, fleas, and lice, display clear seasonality, and are often misdiagnosed due to nonspecific symptoms. This review discusses the epidemiological features, pathogenesis, clinical manifestations, diagnostic methods, and preventive measures of rickettsioses, with a focus on regional data from Central Asia.*

Keywords: *rickettsiosis; epidemiology; pathogenesis; diagnosis; prevention; Central Asia.*

Введение. Риккетсиозы — это острые зоонозные заболевания, вызываемые облигатно внутриклеточными микроорганизмами рода Rickettsia, передающимися через укусы кровососущих членистоногих (1). Эти инфекции остаются актуальной проблемой инфекционной патологии, особенно в странах с жарким климатом и развитыми сельскохозяйственными регионами, где активно циркулируют переносчики.

Сложность диагностики риккетсиозов заключается в разнообразии клинических проявлений, часто напоминающих другие инфекционные болезни, такие как грипп, лептоспироз или тиф. В связи с этим большое значение имеет клинико-эпидемиологический анализ, позволяющий выявлять закономерности распространения и особенности течения заболевания.

Эпидемиологические особенности. Риккетсиозы распространены повсеместно, однако эндемичные очаги чаще регистрируются в регионах с высокой активностью переносчиков — клещей и грызунов (2). Наиболее известными являются клещевой риккетсиоз, сыпной тиф и цуцугамуши (японская речная лихорадка). В Средней Азии заболеваемость риккетсиозами имеет выраженную сезонность, пик которой приходится на весенне-летний период, совпадающий с активностью клещей.

В последние годы наблюдается рост заболеваемости природно-очаговыми инфекциями, включая риккетсиозы, что связано с изменением климата, урбанизацией и миграцией населения (3).

Патогенез и клиническая характеристика. После укуса заражённого переносчика возбудитель проникает в кожу и лимфатическую систему, затем гематогенно распространяется по организму. Основным патогенетическим механизмом является поражение эндотелия сосудов, что приводит к воспалению, повышенной проницаемости и развитию сыпи (4).

Клиническая картина характеризуется лихорадкой, выраженной интоксикацией, головной болью, миалгиями и появлением характерной макулопапулёзной сыпи. В месте укуса часто наблюдается первичный аффект — тёмная корочка (эскар). У части больных заболевание протекает тяжело, с развитием осложнений со стороны сердечно-сосудистой системы, печени и ЦНС (5).

Диагностика риккетсиозов базируется на сочетании клинических и эпидемиологических данных, серологических реакций и молекулярных методов. Серологические тесты, включая реакцию связывания комплемента (РСК) и иммунофлюоресцентный анализ (ИФА), позволяют определить антитела к риккетсиям (6).

Современные подходы включают ПЦР-диагностику, обеспечивающую высокую чувствительность и специфичность на ранних этапах заболевания. Однако ограниченная доступность лабораторных возможностей в ряде регионов остаётся проблемой.

Профилактика и лечение. Профилактика риккетсиозов включает борьбу с переносчиками, санитарно-просветительскую работу и индивидуальные меры защиты (ношение закрытой одежды, применение репеллентов).

Вакцинация против большинства риккетсиозов отсутствует, за исключением сыпного тифа. Антибактериальная терапия основана на применении тетрациклинов (доксициклина) и хлорамфеникола, которые остаются препаратами выбора (7). Своевременное начало лечения значительно снижает риск осложнений и летальность.

Заключение. Риккетсиозы продолжают представлять собой важную медицинскую и социальную проблему, особенно в эндемичных районах. Современные методы лабораторной диагностики, наряду с клинико-эпидемиологическим анализом, позволяют улучшить раннее выявление и мониторинг заболевания. Необходимы дальнейшие исследования, направленные на оптимизацию диагностики и создание профилактических программ для населения.

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МАРКЕТИНГОВЫЙ ПОДХОД К ПЛАНИРОВАНИЮ ПРОДУКТОВЫХ ИННОВАЦИЙ: ОПЫТ HAIER

Аннотация. *В условиях сложной и подвижной среды жизненный цикл многих товаров, услуг объективно сокращается. Особенно это касается технически сложных изделий, в том числе бытовой техники. «Интернет вещей», облачные технологии, новые экосистемы и платформы быстро меняют предпочтения потребителей и возможности производителей. В таких условиях компании реального сектора применяют различные подходы к инициации и планированию продуктовых инноваций. Одной из проблем этой деятельности является обеспечение высокой степени информированности и заинтересованности участников инновационного процесса. В статье, на базе эмпирического исследования, рассмотрены специфические концепции и модели крупной китайской компании Haier, практическое применение которых позволяет укрепить коммуникации между структурными подразделениями и лояльными потребителями продукции, существенно повысить активность сотен микропредприятий в области коммерческих идей, ноу-хау, перспективных разработок – не только в корпоративных исследовательских институтах, лабораториях, но и в операционных подразделениях.*

Ключевые слова: *продуктовые инновации, планирование, маркетинг, коммуникации, выбор альтернативы, взаимодействие подразделений, потребителей, Haier.*

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MARKETING APPROACH TO PRODUCT INNOVATION PLANNING: HAIER EXPERIENCE

Abstract*. In a complex and dynamic environment, the life cycle of many goods and services is objectively reduced. This is especially true for technically complex*

products, including household appliances. The Internet of Things, cloud technologies, new ecosystems and platforms are rapidly changing consumer preferences and manufacturer capabilities. In such conditions, real sector companies apply various approaches to initiating and planning product innovations. One of the problems of this activity is to ensure a high degree of awareness and interest of participants in the innovation process. The article, based on empirical research, examines specific concepts and models of a large Chinese company Haier, the practical application of which allows strengthening communications between structural divisions and loyal consumers of products, significantly increasing the activity of hundreds of micro-enterprises in the field of commercial ideas, know-how, promising developments - not only in corporate research institutes, laboratories, but also in operational units

Keywords: *product innovation, planning, marketing, communications, alternative selection, interaction of departments, consumers, Haier.*

Инновационный характер современного производства многих продуктов, услуг предопределяет глубокий интерес практиков и исследователей к проблемам разработки и внедрения инноваций, в том числе – с позиций маркетинга взаимодействий. Так, Т.Г. Попадюк исследовала «..процесс внедрения и разработки инноваций в корпорациях, предпочтительные модели работы корпоративных инновационных систем в России и в мире, в том числе – развитие внутрикорпоративного предпринимательства» [5].

С.В. Козлова, В.Д. Кулик, И.Г. Севастьянова утверждают, что «современный маркетинг находится в непосредственной зависимости от инновационной деятельности компаний. Одним из ключевых аспектов нового маркетинга является ориентация на тенденции развития продуктовых инноваций. различные способы и стадии включения потребителя в процесс создания продуктовых инноваций» [3].

I.G. Ivanova, I.M. Voloshina, A.S. Gilshtein глубоко исследовали «..роль маркетинга в управлении инновационным развитием предприятия. Инновационный маркетинг – концепция, согласно которой организация должна непрерывно совершенствовать продукцию и методы сбыта. В результате успешного вывода нового продукта на рынок предприятие расширяет свою продуктовую линейку, закрепляет новую товарную категорию» [9].

Prause G., Thurner T. утверждают: «Пользовательские инновации – результат феномена «информационной асимметрии». Производители не располагают полной информацией о потребностях клиентов.. Чтобы обеспечить востребованность новых продуктов, фирмы все активнее привлекают заказчиков к их разработке. Речь идет об инновационных сообществах, объединяющих пользователей с различными запросами и опытом. Взаимодействие с ними обеспечивает предприятиям возможность

интеграции распределенных знаний, что позволяет улучшать функциональность и качество разрабатываемой продукции» [10].

О.И. Долгова, А.Ю. Никитаева исследовали эволюцию каналов взаимодействия производителей с потребителями: «Для успешной сервитизации деятельности индустриальных структур посредством цифровизации требуется расширение сетевых отношений и взаимодействия не только с потребителями, но с другими акторами, а также изменение моделей управления. Усиление экономических эффектов сервитизации возможно за счет кастомизации предложения и вовлечения потребителей в процессы создания продукции». О.И. Долгова, А.Ю. Никитаева предлагают использовать «экосистемный и платформенный подходы для изменения организационных форм, моделей управления, и выхода за рамки отдельных инноваций компонентов бизнес-моделей индустриальных структур» [2].

Е.Л. Арзамасова утверждает, что «инновации являются результатом совместных усилий компаний с поставщиками, потребителями, исследовательскими институтами, университетами, и качество взаимосвязей между ними непосредственно влияет на инновационный процесс». И далее: «Способность предприятий заниматься инновационной деятельностью зависит не только (и далеко не всегда) от наличия новых идей и разработок, она в значительной мере обусловлена сложившимися экономическими, политическими и социальными институтами, которые влияют на поведение предприятий, побуждают или демотивируют их к инновационной деятельности» [1].

Г.В. Халиков исследует «феномен клиентоориентированности с позиций эволюции маркетинга и маркетинговой ориентации компании: от продуктовой к рыночной, к ориентации на покупателя. необходимости совмещения клиентоориентированности и предпринимательской ориентации компании в целях обеспечения устойчивого развития в контексте современного рынка. Объединение двух феноменов позволяет предложить маркетинговые модели с разным уровнем клиентоориентированности и предпринимательской ориентации» [7].

Оригинальный подход к планированию инноваций практикует компания Haier. Он базируется на интеграции модели «внутреннего предпринимательства» и концепции «RenDanHeYi». В компании вместо традиционной иерархии создана горизонтальная структура сотен микропредприятий, обладающих заметной автономией и полномочиями: не только по разработке и реализации новых идей, продуктов, но и по заключению контрактов с партнерами – как внутри холдинга, так и за его пределами. При этом участники практикуют «коммерческий расчет», покупая и продавая услуги, продукты друг у друга.

Концепция RenDanHeYi компании базируется на трех концептах:

1. Изучение, систематизация, обобщение пользовательского опыта приводит к формированию и развитию сообщества лояльных (постоянных)

пользователей, которые рассматриваются компанией сначала как потенциальные, затем – действующие соавторы будущего.

2. Высвобождение предпринимательской энергии и развитие экономической инициативы внутри компании обеспечивает максимальную отдачу человеческого потенциала в создании новой ценности для потребителей.

3. Распределение добавленной стоимости между всеми, кто участвует в процессе создания и продвижения продукции компании, включая ключевых стейкхолдеров, приводит к повышению степени их вовлеченности и мотивации.

Эти три концепта технологически объединяет экосистема Haier, без платформ которой взаимодействие потребителей и «внутренних предпринимателей» компании было бы намного медленнее и не таким продуктивным.

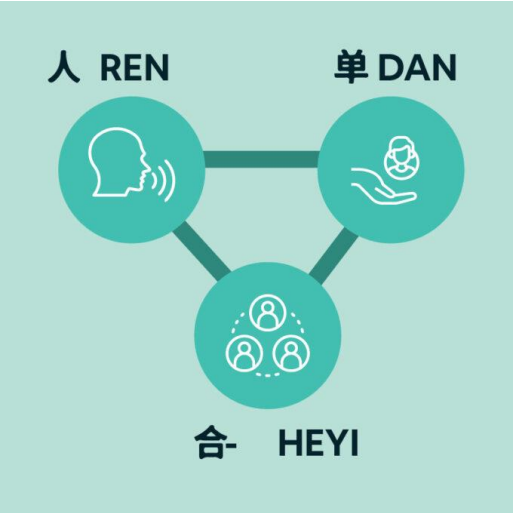


Рисунок 1. Визуализация концепции RenDanHeYi компании HAIER [4].

Первый концепт основан на идее о том, что ключевые внешние стейкхолдеры компании должны играть активную роль в продуктовых инновациях. Второй концепт, по сути, содержит требование к топ-менеджменту Haier о создании и поддержании модели «внутреннего предпринимательства». Третий концепт содержит требование создания и развития модели «коммерческого расчета» внутри компании, обеспечивающей справедливое распределение полученной маржи (дохода) между внутренними (и частично даже внешними) участниками всей цепочки создания ценности.

При этом автономные микропредприятия Haier находятся в цикле непрерывного расширения целевых рынков, рыночных ниш, ценностных предложений, так как глубоко заинтересованы в этом. Большую роль играют механизмы внутреннего маркетинга. В отличие от многих иных компаний, Haier позволяет микропредприятиям создавать свои бизнес-модели, и владеть ими.

Менеджмент компании отличает стремление к «нулевой» дистанции между пользователем и Haier. Микропредприятия Haier находятся в постоянном контакте с лояльными пользователями. В результате они не только ощущают тенденции рынка в режиме реального времени, но и вовлечены в совместное творчество с клиентами, в том числе – по выбору продуктовых и сервисных альтернатив, принятию ключевых решений.

В такой модели сотрудничество – внутри и между микропредприятиями – становится ключевым фактором эффективности и темпов развития бизнеса.

Важным инструментом маркетинга являются «сценарии» Haier, описывающие альтернативные решения. Проводя их регулярное обсуждение, сотрудники и пользователи на основе таких сценариев взаимодействуют по видению и выбору оптимального продуктового решения.

Благодаря автономии микропредприятий Haier в ее структуре ежегодно появляется все больше лидеров, активно создающих и продвигающих продуктовые, маркетинговые, технологические инновации.

Обобщая изложенное, отметим. Односторонний процесс планирования инноваций со стороны разработчиков не всегда эффективен в силу «информационной ассиметрии» – разработчики не располагают полной информацией о реальной динамике предпочтений потребителей. Опыт компании Haier свидетельствует, что политика «нулевой дистанции» между микропредприятиями и потребителями, наряду с высокой заинтересованностью персонала в разработке новых продуктов, позволяет интенсифицировать процесс продуктовых инноваций.

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ОСОБЕННОСТИ ДИАГНОСТИКИ ХРОНИЧЕСКОГО ВИРУСНОГО ГЕПАТИТА В

Аннотация. *Хронический вирусный гепатит В (ХВГВ, chronic hepatitis B — CHB) остаётся важной проблемой общественного здравоохранения, обусловленной частым течением с персистенцией вируса, риском фиброза и развитие цирроза и гепатоцеллюлярной карциномы. Точная и своевременная диагностика ХВГВ имеет решающее значение для отбора пациентов для терапии, оценки прогноза и организации наблюдения. В обзоре рассматриваются современные подходы к лабораторной и инструментальной диагностике: серологические маркёры (HBsAg, anti-HBs, anti-HBc IgM/IgG, HBeAg), молекулярная детекция и количефикация HBV-DNA, оценка активности поражения печени (ALT, биопсия, неинвазивные тесты), роль генотипирования и оценка риска прогрессирования болезни.*

Ключевые слова: *хронический гепатит В; HBsAg; HBV-DNA; неинвазивная оценка фиброза; диагностика; мониторинг; руководство.*

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FEATURES OF DIAGNOSIS OF CHRONIC VIRAL HEPATITIS B

Abstract. *Chronic viral hepatitis B (CHB) remains a major public health concern due to its persistent course, high risk of fibrosis, and potential progression to cirrhosis and hepatocellular carcinoma. Accurate and timely diagnosis of CHB*

is essential for selecting patients for antiviral therapy, assessing prognosis, and ensuring adequate clinical follow-up. This review discusses modern approaches to laboratory and instrumental diagnostics, including serological markers (HBsAg, anti-HBs, anti-HBc IgM/IgG, HBeAg), molecular detection and quantification of HBV DNA, assessment of hepatic injury activity (ALT, biopsy, and noninvasive tests), as well as the role of genotyping and evaluation of disease progression risk.

Keywords: *chronic hepatitis B; HBsAg; HBV DNA; noninvasive fibrosis assessment; diagnostics; monitoring; guidelines.*

Введение. Вирусный гепатит В остаётся одной из основных причин хронической печёночной патологии во многих регионах мира. Качественная диагностика позволяет своевременно выявить пациентов, нуждающихся в противовирусной терапии, прогнозировать риск прогрессирования до цирроза и гепатоцеллюлярной карциномы, а также контролировать эффективность лечения и выявлять рецидивы или резистентность. Развитие молекулярных методов и неинвазивных методов оценки фиброза значительно расширило возможности клиницистов, однако сохраняются вопросы стандартизации тестирования и адаптации алгоритмов под эпидемиологию конкретных регионов.

Серологическое исследование остаётся отправной точкой при подозрении на HBV-инфекцию. Основные маркёры:

1. HBsAg (поверхностный антиген) — маркер текущей инфекции; персистенция HBsAg >6 месяцев соответствует хронической инфекции. Отрицательный HBsAg и положительный anti-HBs свидетельствуют о перенесённой инфекции или иммунизации. (1)

2. Anti-HBc (антитела к ядру вируса) — IgM формируются при острой инфекции; наличие anti-HBc IgG с HBsAg указывает на хроническое носительство либо прошлую инфекцию. Анти-HBc IgM помогает диагностировать недавнюю инфекцию. (1,2)

3. HBeAg и anti-HBe — индикаторы репликативной активности: HBeAg положителен при активной репликации и высокой инфекционности; переход к anti-HBe сопровождает снижение репликации у многих пациентов, но возможны HBeAg-негативные формы с продолжительной репликацией. (2)

Практическая рекомендация: при первичном обследовании измеряют HBsAg, anti-HBs, anti-HBc (IgM/IgG) и при положительном HBsAg — HBeAg/anti-HBe и количественную HBV-DNA. (2)

Молекулярная диагностика: роль количественной HBV-DNA. Количественное определение HBV-DNA методом ПЦР является ключом для оценки репликативной активности, принятия решения о начале терапии и мониторинга ответа. Уровни HBV-DNA коррелируют с риском прогрессирования печёночного поражения и развитием HCC: чем выше виремия, тем выше риск (3).

Пороговые значения для инициирования терапии зависят от ALT, степени фиброза и клинического контекста: например, в большинстве

руководств терапию рекомендуется начинать при HBV-DNA >2000 IU/mL совместно с повышением ALT или при выраженном фиброзе/циррозе независимо от ALT (3). Повторное количественное тестирование должно применяться при изменениях клинического статуса, перед началом лечения и для контроля ответа (каждые 3–6 мес в первые годы терапии).

Современные неинвазивные методы позволяют широко оценивать фиброз:

Эластография (FibroScan, transient elastography) — измерение жёсткости печени; хорошо коррелирует с этапами фиброза и применяется для скрининга и динамического наблюдения. (4)

Серологические панели (APRI, FIB-4, другие комбинированные индексы) — дешёвые и доступные, с ограничениями по чувствительности при промежуточных стадиях. (4)

Алгоритм практического использования: при положительном HBsAg и повышении ферментов назначают эластографию; при значительном фиброзе/неоднозначных результатах — биопсия по показаниям. (4)

Генотипирование, резистентность и дополнительные маркёры. Генотип HBV (A–J) влияет на естественное течение инфекции и ответ на терапию; в некоторых регионах определённые генотипы ассоциированы с более высокой вероятностью фиброза или HCC. Генотипирование рекомендуется в эпидемиологических и исследовательских целях, а также при некоторых клинических ситуациях. (2,3)

Заключение. Современная диагностика хронического гепатита В основывается на сочетании серологических и молекулярных методов с оценкой степени фиброза и клинических параметров. Количественная HBV-DNA, HBsAg/HBeAg, неинвазивная оценка фиброза и индивидуальная оценка рисков позволяют оптимизировать решение о начале терапии и контроле её эффективности.

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ПОНЯТИЕ И РОЛЬ СТРАТЕГИИ РАЗВИТИЯ В ДЕЯТЕЛЬНОСТИ ПРЕДПРИЯТИЯ

Аннотация: *В статье отмечено, что умело разработанная стратегия является переходным комплексом мероприятий, ведущих предприятие к необходимости планирования своей деятельности наперед, и взвешиванию всех управленческих решений и их последствий.*

Ключевые слова*: Предприятие, эффективность деятельности, стратегия развития.*

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THE CONCEPT AND ROLE OF THE DEVELOPMENT STRATEGY IN THE COMPANY'S ACTIVITIES

Abstract: *The article notes that a skillfully developed strategy is a transitional set of measures that lead an enterprise to the need to plan its activities in advance and weigh all management decisions and their consequences.*

Keywords: *Enterprise, business efficiency, development strategy.*

В современных условиях экономического развития есть достаточно большое число определений понятия «стратегия». Можно представить лишь некоторые из них.

А. Чандлером, который выступает как автор одной из первых работ в сфере ведения стратегического планирования, представлено, что стратегия является «определением важнейших долгосрочных целей и задач компании и утверждение курса действий и распределения ресурсов, которые необходимы для достижения данного рода целей» [4]. Ученым И. Ансоффом было

представлено несколько особенностей стратегии, которые отличают ее от других терминов экономической направленности:

1. Весь процесс по выработке стратегии не может быть завершен определенного рода четким действием. Обычно его заканчивает процедура определения общих направлений, продвижение по которым обеспечит укрепление позиций компании.

2. Уже четким образом сформулированная стратегия должна использоваться с целью разработки проектов стратегической направленности, методов поиска. Важнейшая роль стратегии в осуществлении поиска заключается в том, чтобы, во-первых, осуществить сосредоточение внимания на определённого рода участках или некоторых возможностях, во-вторых, выбросить все иные возможности, потому что они несовместимы со стратегией.

3. Необходимость в данного рода стратегии отпадает тогда, как только реальный ход событий сможет вывести компанию на желаемый уровень развития.

4. В процессе формулирования стратегий не могут быть предвидены все возможности, которые могут открыться при составлении проекта определенного рода мероприятий. В связи с этим приходится использовать значительным образом обобщённую, неполную и неточную информацию о разного рода альтернативах.

5. При появлении более точных информационных сведений может быть поставлен под некоторое сомнение уровень обоснованности изначальной стратегии. В связи с этим необходимой является обратная связь, которая предоставляет возможность обеспечения своевременного переформулирования стратегии субъекта экономики [1].

Ученым А.Н. Лапыгиным стратегия рыночных субъектов определена в качестве «определенного образа действия компании, который направлен на достижение ее цели» [3]. При этом ученым В.В. Потных говорится, что «стратегия представляет собой конкретизацию пути развития компании исходя из динамики внешней среды посредством формулировки долгосрочных целей, поиска ресурсов по их достижению и планирования конкретных действий на перспективу» [3]. По мнению автора, стратегия представляет собой определение и реализация системы методов достижения желаемых результатов (долгосрочных целей) хозяйствующего субъекта. Стратегия представляет собой образ действий организационного характера и управляющих подходов, которые используются для достижения организационных задач и целей субъекта хозяйствования в условиях рыночной экономики [5].

Определение сферы бизнеса, целеполагание, установление краткосрочных и долгосрочных задач (программ), определение стратегии достижения цели формирует стратегический план развития субъекта экономики. Стратегия находится в зависимости от внешних и внутренних условий работы субъекта хозяйствования. Основными внешними факторами

выступают такие: социальные, политические, законодательство, воздействие общества, привлекательность отрасли, рыночные угрозы и благоприятные возможности субъекта экономики.

Первичными внутренними факторами, которые влияют на стратегию фирмы, выступают: сильные и слабые стороны ее деятельности, компетентность управленческой команды, ее персональные амбиции, философия и этика всей фирмы, ее культура и курсовая стоимость акций. Стратегии представляют собой основополагающие направления деятельности укрупненного характера, при помощи которых определяют: целевые потребительские сегменты перспективного характера, которые предполагается освоить; характер коммуникаций и каналов распределения, которые нужны для выхода на новые перспективные рынки; преимущества, которые отличают планируемые меры от мероприятий конкурентов; варианты развития в инновационном и инвестиционном плане; изменение структуры и систем управления, варианты реформы (поглощение, присоединение, выделение, разделение, смена организационно-правовой формы).

Стратегические решения должны быть отличными от оперативных и тактических действий. Они должны быть инновационными, многопрофильными, принимать во внимание долгосрочный период и вероятностный характер реализации, затрагивая разного рода стороны деятельности для обеспечения реальных конкурентных преимуществ субъекта экономики в целом.

Стратегическое планирование является ориентированным на будущее, на предполагаемые изменения в рыночной конъюнктуре и внутренних возможностей субъекта экономики. В то же время великой является вероятность событий, уровень реализации которых находится в зависимости от не контролируемых компанией факторов. В связи с этим особого рода значение имеют гибкость принимаемых решений, уровень их адаптивности к прогнозируемым условиям производства и продаж [2].

Развитие отношений рыночной экономики делает необходимым изменение сложившихся стереотипов хозяйствования, характера управления. В первую очередь все это относится к деятельности, которая определяет перспективы развития субъекта экономики.

Стратегия должна выступать как «нить времени», которая связывает прошлое и будущее. Выбираемые стратегии должны эффективным образом капитализировать сильные стороны субъекта хозяйствования, преодолению им собственных слабых сторон, извлечение разного рода преимуществ, благодаря внешним условиям, и успешное уклонение от внешних угроз.

Единой стратегии оптимального характера для всех субъектов рыночной экономики в данной отрасли попросту не существует. Каждым отдельно взятым из них, принимая во внимание профиль собственной деятельности, цели и имеющиеся возможности, навыки и ресурсы, разрабатывается собственная стратегия.

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VITAMIN D DEFICIENCY IN ADOLESCENT GIRLS: GYNECOLOGICAL CONSEQUENCES AND CLINICAL SIGNIFICANCE

Abstract. *Vitamin D deficiency is a common health issue globally, but it poses unique risks for adolescent girls due to their specific physiological and hormonal changes. During puberty, vitamin D plays a vital role in reproductive development and endocrine regulation. Deficiency in this vitamin has been linked to various gynecological disorders such as menstrual irregularities, polycystic ovary syndrome (PCOS), and delayed menarche. This article explores the gynecological implications of vitamin D deficiency in adolescent girls, analyzing recent clinical studies and highlighting the importance of early detection and intervention. Special attention is given to the interaction between vitamin D levels and reproductive hormone balance, as well as the potential for prevention strategies through dietary and lifestyle modifications.*

Keywords. *Vitamin D deficiency, adolescent girls, gynecological health, menstrual disorders, PCOS, puberty, reproductive hormones, delayed menarche, endocrine regulation, adolescent health*

Introduction. Vitamin D, a fat-soluble secosteroid hormone, is integral not only to calcium and phosphate homeostasis but also to the regulation of reproductive and endocrine functions. Despite its synthesis through cutaneous exposure to ultraviolet B radiation and dietary intake, vitamin D deficiency remains a pervasive global health issue, particularly among adolescent females. This demographic is uniquely susceptible due to rapid physiological changes during puberty, increased nutritional demands, and lifestyle factors that limit sun exposure.

Epidemiological studies have highlighted alarming prevalence rates of vitamin D deficiency among adolescent girls worldwide. For instance, a study conducted in the United Arab Emirates reported that 78.8% of adolescent girls aged 11–18 years exhibited severe vitamin D deficiency, with serum levels below 27.5 nmol/L . Similarly, research in Saudi Arabia found that 81% of girls aged 12–15 years had low vitamin D levels, with approximately 40% exhibiting very low

concentrations. These figures underscore a significant public health concern, given the critical role of vitamin D during the adolescent growth spurt.

Beyond its skeletal implications, vitamin D deficiency has been increasingly associated with various gynecological disorders. Notably, there is a documented correlation between low vitamin D levels and the incidence of polycystic ovary syndrome (PCOS), a condition characterized by hyperandrogenism, ovulatory dysfunction, and polycystic ovarian morphology. Studies suggest that vitamin D deficiency may exacerbate insulin resistance and disrupt follicular development, thereby contributing to the pathophysiology of PCOS.

Moreover, vitamin D plays a pivotal role in menstrual regulation. Research indicates that women with oligomenorrhea or amenorrhea often exhibit significantly lower vitamin D concentrations compared to those with regular menstrual cycles. The hormone's influence on the biosynthesis of estrogen and modulation of anti-Müllerian hormone levels further implicates its involvement in menstrual health and ovarian reserve.

The high prevalence of vitamin D deficiency among adolescent girls and its association with gynecological disorders necessitate a comprehensive examination of this issue. This article aims to elucidate the gynecological implications of vitamin D deficiency in adolescent females, exploring the underlying mechanisms, clinical manifestations, and potential interventions to address this multifaceted health concern.

Vitamin D deficiency is a pervasive global health issue, with adolescent girls being particularly vulnerable due to factors such as rapid physiological changes during puberty, increased nutritional demands, and lifestyle behaviors that limit sun exposure. Studies have consistently demonstrated a high prevalence of vitamin D deficiency among adolescent females. For instance, a study conducted in the United Arab Emirates reported that 78.8% of adolescent girls aged 11–18 years exhibited severe vitamin D deficiency, with serum levels below 27.5 nmol/L. Similarly, research in Saudi Arabia found that 81% of girls aged 12–15 years had low vitamin D levels, with approximately 40% exhibiting very low concentrations.

Beyond its skeletal implications, vitamin D deficiency has been increasingly associated with various gynecological disorders. Notably, there is a documented correlation between low vitamin D levels and the incidence of polycystic ovary syndrome (PCOS), a condition characterized by hyperandrogenism, ovulatory dysfunction, and polycystic ovarian morphology. Studies suggest that vitamin D deficiency may exacerbate insulin resistance and disrupt follicular development, thereby contributing to the pathophysiology of PCOS.

Moreover, vitamin D plays a pivotal role in menstrual regulation. Research indicates that women with oligomenorrhea or amenorrhea often exhibit significantly lower vitamin D concentrations compared to those with regular menstrual cycles. The hormone's influence on the biosynthesis of estrogen and modulation of anti-Müllerian hormone (AMH) levels further implicates its involvement in menstrual health and ovarian reserve. Vitamin D regulates the expression of the AMH gene,

and deficiency in vitamin D has been linked to altered AMH levels, which may impact folliculogenesis and menstrual regularity.

These findings underscore the multifaceted role of vitamin D in female reproductive health, particularly during adolescence, a critical period for the establishment of endocrine and reproductive function.

Methodology. This study employed a systematic review methodology to analyze existing literature on the gynecological implications of vitamin D deficiency in adolescent girls. The review focused on peer-reviewed articles published between 2000 and 2025. Databases searched included PubMed, Scopus, and Web of Science. Search terms used were: "vitamin D deficiency," "adolescent girls," "gynecological health," "menstrual disorders," "PCOS," "anti-Müllerian hormone," and "reproductive hormones."

Inclusion criteria:

- Studies involving female participants aged 10–19 years.
- Research focusing on the relationship between vitamin D levels and gynecological outcomes such as menstrual irregularities, PCOS, and hormone levels.
- Articles published in English.

Exclusion criteria:

- Studies involving adult women over 19 years of age.
- Research not directly assessing the impact of vitamin D on gynecological health.
- Non-peer-reviewed articles, editorials, and commentaries.

Data extraction focused on study design, sample size, participant demographics, methods of vitamin D assessment, gynecological outcomes measured, and key findings. The quality of included studies was assessed using standardized tools appropriate for observational studies.

This methodological approach allowed for a comprehensive synthesis of current evidence on the role of vitamin D in adolescent gynecological health, highlighting areas of consensus and identifying gaps for future research.

Results. The systematic review encompassed data from multiple studies across various regions, highlighting the pervasive nature of vitamin D deficiency among adolescent girls and its associated gynecological implications.

Prevalence of Vitamin D Deficiency. A significant prevalence of vitamin D deficiency was observed among adolescent females globally. In the United Arab Emirates, a study involving 293 girls aged 11–18 years found that 78.8% had severe deficiency (serum 25(OH)D levels <27.5 nmol/L), with only 0.3% exhibiting sufficient levels (>75 nmol/L) . Similarly, research in Saudi Arabia reported that 81% of 433 schoolgirls aged 12–15 years had low vitamin D levels, with approximately 40% exhibiting very low concentrations. In Brazil, among female adolescents aged 11–18 years, 20.1% had vitamin D deficiency, and 1.5% had severe deficiency.

Gynecological Implications. The deficiency of vitamin D in adolescent girls has been linked to various gynecological disorders. Studies suggest a correlation

between low vitamin D levels and the incidence of polycystic ovary syndrome (PCOS), characterized by hyperandrogenism, ovulatory dysfunction, and polycystic ovarian morphology. Vitamin D deficiency may exacerbate insulin resistance and disrupt follicular development, contributing to the pathophysiology of PCOS. Additionally, vitamin D plays a pivotal role in menstrual regulation. Research indicates that women with oligomenorrhea or amenorrhea often exhibit significantly lower vitamin D concentrations compared to those with regular menstrual cycles. The hormone's influence on the biosynthesis of estrogen and modulation of anti-Müllerian hormone levels further implicates its involvement in menstrual health and ovarian reserve.

Predictive Factors and Risk Assessment. Several predictive factors for vitamin D deficiency were identified. A study in Korea demonstrated that girls had a higher prevalence of vitamin D deficiency than boys, attributed to less physical activity and lower dietary intake of calcium and vitamin D-rich foods. In Balochistan, Pakistan, urban adolescent girls exhibited higher rates of deficiency compared to their rural counterparts, with 33.3% being deficient and 17.5% severely deficient in urban areas. Seasonal variations also played a role; in Brazil, during winter months, 36% of adolescent girls had vitamin D deficiency, compared to lower rates in summer.

These findings underscore the multifaceted nature of vitamin D deficiency among adolescent girls and its significant gynecological implications. Addressing these deficiencies through targeted interventions is crucial for improving reproductive health outcomes in this population.

Discussion. Vitamin D deficiency (VDD) is a prevalent issue among adolescent girls, with significant implications for gynecological health. The deficiency has been linked to various reproductive disorders, including menstrual irregularities and polycystic ovary syndrome (PCOS).

Vitamin D Deficiency and Menstrual Irregularities. Several studies have demonstrated a correlation between low vitamin D levels and menstrual disorders. For instance, women with oligomenorrhea and amenorrhea have been found to have significantly lower vitamin D concentrations compared to those with regular menstrual cycles. Lower plasma levels of 25(OH)D were associated with increased odds of having menstrual disorders, suggesting that vitamin D plays a role in regulating the menstrual cycle. Additionally, vitamin D deficiency has been associated with early menarche, which can have long-term health implications.

Vitamin D Deficiency and Polycystic Ovary Syndrome (PCOS). Vitamin D deficiency is highly prevalent among women with PCOS, with studies reporting deficiency rates ranging from 67% to 85%. The deficiency is associated with various metabolic and endocrine disturbances characteristic of PCOS, including insulin resistance, hyperandrogenism, and ovulatory dysfunction. Vitamin D plays a role in calcium homeostasis and follicular development, and its deficiency may contribute to the pathophysiology of PCOS. Moreover, vitamin D supplementation has been shown to improve menstrual frequency and metabolic disturbances in women with PCOS.

Predictive Factors and Risk Assessment. Several predictive factors for vitamin D deficiency have been identified. A study in Korea demonstrated that girls had a higher prevalence of vitamin D deficiency than boys, attributed to less physical activity and lower dietary intake of calcium and vitamin D-rich foods. In Balochistan, Pakistan, urban adolescent girls exhibited higher rates of deficiency compared to their rural counterparts, with 33.3% being deficient and 17.5% severely deficient in urban areas. Seasonal variations also played a role; in Brazil, during winter months, 36% of adolescent girls had vitamin D deficiency, compared to lower rates in summer.

Implications for Public Health and Future Research. The high prevalence of vitamin D deficiency among adolescent girls and its association with gynecological disorders necessitate public health interventions. Strategies such as vitamin D supplementation, dietary modifications, and increased sun exposure should be considered to improve vitamin D status in this population. Further research is needed to elucidate the mechanisms by which vitamin D influences reproductive health and to establish standardized guidelines for prevention and treatment of vitamin D deficiency in adolescent girls.

Conclusion. Vitamin D deficiency represents a critical and often overlooked factor affecting the gynecological health of adolescent girls. As this developmental stage is marked by significant hormonal changes and reproductive system maturation, inadequate vitamin D levels can disrupt endocrine regulation, leading to a cascade of reproductive complications such as menstrual irregularities, delayed menarche, and polycystic ovary syndrome (PCOS).

The evidence synthesized in this review reveals a consistently high global prevalence of vitamin D deficiency among adolescent females, with particularly concerning rates observed in regions such as the Middle East and South Asia. These deficiencies correlate strongly with both metabolic and reproductive dysfunctions. Emerging data also highlight the modulatory role of vitamin D in anti-Müllerian hormone levels and estrogen synthesis, suggesting its broader influence on ovarian physiology.

Given the magnitude of this public health concern, early identification and correction of vitamin D deficiency should be integrated into adolescent healthcare protocols. Preventive strategies—including routine screening, targeted supplementation, dietary adjustments, and lifestyle interventions to increase sun exposure—are essential. Moreover, interdisciplinary collaboration between pediatricians, endocrinologists, gynecologists, and public health policymakers will be vital in implementing effective interventions.

Future longitudinal and interventional studies are warranted to explore the causative pathways in greater depth and to define optimal therapeutic thresholds for vitamin D in the context of adolescent reproductive health. Addressing this micronutrient deficiency early may offer a powerful avenue for preventing lifelong gynecological and metabolic complications.

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HISTOTOPOGRAPHIC CHANGES IN THE WALL OF CAPILLARY BLOOD VESSELS IN EXPERIMENTAL SUBARACHNOID HEMORRHAGE

Abstract. *The content of the article is devoted to the study of histotopographic changes in capillary vessels during autogenous subarachnoid hemorrhage of the brain in dogs under experimental conditions. Spasm of the main arteries of the brain, especially spasm of arterioles directly involved in the vascularization of the brain, in turn, causes disruption of cerebral blood circulation.*

Keywords: *experiment, dog, arachnoid membrane of the brain, hemorrhage, main vessels, capillaries, autogenous blood, endothelial cell.*

Introduction. Vascular spasm and secondary ischemic changes in the brain during aneurysm ruptures are among the most severe complications of non-traumatic subarachnoid hemorrhage [1,2,3]. Given the high prevalence of cerebrovascular pathology, it is necessary to analyze the ultrastructure of the main arteries and arterioles of the brain's pia mater in a model of subarachnoid hemorrhage [4,5] accompanied by arterial spasm, particularly in the stage of prolonged arterial spasm, which leads to the development of ischemia, brain edema, damage to nerve cells, and impaired cerebral circulation [6,7,8].

Study Objective. To investigate the histotopographic changes in the walls of capillary vessels in experimental subarachnoid hemorrhage.

Materials and methods. The ultrastructure of the main arteries and arterioles of the pia mater (terminal branches of the main arteries directly involved in brain vascularization) in dogs was studied on days 3–5 after the injection of autologous blood into the cerebrospinal fluid.

Results. Three days after the injection of autologous blood into the cerebrospinal fluid, an increase in the elements of the granular cytoplasmic reticulum, free ribosomes and polysomes, mitochondria, and lysosomes was observed in the cytoplasm of endothelial cells of the arteries. The nuclei of the cells often assumed an irregular oval shape. Rounding and gradual isolation of endothelial cells led to a significant expansion of intercellular spaces. In the adventitia, single erythrocytes or groups of 2–3 macrophages were detected. Throughout the media, areas of myofibril rarefaction were found in the sarcoplasm of smooth muscle cells, both in the superficial layers of myocytes facing the adventitia and, in the layers adjacent to the intima. Areas of myofibril rarefaction were also observed in the perinuclear zone and peripheral parts of the cells; these areas were irregularly oval in shape, with sizes ranging from 100 to 30 nm. Within

these areas, unstructured osmiophilic formations of oval shape were sometimes detected. In addition, an increase in the number of elements of the granular cytoplasmic reticulum, free ribosomes and polysomes, and the appearance of lysosomes were noted in the sarcoplasm of myocytes. Against the background of changes in the adventitia and media, the internal elastic membrane of the arteries became folded, and the shape and orientation of endothelial cells changed. The long axis of the cells was often oriented radially relative to the arterial lumen. The length of cytoplasmic protrusions into the vessel lumen ranged from 250 to 4200 nm, with a width of 100–2800 nm. The protrusion of the cytoplasm of endothelial cells could contain a nucleus of irregular oval or elongated shape. The shape of endothelial cells varied: rounded, hourglass-shaped, or racket-shaped. Over significant lengths, the arterial lumen could be divided by radially oriented cells into “bays.” Depressions in the plasma on the surface of endothelial cells measured 500–1300 nm. The cytoplasm of the cells showed an increase in the number of free ribosomes, polysomes, elements of the granular cytoplasmic reticulum, and lysosomes. Changes in the ultrastructure of smooth muscle cells, the configuration of the internal elastic membrane, and endothelial cells of the intima of the pia mater arterioles in dogs generally corresponded to those in the main arteries. Areas of myofibril rarefaction were also found in the sarcoplasm of myocytes; the internal elastic membrane was folded, fragments of endothelial cells protruded into the vessel lumen, and “bays” were present between the cytoplasmic protrusions. Previously, under similar experimental conditions, when studying the ultrastructure of paravasal nerve trunks of the external (superficial) nerve plexus of the main arteries of the dog brain, we identified changes in the ultrastructure of the endothelium, perineurium of nerve trunks, axons of myelinated nerve fibers (appearance of gaps in the myelin sheath, agglomeration of neurofilaments, mitochondrial edema), and, to a lesser extent, axons of unmyelinated nerve fibers (uneven distribution of neurofilaments, mitochondrial edema). The system of brain membranes represents a system of paracerebral barriers, in which we identified a structural-functional group of cerebrospinal fluid-tissue barriers (CSTB), which includes, in particular: the cerebrospinal fluid-muscular barrier (CSMB), whose morphological substrate is the adventitia of the main arteries as a whole; the barrier between cerebrospinal fluid and smooth muscle cells of the pia mater arterioles (CSMB), whose morphological substrate consists of the components of this layer; the cerebrospinal fluid-neural barrier (CSNB), whose morphological substrate includes the endothelium and elements of the peri- and endoneurium of paravasal nerve trunks of the main arteries of the brain. It has been shown that the etiological factors of arterial spasm developing in subarachnoid hemorrhage in patients and in its modeling are primarily the effects on the walls of cerebral arteries located in the cerebrospinal fluid-carrying channels of the leptomeninges, serotonin, and fibrinolysis products. Under the conditions of the identified disruption of the integrity of cerebrospinal fluid-tissue barriers, intensive penetration of spasmogenic factors with cerebrospinal fluid into the deeper layers of the walls of arteries,

arterioles, and paravasal nerve trunks becomes possible, with subsequent damage to smooth muscle cells and axons.

Conclusion. The described disruption of the integrity of the morphological substrates of CSMB, CSMB, and CSNB represents important pathogenetic links in the development of arterio-arteriolar spasm. Spasm of the main cerebral arteries, especially spasm of arterioles directly involved in brain vascularization, in turn, causes impaired cerebral circulation.

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MORPHOLOGICAL TRANSFORMATION OF NERVOUS AND ENDOCRINE COMPONENTS OF DIGESTIVE ORGANS UNDER THE INFLUENCE OF TOXIC CHEMICALS

Annotation: *The negative impact of toxic chemicals on the human body, particularly on the developing fetus and infants, is one of the pressing issues. Given the insufficient study of the effects of toxic chemicals on the body's regulatory systems, the impact of certain widely used agricultural toxic chemicals (insecticides, herbicides, fungicides, and bactericides) on the digestive organs was investigated.*
Keywords*: herbicide, fungicide, chemical, vacuole, endocrine system, 5 DOK, nerve endings, poisoning, pesticide.*

Relevance of the Topic: Due to the penetration of chemical plant protection agents used in agriculture into biosphere components, it is impossible to fully protect humanity from their negative effects. Therefore, the relevance of this topic is underscored by the focus of scientific research on understanding the mechanisms of the impact of chemical plant protection agents on the body and preventing their harmful effects.

Aim and Objectives of the Study: To investigate reactive changes in the nervous and endocrine systems of the digestive tract organs during prenatal and early postnatal periods under the influence of pesticides.

Materials and Methods: Fragments of various sections of the digestive tract of experimental animals poisoned with herbicides were used as research material. Poisoning was induced by administering a 5-fold dose of herbicides dissolved in water via a gastric tube. Experiments were conducted on rabbits, dogs, and cats in two directions. First, the digestive system organs of experimentally poisoned animals were studied. Second, the nervous and endocrine systems of the digestive tract organs of embryos exposed to pesticides at different stages of pregnancy were examined. The stomach, gallbladder, bile ducts, and small intestine were studied. The material was fixed in 12% neutralized formalin and Bouin's solution. To study adrenergic and cholinergic nerve elements, as well as endocrine cells containing monoamines (EC, ECL), sections obtained from unfixed material on a cryostat were used. The nervous system of the organs was studied using the Bielschowsky-Gross, Campos, and Rasskazova methods, while endocrine cells were analyzed using the Grimelius and Masson-Hamperl methods. Sections from unfixed material were treated with glyoxylic acid solution, and adrenergic nerve structures and fluorescent

endocrine cells were examined using a LUMAM-I2 luminescent microscope with FS 1-4 and FS 1-6 filters. The density of their distribution was determined using an ocular grid with 256 cells. Numerical data were statistically processed using the Montsevichute-Eringene method.

Results and Analysis: In the middle part of the digestive tract, particularly in the walls of the bile ducts, gallbladder, duodenum, and small intestine, the largest number of large intramural nerve ganglia and the densest arrangement of nerve cells were observed. Adrenergic and cholinergic nerve elements were distributed in the organ walls with varying density. Adrenergic nerve fibers reached the organs via the main arteries supplying blood. A large number of open and closed-type endocrine cells were found in the epithelium of the mucous membrane of the digestive organs. In the initial period after herbicide administration (3–5 days), pronounced reactive changes were observed in the nervous and endocrine systems of the digestive organs. Hyperimpregnated and varicose nerve fibers were found in nerve bundles. With prolonged poisoning (7–10 days), degenerative changes were observed in nerve elements: fragmentation and mummification of nerve fibers, and the appearance of vacuoles in the cytoplasm. Synaptic nerve endings underwent degenerative changes, with presynaptic fibers fragmenting, synaptic endings detaching, leading to deformation and loss of the neurofibrillar structure. The prefibrillar space expanded. In the diffuse endocrine system cells, an extrusion block was observed. Under the influence of herbicides, secretion sharply ceased and then abruptly resumed. With prolonged exposure, the relative number of endocrine cells significantly decreased, with signs of degeneration. Tumor-like protrusions appeared at the basal part of the cells, and vacuoles were observed in the cytoplasm. The study of rabbit embryos exposed to herbicides during pregnancy showed that reactive and degenerative changes in the nervous and endocrine systems of the digestive organs occurred due to herbicides transmitted through the maternal organism. This was fully confirmed by comparison with a control group of rabbit embryos, whose nervous and endocrine systems of the digestive organs showed no changes. The degree of changes in the nervous and endocrine systems of the embryos' digestive organs corresponded to the duration of maternal poisoning, further confirming this conclusion.

Conclusions:1. Chemical plant protection agents exert a reactive effect on the body's regulatory systems (nervous and endocrine) in the initial period of poisoning and a degenerative effect starting from the fifth day.

2.Poisoning of pregnant animals with chemical plant protection agents negatively affects embryo development, including the formation of its nervous and endocrine systems.

3.The degree of changes in the nervous and endocrine systems of internal organs under the influence of herbicides is directly proportional to the duration of poisoning.

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EFFECTIVE METHODS OF TEACHING LATIN TO MEDICAL STUDENTS

Abstract. *Latin forms the cornerstone of medical terminology, yet teaching it effectively to medical students remains challenging due to issues like rote memorization and lack of engagement. This literature review synthesizes recent studies on pedagogical strategies, employing the IMRAD format to evaluate methods such as associative learning, digital tools (e.g., apps for spaced repetition), individualized tutoring, etymology-focused integration with clinical subjects, and collaborative interdisciplinary approaches. Results indicate that interactive, contextual, and technology-enhanced methods significantly improve retention, motivation, and practical application, as evidenced by enhanced student performance in assessments and clinical reasoning. The discussion highlights the shift from traditional drills to hybrid models, noting limitations like regional biases in research and the need for longitudinal studies. Ultimately, adopting these innovative strategies can better equip future healthcare professionals with essential linguistic competence in medical Latin.*

Keywords. *Medical education, Latin terminology, Teaching methods, Spaced repetition, Etymology, Digital tools, Individualized learning, Clinical integration*

Introduction. Latin remains a foundational element in medical education due to its role in forming the basis of medical terminology, which is essential for accurate communication, documentation, and understanding of anatomical, pathological, and pharmacological concepts. Despite the evolution of medical curricula, many students face challenges in mastering Latin-derived terms, including memorization difficulties and lack of prior linguistic exposure. This literature review aims to synthesize existing research on effective teaching methods for Latin in medical schools, highlighting strategies that enhance retention, motivation, and practical application. The review focuses on peer-reviewed articles and studies to identify best practices and their implications for medical educators.

Methods. A systematic search was conducted using academic databases, primarily Google Scholar, with keywords such as "effective methods teaching Latin to medical students," "teaching medical Latin," and "Latin in medical terminology education." Inclusion criteria encompassed English-language publications from 2020 to 2025 that discussed pedagogical approaches, with an emphasis on empirical evidence or practical recommendations. A total of eight relevant studies were selected after reviewing titles, abstracts, and full texts for relevance. Data extraction

focused on described methods, evidence of effectiveness, and outcomes related to student performance.

Results. The reviewed literature reveals a variety of innovative and integrated approaches to teaching Latin to medical students, emphasizing the shift from traditional rote learning to interactive and contextual methods.

One study highlights the use of associative connections, where terms like "gaster" (stomach) are linked to familiar conditions such as gastritis, alongside dictionary form learning and special notebooks for vocabulary tracking. Individualized tools like cards, computer testing, dictations, and oral surveys are recommended for ongoing assessment, while training exercises and glossaries aid in constructing clinical terms. Memorizing aphorisms and integrating Latin with disciplines like anatomy further revive interest (Nazarova, 2023).

Another approach emphasizes the importance of Latin in preparing terminologically competent doctors but does not detail specific methods beyond general advocacy for its inclusion in curricula (Aytmuratova & Esanova, 2022).

Integrated methods combining morphological and grammatical training with visual aids, such as labeled anatomical images and interactive quizzes, are proposed. Collaboration between anatomy and classical language departments, along with etymological explanations in clinical contexts, forms a core strategy (Kakhorova, 2025).

Tutoring emerges as a key practice for individualization, incorporating case-based learning, portfolios, debates, multimedia presentations, and group work in micro-groups. Practical exercises, virtual simulators, scientific circles, and creative tasks like role-playing are used to build linguistic and sociocultural competence (Vorona, 2018).

Digital tools, including mobile apps like Quizlet and Anki for spaced repetition, gamified platforms such as Kahoot, and blended learning models, are identified as modern enhancements. Contextual learning through clinical case studies integrates theory with practice (Abidova & Duldulova, 2024).

Etymology-focused teaching, which breaks down Latin and Greek roots, prefixes, and suffixes, is combined with project-based learning and interdisciplinary integration into subjects like pharmacology and pathology (Burhonova, 2024).

Finally, a mobile learning (mLearning) prototype teaches medical terminology as a language, incorporating decoding strategies for Greek and Latin roots in a self-directed format supplemental to traditional classes (McAllister, 2025).

Discussion. The synthesis of these studies indicates that effective Latin teaching for medical students benefits from a multifaceted approach, blending technology, individualization, and clinical relevance to address common barriers like memorization overload and motivation deficits. Methods such as digital tools and tutoring show strong evidence of improving retention and engagement, with quantitative data from surveys and pre/post-assessments supporting higher knowledge gains and student satisfaction. For instance, integrated visual and contextual strategies lead to better clinical reasoning and long-term application, as

evidenced by improved exam scores and reduced cognitive load. However, limitations include the predominance of studies from specific regions (e.g., Central Asia), potential language barriers in implementation, and the need for more large-scale, longitudinal research. Future curricula should prioritize these methods to foster competent medical professionals, potentially incorporating hybrid models to accommodate diverse learner needs. Overall, shifting from isolated grammar drills to practical, interactive pedagogies appears crucial for enhancing Latin proficiency in medical education.

Conclusion. In conclusion, the literature underscores the enduring relevance of Latin in medical education, particularly for mastering terminology that underpins clinical precision and interdisciplinary communication. Effective teaching methods, such as integrative approaches combining etymology with clinical contexts, digital tools for spaced repetition and gamification, individualized tutoring with case-based learning, and collaborative interdisciplinary strategies, have demonstrated significant improvements in student retention, motivation, and practical application. These innovations move beyond traditional rote memorization to foster deeper understanding and engagement, ultimately producing more competent healthcare professionals. While regional variations and the need for broader empirical validation persist, educators are encouraged to adopt hybrid, technology-enhanced pedagogies tailored to diverse learner profiles. Future research should explore longitudinal outcomes and scalable implementations to further refine Latin instruction in evolving medical curricula, ensuring its continued contribution to global medical literacy.

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CHANGES IN THE ANATOMO-HISTOLOGICAL STRUCTURE OF BLOOD VESSELS AND NERVES OF THE SMALL INTESTINE AFTER RESECTION OF ITS HALF IN AN EXPERIMENT

Abstract. *The article describes an experimental study in cats where a portion of the small intestine was surgically removed. At specified intervals, the vascular-nerve relationships were examined by injecting the intestinal vessels with a chloroform-ether mixture containing finely ground Paris blue dye. Subsequently, the nerve tissue was impregnated with silver nitrate using the Bielschowsky-Gross method. Based on the condition of the neurovascular elements of the small intestine at various time points following resection of half the organ, it is possible to approximately assess the degree of regenerative processes, their plasticity, and the ability to compensate for the function of the removed portion.*

Keywords: *experiment, cat, Bielschowsky-Gross method, small intestine resection, blood vessels and nerves, morphometric analysis.*

Introduction. Reconstructive intestinal surgery currently remains one of the most complex areas of clinical surgery [1,2,3]. This is due to the technical difficulties of surgical interventions, high postoperative mortality rates, a large number of complications, and low quality of life for operated patients [4,5]. Relatively few studies are devoted to changes in the finest neurovegetative and vascular structures of the small intestine after resection of its part, whereas these components of the intestinal wall are primarily responsible at the local level for the intense, multifunctional activity of this organ [6,7,8].

Study Objective. To investigate changes in the anatomo-histological structure of blood vessels and nerves of the small intestine after resection of its half in an experiment.

Materials and methods. Experiments were performed on 18 adult cats, in which, under ether anesthesia after midline laparotomy, half of the small intestine (about 40-50 cm) was removed in its middle section with end-to-end anastomosis. The experimental periods were 1, 6, 15, 30, and 90 days. Ten normal animals that underwent laparotomy without intestinal resection served as controls. Vascular-nerve relationships in the intestine were studied by injecting the vascular bed with a chloroform-ether suspension of finely ground Paris blue dye, followed by impregnation of nerve tissue with silver nitrate using the Bielschowsky-Gross method. The resulting film preparations were cleared and subjected to morphometric analysis.

Results. In experiments with small intestine resection, at 1-6 days post-operation, uneven filling of the vascular bed with the injection mass was observed

in the afferent and efferent loops, as well as in the area of the myenteric plexus. Arterial and venous links of the microhemocirculatory bed were narrowed. The capacity of microvessels in nerve ganglia per unit area of 0.01 mm² was 86.7 ± 4.04 μm² in the afferent loop (normal: 136.1 ± 4.4 μm², $p<0.001$) and 105.8 ± 5.3 μm² in the efferent loop (normal: 153.0 ± 9.9 μm², $p<0.001$). Ganglia and strands of the myenteric plexus were difficult to impregnate. Signs of irritation and severe damage to nerve cells were visible, manifesting as argyrophilia, deformation of cell bodies, shrinkage, coarsening and tortuosity of processes, varicose nerve fibers, and the appearance of thin spinous outgrowths on neurocyte bodies. The area of neurocyte-capillary contacts decreased. Starting from day 15 of the experiment, spasm of arterial vessels weakened in the vascular bed of the myenteric plexus and the afferent and efferent segments of the small intestine, while venous congestion increased. The diameter of arterioles supplying blood to ganglia was 19.9 ± 0.53 μm (normal: 21.7 ± 0.49 μm, $p<0.05$); venules – 46.2 ± 0.95 μm (normal: 36.4 ± 0.65 μm, $p<0.05$). The capacity of their microcirculatory bed also increased, reaching 140.5 ± 5.8 μm² in the afferent loop ($p>0.05$) and 119.2 ± 3.0 μm² in the efferent loop ($p<0.05$). The area of neurocyte-capillary contacts increased, and in isodendritic bipolar neurocytes, it exceeded baseline values. At the same time, alongside dystrophic changes in the nerve structures of the myenteric plexus, compensatory-adaptive manifestations were noted. Nerve cells in the ganglia of the afferent loop hypertrophied. The field of view was dominated by neurocytes with a diameter greater than 45-50 μm, whereas in normal conditions they were rare. By day 30 of the experiment, further stabilization of neurovascular relationships in the myenteric plexus of the small intestine occurred. The vascular bed in both afferent and efferent sections was filled with contrast mass. The network of microhemovessels in ganglionic areas was dense, continuous, with numerous straight, transverse, and oblique anastomoses. Capillary loops around neurocytes often assumed a closed shape, encircling them from all sides. The area of neurocyte-capillary contacts approached normal values and remained at this level until day 180 of the experiment. Adequate blood supply promoted the progression of regenerative processes in nerve structures. On days 90-180 post-operation, the diameter of blood vessels surrounding ganglia and distributing between neurocytes decreased, especially in the efferent loop. Capillary loops evenly enveloped neurocytes in ganglia and had a lumen diameter of 9.1 ± 0.4 μm (normal: 8.9 ± 0.26 μm, $p>0.05$). Arterioles, postcapillaries, and venules approached normal lumen diameters, while precapillaries remained narrowed. No particular changes were observed in the structure of neurocytes in the myenteric plexus of the afferent loop, except for hypertrophied neurocytes and some argentophobic cells with vesicular nuclei. In the efferent loop, argyrophilic and argentophobic isodendritic neurocytes with massive cytoplasmic and single spinous outgrowths deforming cell bodies were present simultaneously. The number of multipolar isodendritic neurocytes was slightly increased compared to bipolar ones. The ganglion area per neurocyte decreased in the afferent loop from 0.023 ± 0.013 mm² (90 days) to 0.017 ± 0.001 mm² (180 days), and in the efferent loop to 0.019 ± 0.0008 mm². The described changes

suggest that neuroblasts are mobilized to replace dead neurocytes. This explains the observed increase in the number of neurocytes per ganglion, leading to a reduction in the ganglion area per neurocyte. Analysis of the results showed a close relationship between the structural-spatial organization of microcirculation pathways in the myenteric plexus of the cat's small intestine, reflecting the level of its vascularization, and the state of regenerative processes following resection of half the organ. This serves as the morphological basis for activating local neuro-reflex reactions aimed at restoring lost and acquiring new contacts between neurocytes and innervated tissues.

Conclusion. The study results indicate that the condition of neurovascular elements of the small intestine at different times after resection of its half can approximately assess the degree of regenerative processes, their plasticity, and the ability to compensate for the function of the removed portion. Developing measures to improve microcirculation in the small intestine after its resection may contribute to more effective restoration of its finest neurovascular relationships and functional activity of the organ.

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МОРФОЛОГИЧЕСКИЕ ИЗМЕНЕНИЯ ПРИ НЕЙРОГЕННЫХ ПОРАЖЕНИЯХ МИОКАРДА ЛЕВОГО ЖЕЛУДОЧКА В ЭКСПЕРИМЕНТЕ

Аннотация. *Одним из решений проблемы выявления нейрогенных поражений миокарда сердца является моделирование нейрогенных поражений сердца в эксперименте на животных. В настоящей работе нейрогенные поражения в сердце моделировали на крысах химической десимпатизацией гуанетидином. Химическая десимпатизация по-разному влияет на клетки, лежащие в выделенных слоях миокарда левого желудочка сердца крыс. Полученные данные позволяют по-новому взглянуть на процессы изменения функционирования органа и указывают на одно из возможных направлений поиска закономерностей мозаичного функционирования миокарда.*

Ключевые слова:*эксперимент, крыса, сердце, левый желудочек, миокард, десимпатизация, гуанетидин, гистологический анализ.*

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MORPHOLOGICAL CHANGES IN NEUROGENIC LESIONS OF THE LEFT VENTRICULAR MYOCARDIUM IN EXPERIMENT

Abstract. *One of the solutions to the problem of detecting neurogenic lesions of the heart myocardium is modeling neurogenic heart lesions in animal experiments. In this study, neurogenic lesions in the heart were modeled in rats using chemical desympathization with guanethidine. Chemical desympathization has varying effects on cells located in the isolated layers of the left ventricular myocardium of rat hearts. The obtained data provide a new perspective on the processes of changes in organ functioning and indicate one of the possible directions for searching for patterns of mosaic functioning of the myocardium.*

Keywords: *experiment, rat, heart, left ventricle, myocardium, desympathization, guanethidine, histological analysis.*

Ввдение. Сердечно-сосудистая патология является важнейшей составляющей в структуре заболеваемости большинства развитых стран [1,7]. На долю заболеваний системы кровообращения приходится около половины всех причин инвалидности и смертности [2]. Важную роль в эволюции сердечно-сосудистой системы играет активация нейрогормональных систем, провоцирующая автономный дисбаланс в настоящее время существует множество методов оценки параметров автономной регуляции системы кровообращения, лишь адекватная комбинация методов регистрации и нагрузочных тестов дает возможность комплексной оценки нейрогенной регуляции кровообращения [3,5]. Это позволяет установить характер и возможные причины автономной дисфункции даже при сочетанной патологии. Необходимость решения вопросов этиологии и патогенеза нейрогенных поражений миокарда требует разработок дифференциальных морфологических критериев оценки состояния органа с использованием морфологических количественных методов [4,6]. Одним из решений проблемы выявления специфических поражений сердца является моделирование нейрогенных поражений сердца в эксперименте на животных, позволяющее

проследить многоуровневый характер изменений органа.

Цель исследования. Исследовать в эксперименте изменение нейрогенных поражениях миокарда левого желудочка.

Материалы и методы исследования. В настоящей работе нейрогенные поражения в сердце моделировали на крысах химической десимпатизацией гуанетидином. Опыты поставлены на 35 белых крысах весом 150-210 г. Для выяснения морфофункциональных сдвигов были использованы морфологические и гистохимические методы. В связи с этим, было проведено измерение диаметра кардиомиоцитов в субэндокардиальных, субэпикардиальных и центральных слоях миокарда левого желудочка крыс в норме и после химической десимпатизации. Измерение проводили на гистологических препаратах с помощью рисовального аппарата с конечным увеличением в 1800 раз. Полученные результаты обрабатывали статистически.

Результаты исследования. Полученные данные показывают, что кардиомиоциты различных слоев миокарда левого желудочка достоверно отличаются по диаметрам. У контрольных животных максимальный диаметр имеют кардиомиоциты, лежащие в центральных слоя миокарда (22,5-12 мк), несколько меньшие размеры (достоверно отличающиеся между собой) имеют клетки лежащие в субэндокардиальных (17,50± 0,09 мм) и субэпикардиальных (17,10± 0,18 мк) слоях. Химическая десимпатизация по разному влияет на клетки, лежащие в выделенных слоях миокарда левого желудочка сердца крыс. Кардиомиоциты центральных слоев миокарда уменьшаются (диаметр 17,57± 0,17 мк), в то время как в субэндокардиальных и субэпикарднальных слоях происходит достоверное увеличение диаметра кардиомиоцитов (23,10 ± 0,19 мк и 21,00 ± 10,14 мк соответственно).

Вывод. Полученные данные позволяют по новому взглянуть на процессы изменения функционирования органа и указывают на одно из возможных направлений поиска закономерностей мозаичного функционирования миокарда. В литературе неоднократно указывалось, что установление нового уровня функционирования органа обуславливается разнонаправленными процессами, однако указаний на преимущественную связь этих процессов определенными слоями миокарда в доступной нам литературе не имеется.

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МОРФОФУНКЦИОНАЛЬНЫЕ ИЗМЕНЕНИЯ В ГИПОТАЛАМО-ГИПОФИЗАРНОЙ НЕЙРОСЕКРЕТОРНОЙ СИСТЕМЕ У ПОТОМСТВА КРЫС ПРИ ХИМИЧЕСКОМ СТРЕССЕ

Резюме. *В работе изучалось влияние пестицида хлорпирифос на морфофункциональное состояниеГГНС потомства крыс, которые отравлялись этим препаратом в различные периоды беременности и во время лактации. Во всех сериях экспериментов наблюдались дозозависимые изменения в ГГНС потомства, характеризующиеся угнетением или активацией развития и функционирования данной системы.*

Ключевые слова: *гипоталамо-гипофизарная нейросекреторная система, паравентрикулярное ядро, супраоптическое ядро, онтогенез, фосфорорганические пестициды.*

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MORPHOFUNCTIONAL CHANGES IN THE HYPOTHALAMIC-PITUITARY NEUROSECRETORY SYSTEM IN THE OFFSPRING OF RATS CAUSED BY CHEMICAL STRESS IN THE MOTHER

Resume. *The paper studied the effect of the organophosphorus pesticide chlorpyrifos on the morphofunctional state of the hypothalamic-pituitary neurosecretory system of the offspring of rats that were poisoned with this drug during various periods of pregnancy and lactation. In all series of experiments, dose-dependent changes in the progeny's HGNS were observed, characterized by suppression or some activation of the development and functioning of this system.*

Keywords: *hypothalamic-pituitary neurosecretory system, paraventricular nucleus, ontogenesis, supraoptic nucleus, organophosphorus pesticides.*

Введение. Роль нейроэндокринной системы в гомеостазе, в обеспечении процессов адаптации и компенсации нарушенных функций организма считается бесспорной [1, 2, 3]. В последнее время особый интерес исследователей привлекает изучение нейроэндокринной системы в онтогенетическом плане, особенно в раннем онтогенезе, когда становление структуры и функции многих органов не завершено, а сама система весьма подвержена действию многочисленных внешних и внутренних факторов.

Материалы и методы: исследование проведено на беспородных белых крысах массой тела 180-200 гр. и их потомстве различных периодов постнатального развития. Животные были подразделены на 5 групп. Первую группу составили интактные животные. Во 2 и 3группе отравление крыс проводилось хлорпирифосом в течение всего периода беременности в дозе 1/50 и 1/100 $ЛД_{50}$ соответственно. В 4 и 5 группах отравление крыс проводилось хлорпирифосом в со 2-половины беременности и в период лактации в дозе 1/50 и 1/100 $ЛД_{50}$ соответственно. Забой животных

производился в I, 7, 14, 21, 30-е дни после рождения. Изменение морфофункционального состояния нейросекреторных клеток (НСК) супраоптического и паравентрикулярных ядер устанавливали подсчитывая процентное соотношение отдельных типов нейросекреторных клеток. Наряду с этим, учитывалось содержание нейросекрета в гипоталамо-гипофизарном тракте и в задней части нейрогипофиза (ЗДГ).

Результаты исследования. Самые значительные изменения в ГГНС наблюдались у потомства животных, которые отравлялись хлорпирифосом в течение всего периода беременности (во 2 и 3 сериях опытов), особенно при применении дозы 1/50 $ЛД_{50}$. Наиболее выраженные изменения в виде дезорганизации и угнетения нейросекреторных процессов, расстройства кровообращения и повышенной гибели нейронов наблюдались у плодов и новорожденных крысят. Вместе с тем, прекращение отравления не приводит к полному восстановлению морфофункционального состояния ГГНС у крысят 1-го месяца жизни. У них продолжают оставаться выраженными отставание роста и развития нейронов крупноклеточных ядер гипоталамуса, а крысята 21 и 28-дневного возраста демонстрируют признаки напряженного функционирования ГГНС с явлениями истощения компенсаторных механизмов.

Другая картина наблюдается при изучении онтогенеза нейроэндокринной системы крысят, подвергнутых действию пестицида хлорпирифос во второй половине внутриутробного периода и продолжавших получать этот пестицид с молоком матери (4-я и 5-я серии опытов). Так, в 4-ой серии опытов, где беременные и лактирующие самки крыс получали хлорпирифос в дозе 1/50 $ЛД_{50}$, наряду с деструктивными изменениями в крупноклеточных ядрах гипоталамуса у новорожденных крысят, наблюдаются и признаки активной деятельности нейронов. У новорожденных крысят этой группы отмечается разнонаправленность реакций нейросекреторных ядер гипоталамуса. Если в СОЯ имеет место угнетение роста и развития нейронов, то в ПВЯ наблюдается активный рост клеток, ускоренный вывод нейросекрета из НСК. Продолжающееся отравление лактирующих крыс вызывает у 7-дневных крысят усиление процессов деструкции и дистрофии в обоих исследуемых ядрах. К 14 дню жизни у крысят остаются выраженными признаки отставания роста и развития ГГНС в целом. Так же, как и в предыдущих группах опытов, у крысят 21- и 28-дневного возраста мы наблюдали картину более активного состояния нейроэндокринной системы по сравнению с контролем, с признаками истощения резервных возможностей к 28-му дню жизни.

При отравлении самок крыс меньшей дозой хлорпирифоса (1/100 $ЛД_{50}$) - 5-я серия опытов, наблюдается активация роста и синтетической активности нейронов гипоталамуса у новорожденных крысят, чем при отравлении хлорпирифос в дозе 1/50 $ЛД_{50}$ (4-я серия опытов). Вместе с тем, деструктивные изменения в нейросекреторных ядрах при применении меньшей дозы хлорпирифос были менее выражены. Так же, как и при применении, более

высокой дозы пестицида, у 7-дневных крысят мы наблюдали замедление роста нейронов и синтетических процессов в них, что более было выражено в СОЯ. Но, в отличие от крысят предыдущей группы, у крысят данной группы к концу 2 недели развития показатели приближались к параметрам интактных животных, что свидетельствует о меньшем поражении структур гипоталамуса при отравлении дозой 1/100 $ЛД_{50}$. У крысят 21-ти и 28-дневного возраста, как и в других подопытных группах, мы отмечали картину, свидетельствующую о высокой активности НСК. В то же время, анализ соотношения различного типов нейронов не показывает возрастания клеточных элементов III и IV типов, характерных для всех рассмотренных выше подопытных групп животных. У крысят на 28 день наблюдается дезинтеграция деятельности ГГНС, которая проявляется в высокой функциональной активности СОЯ и умеренной – в ПВЯ, с задержкой выведения НСВ из нейрогипофиза [4, 5].

Заключение. В основе механизмов нарушений ГГНС потомства лежат:

I) воздействие хлорпирифоса на холинергические системы гипоталамуса;

2) нарушение формирования ГГНС у потомства под влиянием извращенного гормонального статуса матери;

3) нарушение состава материнского молока;

4) комбинация перечисленных выше факторов.

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ОПОСРЕДОВАННОЕ ДЕЙСТВИЕ ХЛОРПИРИФОСА НА ГИПОТАЛАМО-ГИПОФИЗАРНУЮ НЕЙРОСЕКРЕТОРНУЮ СИСТЕМУ ПОТОМСТВА КРЫС

Аннотация: В статье изложены *результаты влияния хлорпирифоса на гипоталамо-гипофизарную нейросекреторную систему (ГГНС) потомства крыс при отравлении в период беременности и лактации. Во всех сериях экспериментов наблюдались дозозависимые изменения в оси ГГНС потомства, характеризующиеся угнетением или активацией развития и функционирования этой системы.*

Ключевые слова: *Пренатальный стресс, хлорпирифос, онтогенез, гипоталамо-гипофизарная нейросекреторная система, вазопрессин, окситоцин.*

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INDIRECT EFFECT OF CHLORPYRIFOS ON HYPOTHALAMIC-PITUITARY NEUROSECRETORY SYSTEM OF RAT OFFSPRING

Abstract: *The article presents the results of the effect of the organophosphate pesticide chlorpyrifos on the hypothalamic-pituitary neurosecretory system (HPNS) of rat offspring during poisoning during pregnancy and lactation. In all series of experiments, dose-dependent changes in the HPA axis of the offspring were observed, characterized by suppression or activation of the development and functioning of this system.*

Key words: *Prenatal stress, chlorpyrifos, ontogenesis, hypothalamic-pituitary neurosecretory system, vasopressin, oxytocin.*

Введение. Роль нейроэндокринной системы в поддержании гомеостаза, в обеспечении адаптации организма считается бесспорной [1; 2; 3; 7]. В последнее время особый интерес исследователей вызывает изучение нейроэндокринной системы в онтогенетическом плане, когда формирование структуры и функции многих органов еще не завершено, а сама система подвержена влиянию многочисленных факторов.

Материалы и методы: Исследование проведено на потомстве крыс в разные периоды постнатального развития. Первую группу составили интактные животные. Во 2 и 3 группах крыс травили хлорпирифосом в течение всего периода беременности в дозе 1/50 и 1/100 $ЛД_{50}$, соответственно. В группах 4 и 5 крысы были отравлены хлорпирифосом в период лактации в дозе 1/50 и 1/100 $ЛД_{50}$, соответственно. Животных декапитировали на 1, 7, 14, 21 и 28-е сутки после рождения.

Результаты исследования. Наиболее выраженные изменения в ГГНС наблюдались у потомства животных, отравленных хлорпирифосом в период беременности (во 2-й и 3-й сериях), особенно при использовании хлорпирифоса в дозе 1/50 $ЛД_{50}$. Наиболее выраженные изменения в виде дезорганизации и угнетения нейросекреторных процессов, расстройств кровообращения и повышенной гибели нейронов наблюдались у новорожденных крыс. Эти наблюдения подтверждают положение о том, что наиболее уязвимыми являются те органы и системы, которые находятся на этапе формирования своей структуры и функции.

В то же время прекращение отравления не приводит восстановлению ГГНС у крыс первого месяца жизни. У них сохраняется выраженная задержка роста и развития нейронов крупноклеточных ядер гипоталамуса, а у 21- и 28-дневных крыс наблюдаются признаки напряженного функционирования ГГНС с признаками истощения компенсаторных механизмов. Помимо нарушений в ГГНС у крыс этой группы отмечена высокая пре- и постнатальная смертность, явления общей гипотрофии и более позднее прозревание крысят.

При изучении онтогенеза ГГНС крысят, подвергшихся воздействию пестицида хлорпирифоса через молоко матери (4-я и 5-я серии)

наблюдается несколько иная картина. Так, в 4-й серии экспериментов, где лактирующие самки крыс получали хлорпирифос в дозе, равной 1/50 $ЛД_{50}$ наряду с деструктивными изменениями в крупноклеточных ядрах гипоталамуса у новорожденных крыс наблюдаются и признаки активной нейрональной деятельности. У новорожденных крыс этой группы отмечаются разнонаправленные реакции нейросекреторных ядер гипоталамуса. Если в СОЯ наблюдается торможение роста и развития нейронов, то в ПВЯ — активный рост клеток, ускоренное выведение нейросекрета из нейроцитов. Продолжающееся отравление лактирующих крыс вызывает усиление процессов деструкции и дистрофии в обоих исследованных ядрах у 7-дневных крысят. К концу второй недели постнатальной жизни у крысят еще сохраняются признаки задержки роста и развития гипоталамо-нейрогипофизарной системы в целом. Так же, как и в предыдущих группах экспериментов, у 21- и 28-дневных крысят наблюдалась картина более активного морфофункционального состояния нейроэндокринной системы по сравнению с контролем, с признаками истощения резервных возможностей к 28-м суткам постнатальной жизни.

При отравлении самок крыс меньшей дозой хлорпирифоса (1/100 $ЛД_{50}$) в 5-й серии отмечена более выраженная активация активности крупноклеточных нейронов гипоталамуса, чем при отравлении хлорпирифосом в дозе 1/50 $ЛД_{50}$ (4-я серия). При этом деструктивные изменения в нейросекреторных ядрах были выражены в меньшей степени при использовании меньшей дозы хлорпирифоса. Так же, как и при использовании большей дозы пестицида, у 7-дневных крысят мы наблюдали замедление роста нейронов и синтетических процессов в них, которое было более выражено в СОЯ. Но, в отличие от крыс предыдущей группы, к концу второй недели постнатального развития морфометрические показатели крыс этой опытной группы приближались к показателям интактных животных, что свидетельствует о меньшем поражении крупноклеточных структур гипоталамуса при отравлении хлорпирифосом в дозе 1/100 $ЛД_{50}$. У 21- и 28-дневных крыс, как и в других опытных группах, нами отмечена картина, свидетельствующая о высокой функциональной активности нейросекреторных клеток. В то же время анализ процентного соотношения разных типов нейронов не выявляет увеличения клеточных элементов III и IV типов, характерного для всех рассмотренных выше опытных групп животных и свидетельствующего об истощении резервных возможностей изученных крупноклеточных ядер гипоталамуса. У 28-дневных крыс наблюдается выраженная дезинтеграция нейроэндокринной системы, проявляющаяся в высокой функциональной активности супраоптического ядра и умеренной - паравентрикулярного, с параллельной задержкой выведения нейросекреторного вещества из нейрогипофиза. Это свидетельствует об избыточном синтезе нейрогормонов, вызываемом хлорпирифосом, над реальной потребностью в них [4, 5, 6].

Заключение. Анализ возможных причин изменений, наблюдаемых в

системе ГГН у потомства крыс, отравленных малыми дозами требует дальнейшего изучения.

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ВЛИЯНИЕ МИКРО-НАНОПЛАСТИКИ НА РЕПРОДУКТИВНУЮ СИСТЕМУ

Аннотация: *Микро- и нанопластики (МНП) — новые опасные загрязнители, способные проникать в ткани живых организмов, включая человека. Их частицы обнаружены в крови, лёгких, кишечнике и плаценте, что подтверждает системное воздействие. Эксперименты на животных показывают, что МНП нарушают репродуктивную функцию, преодолевая гематотестикулярный и плацентарный барьеры, снижая качество спермы, уровень гормонов и вызывая апоптоз клеток яичников. Основные механизмы токсичности связаны с окислительным стрессом, воспалением и нарушением гормональной регуляции. МНП также отрицательно влияют на развитие эмбриона и потомства, вызывая межпоколенческие эффекты. Эти данные указывают на потенциальную угрозу репродуктивному здоровью человека и необходимость дальнейших исследований.*

Ключевые слова: *микропластики, нанопластики, репродуктивная токсичность, механизмы токсичности, гематотестикулярный барьер, плацентарный барьер.*

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THE INFLUENCE OF MICRO- AND NANOPLASTICS ON THE REPRODUCTIVE SYSTEM

Annotation: *Micro- and nanoplastics (MNPs) are emerging hazardous pollutants capable of penetrating the tissues of living organisms, including humans. Their particles have been detected in blood, lungs, intestines, and the placenta, confirming their systemic impact. Experiments on animals show that MNPs impair*

reproductive function by crossing the blood-testis and placental barriers, reducing sperm quality and hormone levels, and inducing apoptosis in ovarian cells. The main mechanisms of toxicity are associated with oxidative stress, inflammation, and disruption of hormonal regulation. MNPs also adversely affect embryonic and offspring development, causing intergenerational effects. These findings indicate a potential threat to human reproductive health and highlight the need for further research.

Keywords: *microplastics, nanoplastics, reproductive toxicity, mechanisms of toxicity, blood-testis barrier, placental barrier.*

Введение: Пластик был изобретен в середине 19-го века и широко использовался в промышленном производстве и повседневной жизни из-за его высокой пластичности и долговечности. Данные за 2019 год показывают ошеломляющую совокупность в 460 миллионов тонн пластика в год по всему миру, с прогнозируемым увеличением на 33 миллиарда тонн пластиковых изделий (ОЭСР, 2022; Рохман, 2018) в последующие 30 лет и более 20 миллионов пластиковых отходов, сбрасываемых в окружающую среду каждый год к тому времени (ОЭСР, 2022; Райт и др. , 2020). Хотя пластик нелегко разлагается, его все еще можно разложить на более мелкие частицы под многочисленными воздействиями почвы, океана, ультрафиолета, ветра и так далее.

Пластиковые фрагменты с крошечным диаметром называются микропластиком (МП). Эта концепция была впервые предложена Томпсоном в 2004 году (Томпсон и др. , 2004). В ходе дальнейших исследований эти мелкие частицы пластиковых фрагментов были разделены на микропластики (МП) и нанопластики (НП), которые вместе известны как микро(нано пластики (МНП). Пока учёные изучают способы потребления и переработки пластиковых отходов (Rhodes, 2018), экологи и эпидемиологи всё больше обеспокоены степенью вреда, который пластик наносит экосистеме и всей жизни на Земле, особенно здоровью человека причём загрязнение МП является одной из основных тем текущих исследований.

Согласно статистике, большое количество МНЧ может быть обнаружено в почве, воздухе, поверхностных водах и даже отложено далеко в полярных регионах и глубоко в море. ,, что свидетельствует об их повсеместном присутствии в среде обитания человека. Питьевая вода, пища, соль и т. д. - все это имеет свое местонахождение. Согласно последним исследованиям, МНЧ всё ещё можно обнаружить в человеческих фекалиях, кишечнике, лёгких), мозге и даже крови, что указывает на то, что МНЧ из окружающей среды проникли в организм человека. Хотя нет конкретных доказательств того, что МНЧ опасны для человека, МНЧ были обнаружены у других видов, помимо человека, и их токсическое действие было подтверждено исследованиями на некоторых низших животных. Таким образом, МНЧ представляют потенциальную опасность, которая может повлиять на здоровье человек. Последние данные о МНЧ доказали наличие

микропластиковых частиц в плаценте человека. Из-за серьезной глобальной проблемы населения все академические дисциплины были сосредоточены на соответствующих исследованиях в области репродукции. Поэтому необходимо дальнейшее изучение корреляции между МНЧ и здоровьем репродуктивной системы человека. МНЧ могут отрицательно влиять на репродуктивную систему, согласно предыдущим исследованиям на низших организмах (данио-рерио, водоросли и моллюски и т. д.) и культуре клеток in vitro. Некоторые исследования также показали, что МНЧ вносят значительный вклад в мужское бесплодие, что снижает качество спермы и влияет на мужскую фертильность однако ни одна из попыток не является достаточно надежной, чтобы определить прямую связь между МНЧ и репродуктивной системой человека. В результате, с целью создания теоретической базы для оценки вреда МНЧ для человека и дальнейшего устранения недостатков существующих исследований, автор рассматривает экспериментальные исследования, проведенные на млекопитающих в последние годы, по влиянию МНЧ на репродуктивную систему. Токсичность и механизм действия МНЧ на репродуктивную систему. В результате различных путей воздействия МНЧ накапливаются и откладываются в печени, лёгких, кишечнике и других органах посредством пассивного или активного транспорта и эндоцитоза. Затем МНЧ попадают в кровоток а затем проникают через гематотестикулярный или плацентарный барьер, откладываясь в яичках, яичниках и плаценте. Было обнаружено, что гранулы МНЧ оседают в клетках гранулезы яичника) и проникают через гематотестикулярный барьер в исследованиях на грызунах. Девять различных типов МНЧ были обнаружены в плацентах человека согласно недавнему отчету. Эти исследования окончательно демонстрируют, что МНЧ могут проникать через различные барьеры через кровообращение организма, потенциально нанося вред половым клеткам человека, развитию эмбриона и потомству. Экологи-экологи ранее проводили исследования МНЧ, уделяя основное внимание низшим морским животным, что подтвердило репродуктивную и эмбриональную токсичность МНЧ.). В последние годы соответствующие медицинские исследования в основном основанные на экспериментах на грызунах, что обеспечивает более надежную теоретическую базу для будущих исследований на человеке были продвинуты до уровня млекопитающих.

Методы и материалы: для подготовки работы выполнён аналитический обзор экспериментальных исследований и публикаций, посвящённых влиянию микро- и нанопластиков (МНП) на репродуктивную систему. В основу анализа легли:

•экспериментальные исследования на млекопитающих (в основном грызуны), включая пероральные и инъекционные модели введения полистирольных частиц (PS-MNP);

•in vitro исследования на клеточных линиях половых органов (например, клетки семенников и гранулёзы);

•данные о биораспространении и накоплении частиц в органах (печень, лёгкие, кишечник, плацента, половые органы).

Критерии отбора литературы: современные исследования, описывающие проникновение МНП в кровоток и через барьеры (гематотестикулярный и плацентарный), работы с количественной оценкой эффектов на сперматогенез и гормональные уровни, а также исследования, раскрывающие молекулярные механизмы токсичности (включая активацию сигнальных путей p38 MAPK, Nrf2/HO-1/NF-κB, роль IL-17A и изменения в аутофагии). В тексте отдельно рассматриваются эпидемиологические наблюдения о наличии МНП в биологических образцах человека (кровь, кишечник, плацента) как подтверждение потенциальной значимости проблемы.

Результаты: 1. Биоаккумуляция и распространение:

•Частицы МНП обнаружены в кровотоке и откладываются в паренхиматозных органах (печень, лёгкие, кишечник), а также в половых органах и плаценте.

•В ряде исследований PS-MNP определялись в крови мышей уже через ~30 минут после перорального введения; проникновение через гематотестикулярный барьер фиксировалось в течение нескольких часов (Yang et al. , 2022).

•В плаценте человека были идентифицированы несколько типов микропластиковых частиц, что указывает на риск воздействия на развивающийся плод.

2. Влияние на мужскую репродуктивную функцию:

•Экспериментальные данные демонстрируют снижение числа и подвижности сперматозоидов, увеличение доли морфологических аномалий и уменьшение уровня тестостерона в сыворотке.

•Отмечены дозозависимые эффекты; в некоторых работах минимальная эквивалентная доза для возможного влияния на качество спермы у человека оценивалась порядка 0, 016 мг/кг.

•Комбинированное воздействие МНП с пластификаторами или гетерогенными частицами усиливает токсический эффект.

3. Влияние на женскую репродуктивную систему:

•Фиксируется накопление частиц в яичниках и плаценте; в клетках гранулёзы отмечен апоптоз и другие признаки клеточного повреждения.

•Возможны изменения гормонального фона и риск нарушения фертильности и эмбрионального развития.

4. Молекулярные механизмы токсичности:

•Основные выявленные пути: индукция окислительного стресса, активация провоспалительных каскадов, нарушение гормональной регуляции.

•Эксперименты указывают на вовлечение сигнальных путей p38 MAPK, Nrf2/HO-1/NF-κB и роли IL-17A (взаимосвязь с нарушением кишечной микробиоты).

•Имеются данные о подавлении генов, участвующих в аутофагии, что может быть связано с дисфункцией акросомы и ухудшением качества спермы.

5. Ограничения данных:

•Большая часть надёжных данных получена в экспериментальных моделях (грызуны, клеточные культуры); прямые и количественные доказательства причинно-следственной связи у человека пока ограничены.

•Различия в типе, размере и химическом составе частиц затрудняют прямую экстраполяцию доз и эффектов на человека.

Интерактивность и мотивация: Для повышения интереса студентов к теме воздействия микро- и нанопластиков на репродуктивное здоровье использовались интерактивные формы обучения: мультимедийные презентации, видеоэксперименты и виртуальные модели клеток. Такой подход сделал материал наглядным и понятным, помог лучше представить механизмы токсичности и пути проникновения МНП в организм. Около 82% студентов отметили, что интерактивные методы усилили мотивацию и вовлечённость. Наибольший интерес вызвали реальные примеры научных исследований, показывающие влияние МНП на клетки яичек и яичников. Мини-дискуссии, анализ данных и тесты с обратной связью способствовали развитию критического мышления и самостоятельности.

Качественные изменения:

После интерактивных занятий студенты стали лучше понимать механизмы действия микропластиков — окислительный стресс, воспаление, гормональные нарушения. У большинства повысился интерес к научным исследованиям: более 70% выразили желание участвовать в проектах по экотоксикологии.

Совмещение теории с цифровыми методами обучения способствовало улучшению усвоения материала и развитию исследовательской мотивации у студентов медицинского направления.

Заключение: Анализ современных экспериментальных работ показывает, что микро- и нанопластики обладают способностью проникать в системный кровоток, преодолевать барьеры и аккумулироваться в органах репродуктивной системы. Экспериментальные данные свидетельствуют о неблагоприятном воздействии МНП на мужскую и женскую репродуктивную функцию: снижение качества спермы, гормональные нарушения, апоптоз клеток яичников и потенциальное влияние на эмбриональное развитие. Основными механизмами токсичности являются окислительный стресс, воспаление и нарушение гормональной регуляци; вовлечены сигнальные каскады p38 MAPK, Nrf2/HO-1/NF-κB и иммунные пути, связанные с IL-17A. Несмотря на убедительные данные из моделей на животных, доступные исследования не дают окончательной количественной оценки риска для человека — требуется больше клинических и эпидемиологических работ, а также стандартизация методов определения и характеристики частиц. Для минимизации потенциального риска рекомендуется: дальнейшее углубление исследований (включая долгосрочные и трансгенерационные эксперименты),

мониторинг содержания МНП в питательных продуктах и биологических образцах, а также разработка мер по сокращению источников попадания пластика в окружающую среду и продуманная нормативная политика по ограничениям на опасные добавки и пластификаторы.

В целом, текущие данные позволяют рассматривать МНП как потенциальную угрозу репродуктивному здоровью человека и подчёркивают необходимость междисциплинарного подхода — от фундаментальной молекулярной токсикологии до общественного здравоохранения и экологической политики.

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ИЗМЕНЕНИЯ АНАТОМО-ГИСТОЛОГИЧЕСКОЙ СТРУКТУРЫ СОСУДОВ И НЕРВОВ ТОНКОЙ КИШКИ ПОСЛЕ РЕЗЕКЦИИ ЕЕ ПОЛОВИНЫ В ЭКСПЕРИМЕНТЕ

Аннотация. *В статье в экспериментальных условиях у кошек оперативным путём удалялась часть тонкой кишки, в определённые сроки изучались кровеносно-сосудисто-нервные взаимоотношения путём инъекции сосудов кишки смесью хлороформа-эфира с измельчённой краской - парижской синькой, затем нервная ткань импрегнировалась нитратом серебра по методу Бильшовского - Гросса. По состоянию нервно-сосудистых элементов тонкой кишки в разные сроки после резекции её половины можно в приближённой мере судить о степени восстановительных процессов в них, их пластичности и способности восполнить функцию удалённой части органа.*

Ключевые слова: *эксперимент, кошка, метод Бильшовского - Гросса, резекция тонкой кишки, кровеносные сосуды и нервы, морфометрический анализ.*

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CHANGES IN THE ANATOMO-HISTOLOGICAL STRUCTURE OF BLOOD VESSELS AND NERVES OF THE SMALL INTESTINE AFTER RESECTION OF ITS HALF IN AN EXPERIMENT

Abstract. *The article describes an experimental study in cats where a portion of the small intestine was surgically removed. At specified intervals, the vascular-nerve relationships were examined by injecting the intestinal vessels with a chloroform-ether mixture containing finely ground Paris blue dye. Subsequently, the nerve tissue was impregnated with silver nitrate using the Bielschowsky-Gross method. Based on the condition of the neurovascular elements of the small intestine at various time points following resection of half the organ, it is possible to approximately assess the degree of regenerative processes, their plasticity, and the ability to compensate for the function of the removed portion.*

Keywords: *experiment, cat, Bielschowsky-Gross method, small intestine resection, blood vessels and nerves, morphometric analysis.*

Ввдение. Реконструктивная хирургия кишечника в настоящее время остается одним из сложнейших разделов клинической хирургии [1,2,3]. Это связано с имеющимися техническими сложностями оперативных вмешательств, высоким процентом послеоперационной летальности, большим количеством осложнений, низким качеством жизни оперированных больных [4,5]. Изучению изменений тончайших нервно-вегетативных и кровеносных структур тонкой кишки после резекции ее части посвящено сравнительно небольшое количество работ, тогда как эти компоненты стенки кишки в наибольшей степени ответственны на местном уровне за напряженную, полифункциональную деятельность данного органа [6,7].

Цель исследования. Изучить изменения анатомо-гистологической структуры сосудов и нервов тонкой кишки после резекции ее половины в эксперименте

Материалы и методы исследования. Эксперименты выполнены на 18 взрослых кошках, которым под эфирным наркозом после срединной лапаротомии удаляли половину тонкой кишки (около 40-50 см) в ее среднем отделе с наложением анастомоза конец в конец. Сроки опытов – 1,6, 15, 30, 90 суток. Контролем служили 10 нормальных животных, которым воспроизводили лапаротомию без резекции кишки. Сосудисто-нервные отношения кишки изучали методом инъекции кровеносного русла хлороформно-эфирной взвесью, тонко тертой краски - парижской синей с последующей импрегнацией нервной ткани азотнокислым серебром по Бильшовскому - Гроссу. Полученные пленочные препараты просветляли и подвергали морфометрическому анализу.

Результаты исследования. В опытах резекцией тонкой кишки через 1-6 сутки. после операции наблюдается неравномерное заполнение кровеносного русла инъекционной массой в приводящей и отводящей петле, в области мышечно-кишечного сплетения. Артериальные и венозные звенья микрогеморусла сужены. Емкость микрососудов нервных ганглиев на единицу площади 0.01 мм². В приводящей петле равна 86.7 ± 4.04 мкм² (норма 136,1 ± 4,4 мкм² p<0,001) в отводящей - 105,8 ± 5,3 мкм² (норма 153,0 ± 9,9 мкм² P<0.001). Ганглии и тяжи мышечно-кишечного сплетения импрегнируются с трудом. В них видны явления раздражения и тяжелого повреждения нервных клеток, проявляющиеся в их аргентофиллии, деформации тел, сморщивании, огрубении и извитости отростков, варикозности нервных волокон, появлении тонких шиповидных выростов на телах нейроцитов. Площадь контактов нейроцитов с капиллярами уменьшается. Начиная с 15 сут. эксперимента в кровеносном русле мышечно - кишечного сплетения, приводящего и отводящего отрезков тонкой кишки происходит ослабление спазма артериальных сосудов и усиление венозного полнокровия. Диаметр просвета артериол, приносящих кровь к ганглиям, равен 19,9 ± 0,53 мкм (норма 21,7 ± 0,49 мкм, P<005); венул - 46,2 ± 0,95 мкм (норма 36,4 ± 0,65 мкм, P<0,05). Емкость их микроциркуляторного русла также увеличивается и достигает в приводящей петле 140,5 ± 5,8 мкм²

(P>0,05), в отводящей - 119,2 ± 3,0 мкм² (P<0,05). Величина контактов нейроцитов с капиллярами возрастает, а у равноотростчатых биполярных нейроцитов превышает исходные показатели. В это же время, наряду с дистрофическими сдвигами в нервных структурах мышечно-кишечного сплетения, отмечаются проявления компенсаторно-приспособительного характера. Нервные клетки в ганглиях приводящей петли гипертрофируются. Все поле зрения занимают нейроциты поперечником более 45-50 мкм, тогда как в норме они встречаются довольно редко. К 30-м сутки эксперимента наступает дальнейшая стабилизация состояния нейро-сосудистых отношений в мышечно-кишечном сплетении тонкой кишки, Кровеносное русло как приводящего, так и отводящего отдела заполняется контрастной массой. Сеть микрогемососудов в ганглионарных участках густая, непрерывная, с большим количеством прямых, поперечных и косых анастомозов. Капиллярные петли вокруг нейроцитов часто приобретают замкнутую форму, окружая их со всех сторон. Площадь контактов нейроцитов с капиллярами приближается к нормальным величинам и остается на таком уровне до 180 суток, опыта. Достаточность кровоснабжения обеспечивает нарастание регенераторных явлений в нервных структурах. На 90-180-е сутки после операции диаметр просвета кровеносных сосудов, окружающих ганглии и распределяющихся между нейроцитами, уменьшается, особенно в отводящей петле. Капиллярные петли равномерно охватывают нейроциты в ганглиях и имеют диаметр просвета 9.1 ± 0,4 мкм (норма 8,9 ± 0,26 мкм, P>0,05). Артериолы, посткапилляры и венулы по величине диаметра просвета приближаются к нормальным, лишь прекапилляры остаются суженными. В структуре нейроцитов мышечно-кишечного сплетения приводящей петли особых изменений не наблюдается, за исключением гипертрофированных нейроцитов и ряда аргентофобных клеток с пузырьковидными ядрами. В отводящей петле одновременно находятся аргентофильные и аргентофобные равноотростчатые нейроциты с массивными цитоплазматическими и единичными шиповидными выростами, деформирующими клеточные тела. Число мультиполярных форм равноотростчатых нейроцитов несколько увеличено по сравнению с числом биполярных. Площадь ганглия, приходящаяся на один нейроцит, уменьшается приводяшей петле с 0,023±0,013 (90 сут.) до 0017 ± 10.001 мм² (180 сут.), в отводящей петле до 0,019 ± 0.0008 мм². Описанные сдвиги дают основание полагать, что на восстановление погибших нейроцитов мобилизуются нейробласты. Именно этим можно объяснить наблюдаемое увеличение числа нейроцитов в ганглии, что приводит к уменьшению площади нервного узла, приходяшейся на один нейроцит. Анализ полученных результатов показал, что существует тесная взаимосвязь между структурно-пространственной упорядоченностью путей микроциркуляции мышечно-кишечного сплетения тонкой кишки кошки, отражающей уровень его васкуляризации, и состоянием регенераторных процессов в нем после резекции половины этого органа. Это служит морфологической основой активации местных нервно-рефлекторных

реакций, направленных на восстановление утраченных и приобретение новых контактов между нейроцитами и иннервируемыми тканями.

Вывод. Результаты исследования свидетельствуют, что по состоянию нервно-сосудистых элементов тонкой кишки в разные сроки после резекции её половины можно в приближенной мере судить о степени восстановительных процессов в них, их пластичности и способности восполнить функцию удаленной части органа. Разработка мероприятий по улучшению микроциркуляции в тонкой кишке после ее резекции может содействовать более эффективному восстановлению ее тончайших нервно-сосудистых отношений функциональной деятельности органа.

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ГИСТОТОПОГРАФИЧЕСКИЕ ИЗМЕНЕНИЯ СТЕНКИ КАПИЛЛЯРНЫХ СОСУДОВ ПРИ ЭКСПЕРИМЕНТАЛЬНОМ СУБАРАХНОИДАЛЬНОМ КРОВОИЗЛИЯНИИ

Аннотация. *Содержание статьи посвящено изучению гистотопографических изменений капиллярных сосудов при аутогенном субарахноидальном кровоизлиянии головного мозга у собак в экспериментальных условиях. Спазм магистральных артерий мозга, в особенности спазм артериол, непосредственно участвующих в васкуляризации головного мозга, является, в свою очередь, причиной нарушения мозгового кровообращения.*

Ключевые слова: *эксперимент, собака, паутинная оболочка мозга, кровоизлияние, магистральные сосуды, капилляры, аутогенная кровь, эндотелиальная клетка.*

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HISTOTOPOGRAPHIC CHANGES IN THE WALL OF CAPILLARY BLOOD VESSELS IN EXPERIMENTAL SUBARACHNOID HEMORRHAGE

Abstract. *The content of the article is devoted to the study of histotopographic changes in capillary vessels during autogenous subarachnoid hemorrhage of the brain in dogs under experimental conditions. Spasm of the main arteries of the brain, especially spasm of arterioles directly involved in the vascularization of the brain, in turn, causes disruption of cerebral blood circulation.*

Keywords: *experiment, dog, arachnoid membrane of the brain, hemorrhage, main vessels, capillaries, autogenous blood, endothelial cell.*

Ввдение. Сосудистый спазм и вторичные ишемические изменения головного мозга при разрывах аневризм сосудов головного мозга являются одними из наиболее грозных осложнений нетравматического субарахноидального кровоизлияния [1,2,3]. В связи со значительной распространенностью цереброваскулярной патологии представляется необходимым анализ ультраструктуры магистральных артерий и артериол

мягкой оболочки головного мозга при моделировании субарахноидального кровоизлияния [4,5], сопровождающегося артериальным спазмом, в особенности в стадии длительного артериального спазма, который влечет за собой развитие, ишемии, отека мозга, поражение нервных клеток и нарушение мозгового кровообращения [6,7,8].

Цель исследования. Изучить гистотопографические изменения стенки капиллярных сосудов при экспериментальном субарахноидальном кровоизлиянии

Материалы и методы исследования. Изучали ультраструктуру магистральных артерий и артериол мягкой оболочки (конечных разветвлений магистральных артерий, непосредственно участвующих мозга) головного мозга собак на 3-5 сутки после введения ликвор аутогенной крови.

Результаты исследования. Через трое суток после введения аутогенной крови в ликвор в цитоплазме эндотелиальных клеток артерий отмечено нарастание элементов гранулярной цитоплазматической сети, свободных рибосом и полисом, митохондрий и лизосом. Ядра клеток часто принимают неправильную овальную форму. Округление и постепенное обособление эндотелиальных клеток приводит к значительному расширению межклеточных пространств. В адвентиции обнаруживаются единичные эритроциты или группы их 2-3 нм макрофаги. На всем протяжении средней оболочки в саркоплазме гладкомышечных клеток встречаются участки разрежения миофиламентов как в поверхностных слоях миоцитов, обращенных к наружной оболочке, так в слоях, примыкающих к внутренней оболочке. Участки разрежения миофиламентов наблюдаются в перинуклеарной зоне и в периферических отделах клеток; форма их неправильно овальная, размеры 100-30 нм. В пределах этих участков иногда выявляется наличие бесструктурных осмиофильных образований также овальной формы. Наряду с этим, в саркоплазме миоцитов наблюдается нарастание количества элементов гранулярной цитоплазматической сети, свободных рибосом и полисом, появляются лизосомы. На фоне изменений наружной и средней оболочек внутренняя эластическая мембрана артерий становится складчатой, изменяется форма и ориентация эндотелиальных клеток. Длинная ось клеток часто ориентирована радиально относительно просвета артерий. Длина выпячивания цитоплазмы в просвет сосуда составляет 250-4200 нм, ширина - 100-2800 нм. В выпячивании цитоплазмы эндотелиальных клеток может находиться ядро неправильной овальной или вытянутой формы. Форма эндотелиальных клеток разнообразная: округлая, в виде «песочных часов» или «ракетки». Просвет артерии на значительном протяжении может быть разделен радиально ориентированными клетками на «бухты». На поверхности эндотелиальных клеток имеются углубления плазмы размерами 500—1300 нм. В цитоплазме клеток нарастает количество свободных рибосом, полисом, элементов гранулярной цитоплазматической сети и лизосом. Изменения ультраструктуры гладкомышечных клеток, конфигурации внутренней эластической мембраны и эндотелиальных клеток

внутренней оболочки артериол мягкой оболочки головного мозга собак в целом соответствуют таковым в магистральных артериях. В саркоплазме миоцитов также встречаются участки разрежения миофиламентов; внутренняя эластическая мембрана складчатая, фрагменты эндотелиальных клеток выступают в просвет сосуда, между выпячиваниями цитоплазмы имеются «бухты». Ранее нами в аналогичных экспериментальных условиях, при изучении ультраструктуры паравазальных нервных стволов наружного (поверхностного) нервного сплетения магистральных артерий головного мозга собак были обнаружены изменения ультраструктуры эндотелия, периневрия нервных стволов, аксонов мякотных нервных волокон (появление щелей в миелиновой оболочке, агломерация нейрофиламентов, отек митохондрий) и, в меньшей степени, аксонов безмякотных нервных волокон (неравномерное распределение нейрофиламентов, отек митохондрий). Система оболочек головного мозга - это система парацеребральных барьеров, в которой нами выделена структурно-функциональная группа ликворо-тканевых барьеров (ЛТБ), в которую, в частности, входят: ликворо-мускулярный барьер (ЛМБ), морфологическим субстратом которого является наружная оболочка магистральных артерий в целом; барьер между ликвором и гладкомышечными клетками артериол мягкой оболочки (ЛМБ), морфологическим субстратом которого являются компоненты этой оболочки; ликворо-невральный барьер (ЛНБ), морфологическим субстратом которого являются эндотелий и элементы пери- и эндоневрия паравазальных нервных стволов магистральных артерий головного мозга. Показано, что этиологическими факторами артериального спазма, развивающегося при субарахноидальном кровоизлиянии у больных и при его моделировании, являются, в первую очередь, воздействия на стенки мозговых артерий, располагающихся в ликвороносных каналах лептоменингса, серотонина и продуктов фибринолиза

В условиях выявленного нами нарушения целостности ликворо-тканевых барьеров становится возможным интенсивное проникновение с ликвором спазмогенных факторов в глубинные отделы стенок артерий, артериол, паравазальных нервных стволов с последующим поражением гладкомышечных клеток и аксонов.

Вывод. Описание нарушения целостности морфологических субстратов ЛМБ, ЛМБ и ЛНБ являются важными патогенетическими звеньями возникающего артерио-артериолярного спазма. Спазм магистральных артерий мозга, в особенности, спазм артериол, непосредственно участвующих васкуляризации головного мозга, является, в свою очередь, причиной нарушения мозгового кровообращения.

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РОЛЬ ЭПИДЕМИОЛОГИИ В ПРЕДОТВРАЩЕНИИ ИНФЕКЦИОННЫХ ЗАБОЛЕВАНИЙ

Аннотация. *Инфекционные заболевания остаются глобальной угрозой, вызывая миллионы случаев и смертей ежегодно. Эпидемиология играет ключевую роль в их предотвращении, изучая распространение, источники и факторы риска. Статья начинается с обзора инфекционных заболеваний, их путей передачи и бремени. Далее описываются успехи эпидемиологии в развитых странах, где вакцинация и надзор снизили заболеваемость корью, полиомиелитом и гепатитом. Затем анализируется влияние инфекций на общественное здоровье, включая экономические и социальные последствия. Особое внимание уделяется Центральной Азии, особенно Узбекистану, где зоонозы и ротавирус осложняют ситуацию из-за социально-экономических факторов. Предлагаются меры профилактики: усиление надзора, вакцинация и подход One Health. Эпидемиология спасает жизни и поддерживает устойчивое развитие.*

Ключевые слова: *эпидемиология, инфекционные заболевания, профилактика, вакцинация, общественное здоровье, зоонозы, ротавирус*

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THE ROLE OF EPIDEMIOLOGY IN THE PREVENTION OF INFECTIOUS DISEASES

Abstract. *Infectious diseases remain a global threat, causing millions of cases and deaths annually. Epidemiology plays a key role in their prevention, by studying their distribution, sources, and risk factors. The article begins with an overview of infectious diseases, their transmission routes, and global burden. It then describes the successes of epidemiology in developed countries, where vaccination and surveillance have significantly reduced the incidence of measles, poliomyelitis, and hepatitis. The impact of infections on public health, including their economic and social consequences, is then analyzed. Particular attention is paid to Central Asia, especially Uzbekistan, where zoonoses and rotavirus complicate the epidemiological situation due to socio-economic factors. Preventive measures are proposed: strengthening surveillance, expanding vaccination coverage, and adopting the One Health approach. Ultimately, epidemiology saves lives and supports sustainable development.*

***Keywords**: epidemiology, infectious diseases, prevention, vaccination, public health, zoonoses, rotavirus.*

Введение: Общая информация об инфекционных заболеваниях.

Представьте себе мир, где простая инфекция может унести миллионы жизней, как это было веками назад. Сегодня, в 2025 году, инфекционные заболевания все еще остаются частью нашей реальности, хотя мы научились с ними бороться. Эти болезни вызываются микроорганизмами – бактериями, вирусами, грибами или паразитами, – которые проникают в организм и вызывают хаос. Некоторые, как грипп или COVID-19, передаются воздушно-капельным путем, другие – через воду и пищу, как холера или ротавирус, третьи – через векторов, таких как комары для малярии. А есть и зоонозы, переходящие от животных к людям, вроде Эболы или SARS-CoV-2 [9].

Глобально инфекции уносят около 17 миллионов жизней ежегодно, составляя до 30% от общей смертности. В бедных регионах это особенно остро: дети умирают от диареи, а взрослые – от туберкулеза или ВИЧ. Факторы риска включают бедность, перенаселенность, миграцию и климатические изменения, которые расширяют ареалы векторов. Например, потепление климата сдвигает зоны малярии на север, а урбанизация способствует вспышкам денге в городах. Эпидемиология помогает разобраться в этом: она анализирует инцидентность (новые случаи), превалентность (общее число больных) и детерминанты, позволяя предсказывать и предотвращать. Без нее мы бы действовали вслепую, но с ней – можем targeted interventions, как вакцинацию или карантин. Как отмечают Урсула Шлипкётер и Антуан Флао, прогресс в контроле инфекций за последние два века огромен, но вызовы остаются [1,12]. А Рэйчел Э. Бейкер с коллегами подчеркивают, как глобальные изменения – от урбанизации до климата – усиливают риски [2].

Достижения современной эпидемиологии в предотвращении инфекционных заболеваний в развитых странах

В развитых странах, таких как США, страны Европы или Япония, эпидемиология превратилась в мощный щит против инфекций. Это не случилось в одночасье – это результат десятилетий исследований, инвестиций и сотрудничества. Возьмем эрадикацию оспы в 1980 году: глобальная кампания ВОЗ, основанная на эпидемиологическом отслеживании случаев, спасла миллионы. Аналогично, полиомиелит: с 2001 по 2010 год эндемичные страны сократились с 20 до 4, а случаи – до менее 1500 в год. Вакцинация здесь ключ: охват прививками от дифтерии, столбняка и коклюша превышает 90%, снизив заболеваемость на 95% по сравнению с прошлым [10,13].

Современные успехи впечатляют. В 2023 году несколько стран, включая Азербайджан и Таджикистан, были сертифицированы как свободные от малярии благодаря надзору и профилактике. Вакцины против гепатита В охватили 178 стран, предотвратив 700 000 смертей от рака печени. Пневмококковые и ротавирусные вакцины спасают тысячи детей. Системы

надзора, как Global Influenza Surveillance (Глобальное наблюдение за гриппом), позволяют быстро реагировать: во время H1N1 в 2009 году вакцина появилась за 20 недель. Доступ к чистой воде вырос с 83% до 87% глобально к 2008 году, искоренив холеру в развитых регионах [11].

Междисциплинарный подход – секрет успеха. Эпидемиологи работают с врачами и политиками, используя данные для решений. Как показывает отчет CDC (Центры по контролю и профилактике заболеваний), с 2001 по 2010 год глобально предотвращено 2,5 миллиона детских смертей от вакцин управляемых болезней, а смертность от кори снизилась на 78% [3]. В развитых странах инфекции вызывают менее 10% смертей, благодаря чему фокус сместился на неинфекционные болезни. Но, как предупреждают Baker и коллеги, глобальные изменения требуют бдительности [2]. Эти истории успеха вдохновляют: они показывают, что с правильным подходом инфекции можно победить.

Ситуация с эпидемиологией в предотвращении инфекционных заболеваний и их влияние на общественное здоровье

Сегодня эпидемиология – это не только статистика, а реальный инструмент для спасения жизней, но мир все еще борется с инфекциями. Глобально вспышки происходят постоянно: с 1996 по 2023 год зарегистрировано 3013 событий, от гриппа до Эболы. Цяо Лю и коллеги анализируют, как эти вспышки распределяются – чаще в Африке и Азии – и их влияние: миллионы случаев, сотни тысяч смертей [4]. Эпидемиология помогает через надзор: ВОЗ отреагировала на десятки чрезвычайных ситуаций в 2023 году, включая холеру и денге.

Но влияние на общественное здоровье огромно. Инфекции вызывают экономические потери в триллионы долларов – от лечения до карантинов. COVID-19 показал это ярко: 700 миллионов случаев, 7 миллионов смертей, парализованная экономика. Они усугубляют неравенство: бедные слои страдают больше, а стигма вокруг ВИЧ или туберкулеза приводит к дискриминации. Зоонозы – 60% новых инфекций – требуют One Health. Диарея от ротавируса убивает 1,5 миллиона детей ежегодно, несмотря на вакцины [14].

Эпидемиология предотвращает это: вакцинация снизила детскую смертность, а надзор – выявляет вспышки рано. Но в слабых системах недооценка бремени велика. Как отмечают Шлипкётер и Флао, хотя антибиотики преобразили лечение, резистентность – новая угроза [1]. Влияние многогранно: от перегрузки больниц до социальных конфликтов. Для улучшения нужны инвестиции в наблюдение и образование. Успехи, как элиминация трахомы в 2023 году, дают надежду, но глобальные изменения, по Бейкер и др., усиливают риски [2].

Ситуация в Центральной Азии, особенно в Узбекистане, и рекомендации по профилактике

Центральная Азия – регион на перекрестке путей, где инфекции находят благодатную почву из-за климата, миграции и постсоветских

вызовов. В Узбекистане, Казахстане и Киргизии ротавирус вызывает 26% госпитализаций по диарее у детей до 5 лет. Ренат Латипов и коллеги оценивают: в Узбекистане – 5491 госпитализаций и 662 смерти ежегодно. Зоонозы, как бруцеллез или эхинококкоз, распространены: до 30 случаев на 100 000 в некоторых районах [5].

В Узбекистане ввели ротавирусную вакцину в 2014 году первой в регионе. Умид Ералиев и др. показывают: позитивные тесты на ротавирус среди госпитализированных детей снизились с 26-27% до 8-16%, эффективность вакцины – 51% против госпитализаций [6]. Но проблемы остаются: слабый надзор, бедность, загрязненная вода. CDC работает здесь с 1995 года, укрепляя лаборатории и FETP, обучая эпидемиологов [7].

Влияние на здоровье огромно: инфекции снижают продуктивность, вызывают инвалидность, нагружают экономику. Для профилактики в Узбекистане предлагаю: 1) Укрепить One Health, приоритизируя зоонозы как антракс и бешенство. 2) Расширить вакцинацию, включая HPV и ротавирус. 3) Улучшить санитарию и воду. 4) Развить лаборатории с помощью CDC и FAO. 5) Межсекторальное сотрудничество для мониторинга. Эти шаги, подкрепленные инвестициями, снизят бремя. Как подчеркивает Всемирная организация здравоохранения в 2023 году, устранение болезней возможна с усилиями [8,15].

Заключение. Эпидемиология – это мост между наукой и жизнью, помогающий предотвращать то, что раньше казалось неизбежным. В развитых странах она принесла триумфы, глобально – борется с вызовами, а в Центральной Азии, как в Узбекистане, требует срочных действий. Инвестируя в надзор и сотрудничество, мы можем построить мир, где инфекции – редкость. Будущее зависит от нас: давайте использовать знания, чтобы защитить поколения.

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ВОЗДЕЙСТВИЕ ИММУНОМОДУЛИНА НА АЛЛЕРГИЧЕСКИЕ ПАРАМЕТРЫ ВИРУСНЫХ ГЕПАТИТОВ, РАЗВИВАЮЩИХСЯ ПРИ ЛЯМБЛИОЗЕ

Аннатоция: Проблема вирусных гепатитов до настоящего времени остаётся одной из актуальных в инфекционной патологии. Вирусный гепатит часто встречается в сочетании с другими инфекциями. В статье описаны влияние иммуномодулина на проявлении аллергии у больных с вирусным гепатитом типа В (ВГВ) на фоне сочетанного течения лямблиоза.

Ключевые слова: иммуномодулин, аллергия, иммуностимуляция, гепатит, лямблиоз, дегрануляция.

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IMPACT OF IMMUNOMODULIN ON ALLERGIC PARAMETERS IN VIRAL HEPATITIS DEVELOPING IN THE PRESENCE OF GIARDIASIS

Annotation: The article describes the effect of immunomodulin on allergy manifestations in patients with viral hepatitis B in the context of concurrent giardiasis.

Keywords: immunomodulin, allergy, immunostimulation, hepatitis, giardiasis, degranulation.

Актуальность темы. Проблема вирусных гепатитов до настоящего времени остаётся одной из актуальных в инфекционной патологии. Участились случае сочетании вирусного гепатита с другими инфекциями. Это способствует переходу острого процесса в затяжное или хроническое течение.

Цель и задачи исследования. Изучение влияния иммуномодулина на аллергические показатели у больных с вирусным гепатитом типа В на фоне сочетанного течения лямблиоза.

Методы исследования. Под наблюдением находилось 55 больных с диагнозом вирусный гепатит типа В (ВГВ), протекающего на фоне лямблиоза. Из общего числа наблюдаемых больных 58,2% составляли мужчины и 41,8% - женщины. Возраст больных колебался от 16 до 45лет. Наличие лямблиоза подтверждено результатами паразитологических исследований, (в 70,9% случаев цисты лямблий, а в 29,1% случаев вегетативной формы, других паразиты яиц глистов не обнаружено), а диагноз ВГВ ставился на основании анамнестических, эпидемиологических, клинических и лабораторных (обнаружение маркеров ВГВ) методов исследований. О состоянии аллергии немедленного типа судили по реакции дегрануляции тучных клеток (РДТК) по И.Л.Ишимовой и Л.И.Зеличенко (2), реакции дегрануляции базофилов (РДБ) по Т.С.Соколовой и Т.Т.Рошаль (5). Определение в сыворотке крови концентрации иммуноглобулинов Е (IgE) проводили иммуноферментным методом, путём применения тест-систем ИЧЕ-ИФТС. Состояние аллергии замедленного типа оценено по показателю повреждения нейтрофилов (ППН) по методу В.А.Фрадкина (7). Оценка эффективности терапии иммуномодулином осуществлялась путём сопоставления результатов лечения больных двух однородных групп. Первую группу составили 25 больных, получивших иммуномодулин на базисной терапии в течении 10 дней (общая доза по иммуномодилину составила один год на курс лечения и противопаразитарные метронидазол и фразолидон).

Все больные до и после окончание курса лечения подвергались лабораторному обследованию. Полученные данные обрабатывали на компьютере.

Результаты исследования. Ранее проведённые исследования (4) показали, что аллергический компонент играет важную роль в патогенезе ВГВ, протекающего на фоне лямблиозной инфекции. Учитывая это изучены клинико-патогенетическая эффективность иммуномодулина у указанного контингента больных. Результаты проведённых исследований по изучению влияния иммуномодулина на показатели ПЧНТ, ПЧЗТ у больных ВГВ, протекающего на фоне лямблиоза, приведены ниже.

При среднетяжёлых и тяжёлых формах ВГВ, протекающего на фоне лямблиёза показатели ПЧНТ, ПЧЗТ до лечения в сравниваемых группах больных достоверно выше, чем у здоровых.

В дальнейшем, посвящённые изучению влияния иммуномодулина на показатели ПЧНТ, ПЧЗТ у больных ВГВ, протекающего на фоне лямблиёзной инфекции как показали исследования в указанном контингенте больных показатели РДКТ, IgE, РДБ были меньше, чем в контрольной группе больных, что включение 0,01% раствора иммуномодулина в лечение больных основной группы привело к более выраженному снижению следующих показателей: относительное содержание РДТК снизилось в 1,5-1,7 раза, ППН – 2,7-2,2 раза,

IgE – 1,4-1,5 раза, РДБ – 1,5-1,6 раза, но практически не отличались от показателей контрольной группы.

Таким образом, на основании проведённых исследований можно считать, что иммуномодулин у больных ВГВ на фоне сочетанного течения лямблиоза практически не влияет проявлении аллергии как замедленного типа, так и немедленного типа. Учитывая это, указанный препарат нецелесообразно включать в комплекс лечебных мероприятий больным ВГВ на фоне сочетанного течения лямблиоза, как антиаллергический препарат.

Выводы. У больных ВГВ при сочетанном течении лямблиоза, леченных иммуномодулином, после терапии показателии ПЧНТ и ПЧЗТ незначительно менее выражены, чем у больных ВГВ на фоне сочетанного течения лямблиоза, не лечившихся иммуномодулином.

В комплексе лечебных мероприятий больных ВГВ на фоне сочетанного течения лямблиоза нецелесообразно включать препарат иммуномодулин в качестве антиаллергического средства.

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ГИСТОЛОГИЧЕСКОЕ СТРОЕНИЕ ПЛАЦЕНТЫ И ЕЁ ФУНКЦИОНАЛЬНОЕ ЗНАЧЕНИЕ В РАЗНЫЕ СРОКИ БЕРЕМЕННОСТИ

Аннотация: *Плацента — уникальный временный орган, обеспечивающий связь между организмом матери и плода. Она выполняет дыхательную, питательную, выделительную, эндокринную и иммунную функции, играя ключевую роль в нормальном развитии беременности. Гистологическое строение плаценты изменяется по мере её созревания: от формирования ворсинчатого хориона на ранних сроках до зрелой многослойной структуры с выраженными синцитиотрофобластом, фетальными капиллярами и базальной пластинкой в конце беременности. В статье рассматриваются основные этапы гистогенеза плаценты, микроскопическое строение её компонентов и функциональное значение каждого структурного элемента на разных стадиях гестации.*

Ключевые слова: *плацента, хорион, трофобласт, ворсина, синцитиотрофобласт, цитотрофобласт, фетальные сосуды, беременность, гистология, материнско-плодный обмен.*

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HISTOLOGICAL STRUCTURE OF THE PLACENTA AND ITS FUNCTIONAL SIGNIFICANCE AT DIFFERENT STAGES OF PREGNANCY

Abstract: *The placenta is a unique temporary organ that provides a connection between the mother's body and the fetus. It performs respiratory, nutritional, excretory, endocrine, and immune functions, playing a key role in the*

normal development of pregnancy. The histological structure of the placenta changes as it matures: from the formation of the villous chorion in the early stages to a mature multilayered structure with pronounced syncytiotrophoblast, fetal capillaries, and basal plate at the end of pregnancy. The article discusses the main stages of placental histogenesis, the microscopic structure of its components, and the functional significance of each structural element at different stages of gestation.

***Keywords**: placenta, chorion, trophoblast, villi, syncytiotrophoblast, cytotrophoblast, fetal vessels, pregnancy, histology, maternal-fetal exchange.*

Введение: Плацента — это временный, но жизненно важный орган, формирующийся в организме женщины во время беременности. Она служит связующим звеном между матерью и плодом, обеспечивая транспорт кислорода, питательных веществ и гормонов, а также удаление продуктов обмена. Плацента формируется из тканей плода (хорион) и матери (эндометрия), образуя так называемую фетоматеринскую систему.Гистологическое строение плаценты динамично и отражает функциональные потребности развивающегося плода. На ранних сроках преобладает активный рост ворсин и инвазия трофобласта, а к концу беременности происходит их дифференцировка и упрощение структуры

1. Формирование и развитие плаценты

Плацента начинает формироваться вскоре после имплантации бластоцисты в слизистую оболочку матки (6–7 день после оплодотворения). Важнейшую роль играет трофобласт — наружный слой клеток бластоцисты, который дифференцируется на два типа клеток:

Цитотрофобласт — внутренний слой, состоящий из кубических клеток с выраженным ядром и митотической активностью;

Синцитиотрофобласт — наружный слой, представляющий собой многоядерную массу, активно внедряющуюся в эндометрий.

В результате внедрения образуются лакуны — полости, заполняющиеся материнской кровью, что становится основой для будущей материнской части плаценты. К концу 3-й недели формируется первичная ворсина

хориона, включающая ось из цитотрофобластических клеток и наружный слой синцитиотрофобласта. Затем появляются вторичные и третичные ворсины, в которых образуются фетальные капилляры, связывающие

плаценту с

2. Гистологическое строение плаценты

Зрелая плацента имеет дисковидную форму, диаметр 15–20 см, толщину 2–3 см и массу около 500 г. Гистологически в ней различают материнскую и плодную части.

2.1 Материнская часть (decidua basalis)

•Представлена изменённым эндометрием матки, содержащим:

•децидуальные клетки (увеличенные фибробласты, богатые

гликогеном);

•спиральные артерии, адаптированные для постоянного кровотока;

•лакуны, заполненные материнской кровью;

•соединительнотканные перегородки, разделяющие плаценту на дольки (котиледоны).

2.2Плодная часть (ворсинчатый хорион) Включает:

•Хориальную пластинку — соединительнотканную основу, обращённую к амниотической оболочке;

•Плацентарные ворсины — главные структурно-функциональные единицы;

•Пуповинные сосуды — 2 артерии и 1 вену, проходящие через стромальную ткань ворсин.

3. Микроскопическое строение ворсинчатого дерева

Ворсинчатое дерево состоит из ветвящихся ворсин различного калибра, покрытых эпителиальным покровом. Различают:

•стволовые ворсины (основные сосудистые ветви);

•промежуточные ворсины;

•терминальные ворсины, где осуществляется активный обмен между кровью матери и плода.

Структура ворсины:

•снаружи — синцитиотрофобласт с микроворсинками, выполняющий секреторную и барьерную функции;

•под ним — цитотрофобласт (в зрелой плаценте представлен отдельными клетками или исчезает);

•в центре — рыхлая соединительная ткань (строма) с макрофагами — клетками Хофбауэра;

•внутри — фетальные капилляры, выстланные эндотелием и соединённые с сосудами пуповины.

Толщина плацентарного барьера в начале беременности достигает 25–30 мкм, к концу — уменьшается до 2–4 мкм, что значительно облегчает

газообмен и транспорт веществ.

4. Функции плаценты в разные сроки беременности

4.1 Ранние сроки (I триместр)

•Активное внедрение трофобласта в эндометрий;

•Формирование материнских лакун и первичных ворсин;

•Начало гормональной активности — синцитиотрофобласт вырабатывает хорионический гонадотропин (ХГЧ), поддерживающий жёлтое тело

•беременности;

•Становление плацентарного барьера.

4.2 Второй триместр

•Развитие сложной сети капилляров в ворсинах;

•Усиление обменных процессов;

•Начало выработки плацентарного лактогена, эстрогенов, прогестерона;

•Созревание иммунного барьера — плацента предотвращает проникновение большинства патогенов и антител класса IgM.

4.3 Поздние сроки (III триместр)

•Максимальное развитие терминальных ворсин;

•Уменьшение толщины барьера между кровью матери и плода;

•Активизация газообмена и транспорта глюкозы, аминокислот, электролитов;

•Сохранение эндокринной активности до родов;

•Постепенное старение плаценты — отложение фибриноидов, кальцификатов, уменьшение числа цитотрофобластов.

5. Функциональное значение плаценты

1. Трофическая функция — обеспечивает плод питательными веществами (глюкозой, аминокислотами, липидами).

2. Дыхательная функция — транспорт кислорода от матери к плоду и углекислого газа в обратном направлении.

3. Выделительная функция — удаление продуктов обмена (мочевина, креатинин).

4. Барьерная функция — защита плода от токсинов и микроорганизмов.

5. Эндокринная функция — выработка гормонов (ХГЧ, прогестерон, эстрогены, плацентарный лактоген).

6. Иммунная функция — предотвращение иммунного конфликта между матерью и плодом.

6. Возрастные изменения и старение плаценты

К концу беременности ворсины становятся более тонкими, количество синцитиальных ядер увеличивается, образуются участки фибриноидного перерождения. Эти изменения подготавливают плаценту к отделению

после родов. Физиологическое старение сопровождается снижением

обменной активности и уменьшением кровотока, что играет роль в запуске родовой деятельности.

Заключение: Плацента — это сложный, многофункциональный орган, объединяющий в себе свойства эндокринной железы, дыхательной и выделительной систем. Её гистологическое строение динамично изменяется в зависимости от срока беременности, обеспечивая оптимальные условия для роста и развития плода. Изучение морфологии плаценты имеет большое значение для диагностики осложнений беременности, таких как фетоплацентарная недостаточность, гипоксия и задержка развития плода. Таким образом, плацента — это не только временный орган, но и важнейшее звено, обеспечивающее физиологическое единство матери и ребёнка.

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MILLIY CHOLG'ULARNI O'QITISHDA RAQAMLI KOMPETENSIYA VA IJODIY TAFAKKURNI RIVOJLANTIRISH OMILLARI

Annotatsiya:*Maqolada milliy cholg'ularni o'qitish jarayonida o'qituvchi va o'quvchilarda raqamli kompetensiyani shakllantirish hamda ijodiy tafakkurni rivojlantirishning nazariy asoslari tahlil qilingan. Raqamli ta'lim muhiti, interfaol platformalar, virtual ustoz–shogird tizimi, multimediaviy vositalar va reflektiv tahlil metodlarining o'quv jarayoniga ta'siri ilmiy jihatdan yoritilgan. Shuningdek, O'zbekiston Respublikasi Prezidentining "Raqamli O'zbekiston – 2030" strategiyasi hamda UNESCO va OECD tomonidan ilgari surilgan "Digital Competence Framework" konsepsiyalari asosida milliy musiqa ta'limining zamonaviy yo'nalishlari tahlil etilgan.*

Kalit so'zlar:*Raqamli kompetensiya, ijodiy tafakkur, milliy cholg'ular, raqamli ta'lim muhiti, interfaol metod, reflektiv o'qitish, multimediaviy resurs, madaniy identitet, musiqiy tafakkur, texnologik integratsiya.*

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FACTORS FOR DEVELOPING DIGITAL COMPETENCE AND CREATIVE THINKING IN TEACHING NATIONAL MUSICAL INSTRUMENTS

Abstract:*The article analyzes the theoretical foundations of developing digital competence and creative thinking among teachers and students in the process of teaching national musical instruments. The impact of the digital learning environment, interactive platforms, the virtual mentor–student system, multimedia tools, and reflective analysis methods on the educational process is scientifically examined. Moreover, based on the "Digital Uzbekistan – 2030" Strategy of the President of the Republic of Uzbekistan and the "Digital Competence Framework" concepts promoted by UNESCO and the OECD, modern directions of national music education are explored.*

Keywords:*Digital competence, creative thinking, national musical instruments, digital learning environment, interactive method, reflective teaching, multimedia resources, cultural identity, musical thinking, technological integration.*

Kirish

Bugungi globallashuv davrida ta’lim tizimining raqamli transformatsiyasi pedagogik jarayonning barcha bosqichlariga chuqur ta’sir ko‘rsatmoqda. Xususan, musiqa ta’limida, ayniqsa milliy cholg‘ularni o‘qitish jarayonida raqamli texnologiyalar o‘qituvchi va o‘quvchi o‘rtasidagi muloqotni yangicha mazmunda shakllantirmoqda. O‘zbekiston Respublikasi Prezidenti Sh.M. Mirziyoyev “Raqamli O‘zbekiston – 2030” strategiyasida shunday deydi:

“Raqamli texnologiyalarni joriy etish ta’lim, fan, madaniyat va san’at sohalarini yangi bosqichga olib chiqishi kerak, zero, raqamli fikrlovchi avlod – kelajakning poydevoridir.” [1]

Mazkur fikr musiqiy ta’lim tizimida ham raqamli kompetensiyani shakllantirish zaruriyatini ko‘rsatadi. Milliy cholg‘ularni o‘qitishda raqamli kompetensiya – bu faqat texnik ko‘nikma emas, balki ijodiy tafakkur, musiqiy idrok, refleksiya va mustaqil o‘rganish salohiyatining uyg‘unligi hisoblanadi.

UNESCO (2021) hisobotida raqamli kompetensiya “insonning o‘z kasbiy faoliyatida axborot texnologiyalarini ijodiy va tanqidiy qo‘llay olish qobiliyati” sifatida talqin etiladi. [6] Shunga ko‘ra, musiqa o‘qituvchisi o‘z darsida nafaqat raqamli vositalardan foydalanuvchi, balki ularni ijodiy o‘quv muhitiga aylantira oluvchi shaxs bo‘lishi kerak.

Milliy cholg‘ularni o‘qitish jarayonida raqamli texnologiyalar o‘quvchining ijodiy tafakkurini rag‘batlantiradi. Video tahlil, audio yozuvlar, virtual cholg‘u simulyatorlari, interfaol musiqiy dasturlar o‘quvchiga o‘z ijrosini tahlil qilish, kamchiliklarni ko‘rish va takomillashtirish imkonini beradi. Bu jarayon o‘quvchida reflektiv tafakkurni, o‘z faoliyatiga tanqidiy qarashni rivojlantiradi.

Usullar

Maqola nazariy-tahliliy yo‘nalishda yozilgan bo‘lib, unda ilmiy umumlashtirish, qiyosiy tahlil va konseptual modellashtirish metodlaridan foydalanildi.

- **Qiyosiy tahlil** orqali milliy va xorijiy tajribalardagi raqamli kompetensiya shakllantirish mexanizmlari solishtirildi.
- **Kontent tahlil** usuli yordamida UNESCO (2021) va OECD (2022) hisobotlarida ko‘rsatilgan o‘qituvchilar uchun raqamli kompetensiya modellarining asosiy komponentlari o‘rganildi.
- **Pedagogik modellashtirish** yordamida milliy cholg‘ularni o‘qitishda raqamli kompetensiyani rivojlantirishning nazariy modeli ishlab chiqildi.
- **Nazariy umumlashtirish** orqali milliy cholg‘ularni o‘rgatishda raqamli tafakkur va ijodiy motivatsiyaning o‘zaro bog‘liqligi tahlil qilindi.

Natijalar va Munozara

Tahlil natijalariga ko‘ra, raqamli kompetensiyani shakllantirish milliy cholg‘ularni o‘rgatish sifatiga bevosita ta’sir ko‘rsatadi. O‘qituvchi raqamli kompetensiyaga ega bo‘lgan taqdirda:

- dars jarayonida zamonaviy multimedia vositalaridan samarali foydalanadi;
- o‘quvchining ijodiy tafakkurini faollashtiradi;
- milliy musiqani global madaniy kontekstda talqin qilishga o‘rgatadi;
- virtual ustoz–shogird tizimini tashkil etadi.

OECD (2022) ta’kidlaganidek, “raqamli kompetensiya – bu faqat texnik tayyorgarlik emas, balki inson tafakkurini ijodiy rivojlantirish jarayonidir.” [8] Shu bois, milliy musiqa ta’limida raqamli muhit o‘qituvchi va o‘quvchining hamkorlikdagi ijodiy maydoniga aylanmoqda. Milliy cholg‘ularni o‘qitishda raqamli kompetensiya quyidagi komponentlardan iborat bo‘lishi lozim:

1. **Texnik savodxonlik** – dasturiy vositalarni bilish;
2. **Musiqiy tafakkur** – raqamli muhitda ijodiy fikrlash qobiliyati;
3. **Madaniy integratsiya** – milliy qadriyatlarni global raqamli kontekstda ifodalash;
4. **Reflektiv tafakkur** – o‘z ijodiy faoliyatini baholay olish.

Bu yondashuv milliy cholg‘ularni o‘rganish jarayonini faqat o‘rgatish emas, balki raqamli madaniyatning bir qismi sifatida shakllantirishga yordam beradi.

Xulosa

Milliy cholg‘ularni o‘qitishda raqamli kompetensiyani rivojlantirish o‘qituvchining metodik tayyorgarligini, o‘quvchining ijodiy tafakkurini va umumiy madaniy saviyasini oshiradi. Raqamli kompetensiya – bu XXI asr musiqa o‘qituvchisi uchun zarur professional mezon. U orqali:

- ijodiy fikrlash kengayadi;
- milliy musiqaning raqamli madaniyatdagi o‘rni mustahkamlanadi;
- ta’lim samaradorligi oshadi.

O‘zbekistonning “Raqamli O‘zbekiston – 2030” strategiyasi ham aynan shu yo‘nalishda ta’lim tizimini zamonaviy texnologiyalar bilan uyg‘unlashtirishni belgilab bergan.

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ЛЕСОМЕЛИОРАТИВНЫЕ МЕРОПРИЯТИИ И ОБЩЕНАЦИОНАЛЬНЫЙ ПРОЕКТ «ЯШИЛ МАКОН» В УЗБЕКИСТАНЕ

Аннотация: *В статья посвящена основным направлениям лесомелиоративных мероприятий в Узбекистане, которые направлены на решение ряда острых экологических проблем. В ней рассматриваются методы борьбы с ветровой эрозией, закрепления песков и улучшения экологической ситуации в целом. Кроме того, обсуждаются как перспективы развития, так и существующие трудности на этом пути.*

Ключевые слова: *Лесомелиорация, Узбекистан, Аральского море, пустыне, эрозия, регион,* ***«Яшил макон»****.*

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FOREST RECLAMATION ACTIVITIES AND THE NATIONAL PROJECT «YASHIL MAKON» IN UZBEKISTAN

Annotation: *This article explores the main areas of forest reclamation in Uzbekistan, which are aimed at addressing a number of pressing environmental issues. It examines methods for combating wind erosion, stabilizing sand, and improving the overall environmental situation. It also discusses both development prospects and existing challenges.*

Key words: *Forest reclamation, Uzbekistan, Aral Sea, desert, erosion, region, «Yashil Makon».*

Лесомелиорация в Узбекистане играет ключевую роль в стабилизации природных ландшафтов, борьбе с опустыниванием и восстановлении деградированных земель. Особенно важное значение лесомелиоративные мероприятия имеют в условиях Арало-Сырдарьинской низменности и Кызылкумской пустыни, где проблема деградации почв и песчаных бурь стоит наиболее остро.

В последние годы в стране реализуются крупные проекты по созданию защитных лесных насаждений на высохшем дне Аральского моря. Эти мероприятия направлены на предотвращение ветровой эрозии, закрепление песков и улучшение экологических условий жизни населения. Согласно данным Министерства сельского хозяйства и Государственного комитета лесного хозяйства, с 2018 по 2024 годы было создано свыше 1,7 млн гектаров новых лесных насаждений, преимущественно из саксаула, солянки и тамарикса [1].

Основные направления развития лесомелиорации:

1. Создание защитных лесных полос вдоль автомагистралей и ирригационных каналов.
2. Лесонасаждения на деградированных и засоленных землях.
3. Восстановление естественных лесов в горных и предгорных районах.
4. Использование дронов, спутников и ГИС-технологий для мониторинга состояния насаждений.

Таблица 1.

Площадь лесных насаждений в Узбекистане, (по регионам, тыс. га)

Регион	**Площадь лесов (2020)**	**Площадь лесов (2024)**
Республика Каракалпакстан	630	850
Бухарская область	410	470
Навоийская область	520	620
Кашкадарьинская область	260	300
Самаркандская область	150	190
Ташкентская область	130	150
Итого	**2100**	**2580**

Из таблицы видно, что за последние годы площадь лесных насаждений увеличилась примерно на 22%, что свидетельствует о значительном прогрессе в сфере лесомелиорации [2].

Основные направления лесомелиоративных мероприятий:

1. Создание пескоукрепительных насаждений (саксаул, терескен, солянка).
2. Восстановление пойменных лесов вдоль рек Амударьи и Сырдарьи.
3. Создание зелёных поясов вокруг населённых пунктов и промышленных зон.
4. Введение капельного орошения и агролесомелиорации.

В перспективе до 2030 года планируется довести общую площадь лесов до 3 млн гектаров, укрепить научную базу лесомелиорации и внедрить цифровой мониторинг для оперативной оценки состояния лесных экосистем [4].

А также в республике наблюдается активное лесомелиорационное развитие, особенно в рамках национальной программы **«Яшил макон»**, запущенной в 2021 году по инициативе Президента Республики. Цель программы - высадить более **1 миллиард деревьев ежегодно** и увеличить площадь зеленых насаждений во всех регионах страны. «Яшил макон» способствует не только улучшению экологической обстановки, но и укреплению лесомелиоративного потенциала страны, особенно в засушливых и деградированных районах [1].



Рисунок 1. Посадка деревьев в Касбинском районе Кашакадарьинской области.

Несмотря на достигнутые успехи, лесомелиорация сталкивается с рядом проблем как нехваткой посадочного материала, засолением почв, ограниченным водоснабжением и влиянием климатических изменений. Для повышения эффективности необходимо активнее внедрять инновационные технологии, расширять питомническую базу и развивать международное сотрудничество.

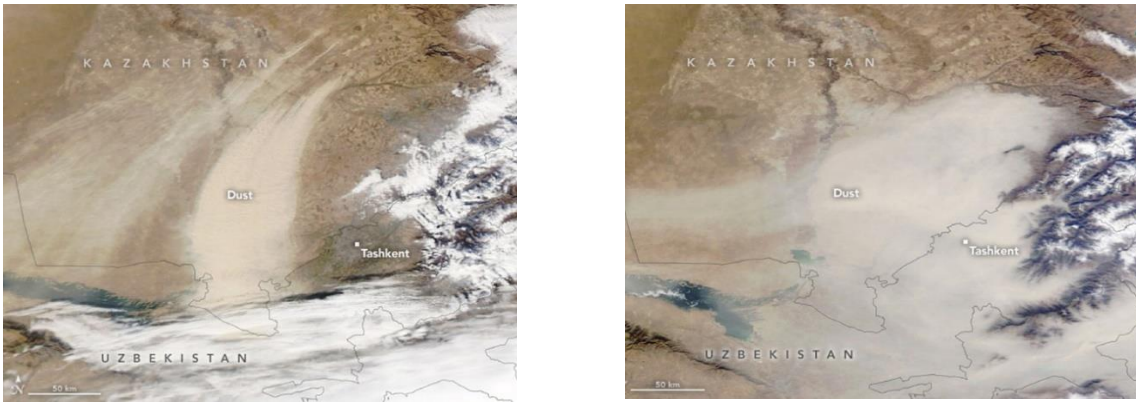


Рисунок 2. Пыль покрывает Ташкент, космоснимки 4 и 5 ноября 2021 года.

Из-за высыхания Аральского моря климат в Центральной Азии меняется в два раза быстрее, чем в других регионах мира. Узбекистан, полностью осознавая опасности, которые несёт с собой изменение климата, взял на себя обязательство снизить интенсивность выбросов своей экономики - объём парниковых газов, выделяемых для производства товаров и услуг - на 35% в течение следующего десятилетия.

ЗАКЛЮЧЕНИЕ. Лесомелиорация в Узбекистане сегодня является стратегически важным направлением экологической политики государства. Она способствует защите земель от эрозии, улучшению климата и сохранению биоразнообразия. Развитие этой сферы требует комплексного подхода, включающего научные исследования, государственную поддержку и международное сотрудничество.

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СОЗДАНИЕ РАСТЕНИЯ ТРИТИКАЛЕ И ЕГО ЗНАЧЕНИЕ В СОВРЕМЕННОМ МИРОВОМ СЕЛЬСКОМ ХОЗЯЙСТВЕ

Аннотация: *В статье рассматриваются история создания тритикале, его биологические и агрономические характеристики. Автор также обсуждает значимость тритикале в современном сельском хозяйстве, отмечая его высокую приспособляемость к климату Узбекистана.*

Ключевые слова: *история, тритикале, особенности, значение, сельское хозяйства, сорт, Узбекистан.*

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THE CREATION OF THE TRITICALE PLANT AND ITS IMPORTANCE IN MODERN GLOBAL AGRICULTURE

Annotation: *The article examines the history of triticale's development, its biological and agronomic characteristics. The author also discusses its importance in modern agriculture, noting its high adaptability to Uzbekistan's climate.*

Key words: *history, triticale, characteristics, importance, agriculture, sort, Uzbekistan.*

Введение. Тритикале (*triticosecale*) - это искусственно созданный гибрид пшеницы (*triticum*) и ржи (*secale*), сочетающий в себе лучшие биологические и хозяйственные качества обоих родительских видов. Название «тритикале» образовано от первых слогов латинских названий пшеницы - *triticum* и ржи - *secale*. Основная цель создания тритикале - объединить высокую урожайность и качество зерна пшеницы с устойчивостью ржи к неблагоприятным условиям среды [2].

Основная часть. Впервые тритикале было получено в конце xix века в результате межродовой гибридизации с целью объединить высокую урожайность и качество зерна пшеницы с устойчивостью ржи к неблагоприятным условиям среды, болезням и засухе. Первые гибриды были малоплодородными, однако с развитием цитогенетических методов селекции удалось создать стабильные и продуктивные формы. Однако успешное получение фертильных гибридов стало возможным лишь во второй половине xx века благодаря развитию методов полиплоидии. Первая коммерческая сортовая тритикале появилась в 1970-х годах.

В настоящее время тритикале занимает важное место среди зерновых культур и выращивается во многих странах мира как продовольственная, кормовая и техническая культура. Зерно тритикале отличается высоким содержанием белка, хорошей усвояемостью и биологической ценностью. Оно используется для производства муки, круп, хлеба, а также как концентрированный корм для сельскохозяйственных животных.

В условиях узбекистана тритикале рассматривается как перспективная культура, способная адаптироваться к различным почвенно-климатическим условиям, обладающая высокой урожайностью и устойчивостью к болезням. Изучение биологических особенностей, агротехники и адаптационных свойств тритикале имеет важное научное и практическое значение для дальнейшего развития растениеводства и повышения продовольственной безопасности страны.

Биологические и агрономические особенности. Тритикале отличается следующими преимуществами:

- Высокая устойчивость к засухе и низким температурам;
- Устойчивость к болезням и вредителям, характерным для пшеницы;
- Хорошая адаптация к бедным почвам;
- Высокая урожайность и питательная ценность зерна;
- Повышенное содержание белка

Таблица 1.

Аминокислотный состав зерна тритикале и зерна пшеницы (в % к яичному белку)

Аминокислота	Тритикале	Пшеница
Лизин	47	35
Триптофан	74	86
Треонин	62	55
Валин	66	71
Метионин	49	53
Изолейцин	59	63
Лейцин	79	74
Фенилаланин	86	83

Значение тритикале в современном сельском хозяйстве. Сегодня тритикале выращивается в более чем 30 странах мира. Основные направления его использования:

1. Кормовая база животноводства – зеленая масса, силос и зерно в корм.
2. Пищевая промышленность – производство муки, хлебобулочных и диетических продуктов.
3. Биотопливо – перспективный источник биоэтанола.

Тритикале является перспективной культурой для регионов с проблемным земледелием, где традиционные зерновые дают низкий урожай. Его использование помогает повысить продовольственную безопасность и устойчивость сельского хозяйства.

Урожай зеленой массы тритикале в 2 раза больше, чем у пшеницы. Зеленая масса кормовых сортов тритикале превосходит озимую рожь по содержанию протеина, каротиноидов и сахаров [4].

Большой интерес вызывает высокая продуктивность и потенциальные возможности этой культуры. Максимальная урожайность тритикале достигла в Болгарии-116, Италии-110, Ирландии-107, Германии-92, Швеции-86, Польше-85, в Беларуси-99 ц/га. В настоящее время первые три лидируют места по площадям посевов тритикале занимают Германия, Польша и Беларусь [3].

Сорта тритикале продовольственного направления находят применение в кондитерской, хлебопекарной, спиртовой и пивоваренной промышленности. По типу развития тритикале тритикале имеет как яровые, так и озимые формы.

- Озимой тритикале;
- Яровой тритикале

Яровые культуры высеваются весной и растут летом, осенью с них собирают урожай. Яровая тритикале относится к кормовым растениям. Она

содержит аминокислоты, может добавляться в комбикорма вместо пшеницы и кукурузы. Такая тритикале позволяет экономнее расходовать корма и повышать продуктивность сельхоз животных. Среди прочих яровых тритикале, выведены позднеспелый сорт Ульяна (на зерно), зерно кормовые Амиго и Лотас, а также зерно сенажный Гребешок.

Озимые растения дольше растут и развиваются, чем яровые культуры. Они выдерживают более низкие температуры и высеваются осенью или в начале зимы. Известные сорта озимой тритикале в России – Алтайская 4, Ставропольский 5, Юбилейная, Гермес, Башкирская, Торнадо, Хлебороб и другие.

Тритикале в Узбекистане пока не является широко распространённой культурой, но учёные и фермеры проявляют к ней большой интерес. Причиной тому - высокий потенциал этой зерновой культуры, особенно в качестве источника белка и клетчатки для пищевой промышленности. Исследования показывают, что тритикале хорошо приспосабливается к климату Узбекистана и обладает высокой урожайностью.

В стране проводились исследования различных сортов озимой тритикале. Согласно данным Узбекского научно-исследовательского института растениеводства, для региона районированы такие сорта, как Многозерный 2. Среди других изучаемых сортов упоминаются Праг серебристый, Сват, Сергей и Туйимли [1].

ЗАКЛЮЧЕНИЕ. Создание тритикале стало важным этапом в развитии селекции зерновых культур. Эта культура сочетает лучшие качества пшеницы и ржи, обеспечивая стабильное производство зерна даже в сложных агроклиматических условиях. Тритикале играет все большую роль в мировом сельском хозяйстве и имеет значительный потенциал для дальнейшего расширения.

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ИСПОЛЬЗОВАНИЕ ЭКСПЕРИМЕНТАЛЬНЫХ ТЕХНИК АКВАРЕЛИ В ОБРАЗОВАТЕЛЬНОМ ПРОЦЕССЕ

Аннотация. *В статье рассматриваются современные подходы к применению экспериментальных техник акварели в системе художественного образования. Определяется роль акварельных экспериментов как инновационного средства формирования креативного мышления и развития методической компетентности будущих педагогов изобразительного искусства. Раскрываются методологические основы внедрения текстурных и гранулированных эффектов, а также анализируется их значение в развитии индивидуального стиля учащихся.*

Ключевые слова: *акварель; экспериментальные техники; художественное образование; педагогика искусства; креативность.*

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USING EXPERIMENTAL WATERCOLOUR TECHNIQUES IN THE EDUCATIONAL PROCESS

Annotation. *The article examines the integration of experimental watercolor techniques into art education. It highlights their methodological and aesthetic potential in developing creative thinking and artistic individuality among future teachers of fine arts. The study focuses on texture and granulation as innovative expressive tools in watercolor that enhance students' cognitive and imaginative skills.*

Keywords: *watercolor; experimental techniques; art education; pedagogy; creativity.*

Современное художественное образование переживает период активного поиска инновационных подходов, направленных на развитие творческой индивидуальности обучающихся. Акварель, как один из наиболее пластичных и выразительных материалов, предоставляет широкие возможности для экспериментов, позволяя соединять традиционные

живописные приёмы с современными авторскими поисками. Использование экспериментальных техник акварели — грануляции, солевых текстур, комбинирования пигментов, добавления природных и синтетических компонентов — становится значимым педагогическим инструментом в процессе формирования профессиональных компетенций будущих педагогов искусства [1].

Вопросы применения экспериментальных техник в художественном образовании исследуются рядом отечественных и зарубежных авторов. Так, Семёнова М.А. [2] рассматривает акварель как средство эстетического воспитания, отмечая её влияние на развитие наблюдательности и чувства цвета у обучающихся. Дербисова М.А. [3] подчёркивает значение акварельной живописи в профессиональной подготовке дизайнеров.

В зарубежных исследованиях Yang M. [4] и Halverson E.R., Heath S.B. [5] подчёркивается важность синтеза традиционных и цифровых подходов к обучению живописи, что расширяет представления о художественном эксперименте. Методологические принципы художественного эксперимента раскрываются также в трудах Bychkov V.V., Grushka K. и других исследователей педагогики искусства [6; 7].

Основу методологического подхода составляет сочетание наблюдения, анализа педагогического опыта, экспериментальной практики и художественно-творческого моделирования. В ходе исследования проводились учебные занятия со студентами направления «Изобразительное искусство и инженерная графика», где использовались авторские техники акварели с применением грануляционных эффектов, создаваемых на основе различных природных минералов и солей.(рис1)



Рис1. Авторские техники акварели с применением грануляционных эффектов

Для анализа результатов использовались качественные и количественные методы педагогического эксперимента, включающие наблюдение за динамикой развития художественного восприятия и анализ учебных работ студентов.

Результаты проведённого эксперимента показали, что применение экспериментальных техник акварели способствует:

- активизации творческого потенциала студентов;
- развитию сенсорного восприятия цвета и фактуры;
- формированию индивидуального стиля живописи;
- осмыслению художественного процесса как исследовательской деятельности.

Студенты отмечали, что использование нестандартных материалов (например, природной соли, песка, гранулирующих пигментов) делает процесс создания акварели более увлекательным и исследовательским.

Современные тенденции в искусстве требуют от педагога умения сочетать традиционные методы преподавания с инновационными. Экспериментальная акварель позволяет формировать у обучающихся не только художественные, но и исследовательские навыки, что согласуется с идеями В. Выготского, Дж. Дьюи и Р. Арнхейма о значении творческого опыта в развитии личности [8].

Таким образом, художественный эксперимент в акварели становится не только эстетической, но и педагогической категорией, способствующей формированию компетенций XXI века — креативности, критического мышления и визуальной грамотности.

Использование экспериментальных техник акварели в образовательном процессе является перспективным направлением художественно-педагогической практики. Эти методы обеспечивают интеграцию чувственного опыта и исследовательского подхода, что особенно важно в подготовке будущих педагогов искусства.

В дальнейшем планируется расширить спектр экспериментальных приёмов и разработать методические рекомендации по их применению в образовательных учреждениях.

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ОБОБЩЕННАЯ МОДЕЛЬ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В СФЕРЕ ПРАВОПРИМЕНЕНИЯ. КРИТИЧНОСТЬ ОБУЧАЮЩИХ ДАННЫХ И МОРАЛЬНО – ЭТИЧЕСКИЕ ПРОБЛЕМЫ

Аннотация: *Статья посвящена вопросам использования систем искусственного интеллекта в сфере правоприменения. Для абстрагирования от несущественных реализационных аспектов систем искусственного интеллекта, вводится понятие обобщенной модели, главной характеристикой которой является ее функционал. Выполнен анализ исследований различных авторов по предпочтительным способам использования таких систем. Рассмотрены риски морально-этического плана, детерминируемые использованием систем искусственного интеллекта.*

Ключевые слова: *правоприменение, принципы использования, искусственный интеллект, гражданское право, арбитражное право, приказное производство, судебный приказ, предиктивная аналитика, риск дегуманизации.*

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GENERALIZED MODEL OF ARTIFICIAL INTELLIGENCE IN THE FIELD OF LAW ENFORCEMENT. CRITICALITY OF TRAINING DATA AND MORAL AND ETHICAL ISSUES

Abstract: *The article is devoted to the issues of using artificial intelligence systems in the field of law enforcement. In order to abstract from the insignificant implementation aspects of artificial intelligence systems, the concept of a generalized model is introduced, the main characteristic of which is its functionality. The article analyzes the research conducted by various authors on the preferred methods of using such systems. It also discusses the moral and ethical risks associated with the use of artificial intelligence systems.*

Keywords: *law enforcement, principles of use, artificial intelligence, civil law, arbitration law, writ proceedings, court order, predictive analytics, risk of dehumanization.*

Введение. Необходимость использования обобщенной модели искусственного интеллекта. Нынешний период развития цивилизации наверняка войдет в историю как знаковый. По своему воздействию на общественно-экономические отношения он превосходит периоды турбулентности в истории социума, связанные с изобретением парового двигателя или электричества. Действительно, феномен, называемый искусственным интеллектом (ИИ), оказывает кардинальное влияние не только на эффективность процессов, имеющих выраженное внешнее проявление (например, промышленное производство, связь, транспорт и т.д.), но также изменяет и скрытые, когнитивные процессы (в том числе, правовое мышление и правовое познание).

Как научная дисциплина, область исследований в области ИИ сложилась в 1950-х годах прошлого века. Несмотря на значительное время, прошедшее с момента зарождения первых экспериментов с моделями ИИ, терминология в этой области знаний, не является устоявшейся до сих пор. Так, в некоторых источниках разделяют искусственный интеллект на сильный и слабый, в других применяют иные противопоставляемые друг другу категории – узконаправленный искусственный интеллект и универсальный искусственный интеллект. В частности, последнее деление предусматривает ГОСТ Р 71476 – 2024 «Искусственный интеллект. Концепции и терминология искусственного интеллекта» [1].

Отметим, что в соответствии с ГОСТ Р 71476 – 2024 [1], универсальный искусственный интеллект является гипотетическим концептом с неясной перспективой практической реализации. Для целей настоящей статьи будет использоваться введенная автором обощенная модель ИИ, описываемая термином **FLAI** (**future law artificial intelligence**) для подчеркивания того, что речь идет об описании как ныне существующих систем, так и тех, которые будут доработаны с улучшением их функциональности в кратко- или среднесрочной перспективе. Этим мы уходим от необходимости уточнения дихотомий «слабый/сильный» искусственный интеллект или «узконаправленный/универсальный» искусственный интеллект, а также от необходимости точного указания на технологию реализации (нейросеть или иное), сосредоточившись на ключевом аспекте: обсуждению подлежат «компьютерные системы, способные выполнять задачи, которые обычно требуют интеллекта» [1, п. 5.1]. В тех случаях, когда соответствующая аббревиатура ИИ используется в прямой цитате, в этой статье, как и в первоисточнике, будет применяться термин ИИ.

Особый интерес представляет использование FLAI-систем в правоприменении, в том числе и потому, что несомненно сверхвысокие вычислительные характеристики таких систем, при поверхностном рассмотрении у многих исследователей порождают ложное понимание универсальности FLAI-систем, их всеохватности и всемогущества. Рационально-диалектический же взгляд на фактические возможности FLAI-систем требует философского подхода.

Можно сказать, что правоприменение является наиболее удобным «микроскопом и томографом» для анализа сильных и слабых сторон FLAI-систем, поскольку именно в правоприменении эти стороны проявляются в наиболее полной мере.

Под правоприменением мы понимаем особую, носящую государственно-властный характер, форму практической реализации норм права. Институт правоприменения подробно рассмотрен в работе [2]. Естественно, что в условиях проникновения FLAI во все сферы общественной жизни, изменения происходят и в институте правоприменения.

При этом в работе [3], посвященной судебному правоприменению с учетом возможностей систем искусственного интеллекта, отмечается: «применение систем ИИ не должно умалять гуманистическую сущность правосудия, в котором находит свое отражение справедливость, не тождественная математическим алгоритмам. В противном случае гуманизм правосудия будет подменен трансгуманизмом, разрушающим саму сущность права, исходящего от людей и направленного на защиту человека» [3].

Правоприменение FLAI. Текстовые документы. Несмотря на то, что термин искусственный интеллект существует достаточно давно, с 1950-х годов прошлого века, реальное практическое использование искусственного интеллекта началось сравнительно недавно. Именно поэтому, как отмечается в работе [4], по этой причине многие существенные моменты, касающиеся данной технологии, начиная с ее теоретических возможностей и допустимых сфер использования, заканчивая возможными ограничениями и рисками ее использования, не до конца понятны. Поэтому вопрос о принципиальной возможности использования FLAI в сфере отправления правосудия, в частности, по гражданским и арбитражным делам является актуальным, с учетом того, что целый ряд авторов не без оснований выказывают на этот счет определенный скепсис [5].

Нужно отметить, что на данный момент уже известен опыт практического использования систем FLAI в судопроизводстве в Австрии, ФРГ, Франции, Аргентине, КНР, Мексике, США, Нидерландах, Канаде [5], [6].

Например, в КНР предложенное FLAI решение или рекомендация может отвергаться судьей, но в этом случае ему необходимо письменно привести доводы своего несогласия с предложенным FLAI проектом решения [3], [21], т.е. применение FLAI призвано содействовать отправлению правосудия, а не замене судьи в его основной обязанности - принятии законного и обоснованного решения [3], [21].

Отталкиваясь от идеи о принципиальной возможности использования систем FLAI в судопроизводстве, в работах [4], [7] предложены две возможные процессуальные модели такого использования в актуальном российском гражданском процессе:

1. Модель «суррогатного» правосудия, при котором анализ обстоятельств дела и принятие процессуального решения осуществляется

системами FLAI без непосредственного участия человека, но под его контролем (техническим и процессуальным).

2. Модель «дополненного» судопроизводства, при котором аналитическая деятельность суда по делу дополняется системами FLAI, анализирующими обстоятельства дела и предлагающими возможный вариант решения, но окончательное решение принимается человеком.

Автору настоящей статьи не кажутся предложенные в работах [4], [7] термины удачными, особенно термин «суррогатный», который в соответствии с дефинициями толкового словаря русского языка имеет значение продукта, отчасти заменяющего какой-либо другой продукт, а также значение подделанного, фальсифицированного продукта [8]. Но остановимся на сутевой части предложений работ [4], [7].

Как полагает автор работ [4], [7], обе модели являются возможными с технической, нормативной, и теоретической точек зрения. Во-первых, современный уровень развития искусственного интеллекта уже позволяет ему, с одной стороны, анализировать различные тексты, находить в них ключевые понятия (как правило, заранее заданные), устанавливать взаимосвязи между ними и, с другой стороны, генерировать текст с заранее заданными параметрами (структурой, содержанием, стилистикой). С этой точки зрения современные системы FLAI вполне могут быть использованы для анализа представленных сторонами состязательных бумаг, подбора соответствующих обстоятельствам дела норм права и судебной практики и подготовки на основе этого проекта судебного акта по существу дела [4].

Таки образом, по мнению автора работы [4], с нормативной и теоретической точек зрения обе модели могут быть вписаны в уже существующие процессуальные институты.

Так, «суррогатное» правосудие соответствует существующим механизмам приказного производства [4]: в нем рассматриваются только бесспорные требования, нет как такового судебного разбирательства, а все судебное доказывание сводится, по сути, к установлению нескольких локальных предметов доказывания.

Идея «дополненного» правосудия, по мнению автора работы [4], вписывается в стадию подготовки судебного разбирательства. Так, если задачами суда при подготовке к судебному разбирательству являются среди прочего установление предмета доказывания по делу, определение нормы права, подлежащей применению в деле, предварительная квалификация отношений сторон, определение достаточности представленных доказательств, то не видится никаких серьезных препятствий к тому, чтобы эти задачи не могли решаться путем публикации предварительного судебного акта по делу, подготовленного системой FLAI на основе документов, представленных лицами, участвующими в деле, к моменту начала (или окончания) данной стадии [4].

Автор работы [4] говорит, что в качестве концептуального возражения против полномасштабного использования самообучающихся систем в

судопроизводстве часто приводятся аргументы об ограниченных возможностях современного FLAI, не соответствующих задачам и специфике правосудия: якобы он не способен полноценно воспринимать окружающий мир, «понимать», в привычном нам значении этого слова, и оперировать смыслами, толковать нормы права.

Частично признавая обоснованность этих доводов, автор статьи [4] в защиту FLAI приводит следующие аргументы. Современный гражданский и, в особенности, арбитражный процесс исходят из негласного приоритета письменных доказательств над устными, письменного процесса над устным, в связи с чем подавляющее большинство информации, циркулирующей в судопроизводстве по гражданским делам, представлено именно в форме текста [4].

Далее, продолжает автор статьи [4], реалии современного гражданского оборота таковы, что абсолютное большинство фактов, происходящих в нем, в той или иной форме документируются, т.е. могут быть доказаны и чаще всего доказываются именно посредством письменных доказательств. Ключевые для доказательственной деятельности документы - исковое заявление и отзыв на него - также представляются в письменной форме, т.е. первичное представление об обстоятельствах дела и о предмете доказывания суд получает именно из текстовых документов [4].

Фактически анализ текстовой информации является главенствующей формой судебного познания вплоть до первого судебного заседания по делу, т.е. как минимум до окончания стадии подготовки дела к судебному разбирательству. При этом значительный объем дел (дела приказного производства) вообще рассматривается без проведения судебных заседаний и без исследования каких-либо других, кроме письменных, доказательств [4].

Принципиальные алгоритмические и программные проблемы FLAI. Транспонирование речи. Наибольшую сложность в настоящее время для систем FLAI представляет задача транспонирования слов в текст (распознавание речи с переводом в текст), при которой могут возникать существенные ошибки, поскольку точность технологий неодинакова относительно разных лиц из различных регионов [9].

Тем не менее, например, в судебной системе Италии технология FLAI, а именно алгоритм преобразования устной речи в текст, используется при оценке свидетельств для получения быстрых и точных записей судебных слушаний, в основном в ходе гражданского судопроизводства и часто при составлении документов [9]. Эта технология позволяет упростить процесс записи эквивалентов между фонемными и письменными терминами, а также правил, регулирующих устные и письменные коммуникации, преобразуя аналоговый звук в цифровой поток. Затем цифровой поток фрагментируется в короткие сигналы, которые ассоциируются с фонемами и словами, при помощи ресурсоемких техник глубокого обучения [10]. Как отмечают итальянские исследователи, эта система может быть полезна не только для

преобразования речи в письменный текст, но и для повышения точности стенограмм, составляемых в судах [10].

При этом автор статьи [11] подчеркивает, что когда мы допускаем в качестве судебного доказательства информацию, облеченную в электронную форму или зафиксированную при помощи электронных носителей, это требует выработки особого механизма ее проверки, в особенности - проверки достоверности: «оценки свойств носителя информации, его способности фиксировать информацию без искажений, способности сохранять информацию в неизменном виде, способности воспроизводить информацию в неискаженном виде и пригодном для судебного исследования» [11]. Более того, стоит предположить, что применение FLAI потребует и качественно новых способов получения и проверки такой информации и ее достоверности - например, посредством моделирования, что применимо не ко всем видам доказательств [11].

Цифровизация суда по гражданским делам. Вернемся к текстовым документам. Автор работы [4], в целом соглашаясь с ограниченностью возможностей нынешних систем ИИ, полагает, что «современные системы интеллектуального анализа и генерации текстовой информации (так называемые языковые модели) вполне способны справиться с задачами *предварительного* установления фактической основы дела на стадии подготовки дела к судебному разбирательству. А поскольку эта информация (обстоятельства дела, их правовая квалификация) является базисом и для установления правовой основы дела, а также его типизации, то и с задачей *предварительного* подбора применимых норм и судебной практики при подготовке дела к судебному разбирательству системы ИИ также способны справиться» [4].

Единственным существенным препятствием на пути реализации предложенных моделей использования FLAI, по мнению автора работы [4], является отсутствие внятного нормативного регулирования таких систем: как материального (устанавливающего принципы их разработки и применения), так и процессуального [4]. При этом автор статьи [4] полагает, что это препятствие не является непреодолимым. «Опыт внедрения новых технологий в сферы, регулируемые правом, показывает, что нормативное регулирование, как правило, действительно отстает от научно-технического прогресса. Но по истечении некоторого времени, по мере накопления опыта применения технических новшеств, выработки наукой и практикой консолидированных позиций по наиболее концептуальным вопросам такого применения, регулирование появляется» [4].

Как считает автор работы [4], централизованный характер разработки и внедрения цифровых технологий в гражданское судопроизводство представляется одним из важнейших принципов цифровизации гражданского процесса.

При этом, по мнению автора работы [4], полноценная система «дополненного» правосудия, должна создаваться, настраиваться и

оперироваться если и не самим Верховным Судом РФ, то по его заданию и под его непосредственным контролем. В контексте рассматриваемой проблемы это означает, что задавать алгоритмы работы FLAI (выявлять и обозначать переменные, от наличия/отсутствия которых зависит существо судебного акта), подбирать и корректировать судебную практику для его обучения (дифференцировать показательную и непоказательную судебную практику, оперативно привносить новые правовые позиции и отсеивать устаревшие), оттачивать формулировки генерируемых FLAI текстов будет тот же субъект, который ответственен за поддержание единообразия судебной практики.

Таким образом, в российском гражданском процессе может появиться еще один технический способ обеспечения единообразия судебной практики, причем в сравнении с уже существующими способами (например, системой инстанционных пересмотров судебных актов) он может быть [4]:

- более оперативным (процесс внесения новых обзоров практики ВС РФ в пул судебной практики, используемой для обучения FLAI, будет происходить быстрее, чем процесс доведения их до нижестоящих судов;
- более безотказным (существующие и релевантные делу правовые позиции будут обозначены FLAI вне зависимости от знания их судом, рассматривающим дело);
- менее субъективным (снижается риск игнорирования судом, рассматривающим дело, существующих правовых позиций в угоду уже сформировавшемуся у него убеждению по делу, риск закрепления вышестоящими судами судебных актов по причинам, не связанным с их законностью и обоснованностью).

Проблемы использования FLAI в правоприменении. Риск утраты творческого начала в судейской деятельности. Некоторые исследователи, например [12], отмечают риск утраты творческого начала в судейской деятельности. Суть этой проблемы можно описать следующим образом.

Система FLAI, опираясь на предыдущую судебную практику, предлагает суду возможный вариант решения по делу. Далее автор работы [4] продолжает: «поскольку такая система не в последнюю очередь имеет своей целью снижение нагрузки на суды за счет освобождения их от необходимости формулировать однотипные решения по, как правило, несложным делам, естественно, что судьи будут склонны подтверждать предложенные решения, не внося в них никакие коррективы - даже, если для этого будут иметься все основания. Далее эти решения будут попадать в пул судебной практики, используемой для обучения ИИ, и служить основой для принятия новых «автоматизированных» судебных актов. Так, судебная практика замыкается сама в себе, бесконечно самовоспроизводясь, а роль суда вместо творческого правоприменения сводится к простому подтверждению ранее существовавшей судебной практики» [4].

Для страховки от опасности «сведения» правосудия к стандартным схемам, автор статьи [4] считает нужным предусмотреть, чтобы решения,

предлагаемые FLAI, носили предварительный характер и не были обязательны для суда; чтобы суд мог от них отступить, не опасаясь последующей отмены принятого им судебного акта на одном лишь только этом основании. «В этом смысле в процессуальном законе должен быть закреплен вспомогательный характер данного инструмента; понимание того, что он предназначен для помощи суду и удобства сторон, но не снимает с первого ответственность за принятый судебный акт» [4].

Другим механизмом устранения недостатков правоприменения должны оставаться инстанционные пересмотры. В отношении судебных актов, принятых по делам, в которых применялись системы «дополненного» правосудия, должны сохраняться обычные (а может быть, и повышенные) возможности для их пересмотра вышестоящим судом, причем именно человеком, чтобы минимизировать риски «механистического» правосудия [4].

Творческий характер судебной деятельности проявляется не только и не столько в определении надлежащей нормы права и ее истолковании. Творческий характер судебной деятельности, помимо установления нормы, подлежащей применению, и ее истолкования проявляется, например, в установлении обстоятельств дела, свободной и независимой оценке доказательств, на что FLAI пока в полной мере не способен [4].

Кроме того, творческий характер судебной деятельности, также проявляется и в наличии в праве оценочных понятий [13] и судейского усмотрения [14 - 19] - категорий, оперировать которыми FLAI на данный момент принципиально не способен. Поэтому, на взгляд автора статьи [4], применение FLAI не способно концептуально изменить творческий характер судебной деятельности. Автор настоящей статьи не придерживается столь категорично-оптимистичного вывода и полагает, что сохранение творческого характера судейской деятельности, равно как и гуманистического наполнения права, возможно только при определении рационального «ареала» распространения FLAI внутри судебной сферы.

В работе [9] по этому поводу говорится: «наличествующее у судьи (суда) право выбирать один из нескольких вариантов решения изначально вытекает исключительно из закона и осуществляется в рамках закона. Усмотрение - это своего рода инструмент для принятия решений, законных и обоснованных, без него судья становится всего лишь чиновником на службе государства, средством принятия решений, но никак не субъектом осуществления правосудия, деятельности, несомненно, имеющей творческий характер» [9].

Критичность обучающих данных. В работе [11] обращается внимание на другую проблему, связанную с FLAI: критичность того, какие исходные данные (в соответствии с [1] такие данные называются обучающими), базу, концепт решения тех или иных задач в FLAI вкладывает человек, а значит, закладывает и определенную идеологию, ценностные ориентиры и оценочные критерии.

«Это особенно актуально применительно к гуманитарной области, каковым является правосудие. Чтобы машина самообучилась и получила некие когнитивные функции, база должна быть заложена извне, человеком. Для цивилистического процесса, правосудия особую роль в таком «первичном знании» играет концепт процесса, его общая идеология, принципы, дефинитивные категории и их понимание человеком. Поэтому ожидаемая от машинной системы объективность во многом иллюзорна, а опасность формализованного злоупотребления гораздо выше» [11].

Иными словами, машинная система подчинена той идеологии и тому алгоритму оценки, которые в него заложены людьми, - и в той парадигме, которая использована людьми при разработке соответствующей программы [20].

Именно поэтому, как говорит автор статьи [20], «есть определенный соблазн в определении объективных возможностей использования ИИ в правосудии, который кроется в некоторой схожести интеллектуальной методологии. Судебный процесс с психологической (в том числе когнитивной) позиции является искусственно созданной реальностью (артефактом), в которой отсутствуют заранее заданные и стабильные параметры (в виде тезисов, аргументов), но при этом требуется достичь истинных и верных решений (об искомых фактах, действительно существующем правоотношении, субъективном праве и/или обязанности)» [20].

Далее в работе [20] читаем: «Средства и способы, юридический инструментарий, которые надлежит использовать для достижения целей, сами творимы в процессе и процессом. Более того, будучи сотворенными, они не являются статичными и могут подвергнуться видоизменениям в ходе процесса (информация может стать неотносимой, факты - потерять юридическое значение), т.е. они вариативны, но не константны. Часть инструментария вариативна по определению - и может как использоваться, так не использоваться (в зависимости от волеизъявления и осознаваемого стороной/сторонами интереса)» [20].

Однако, по мнению автора настоящей статьи, сходство между FLAI и человеком носит весьма ограниченный характер: за внешним сходством FLAI и человека кроется кардинальное различие. FLAI – это компьютерное устройство, которое лишь имитирует сознание, тогда как человеческое Сознание в соответствии с современным пониманием мироустройства является центром Мироздания.

Наверное, можно согласиться с автором работы [20], что чисто с технической точки зрения, может быть создано устройство, напоминающее судью-человека и потому называемое «электронный судья», ибо «машинная система сможет решать задачи по смыслу в той же когнитивной парадигме, что и человек» [20].

Но тогда уже в практическом плане возникнет вопрос для понимания сущности FLAI, который заключается в следующем: имеются ли

объективные критерии оценки качества FLAI как интеллекта, т.е. определенной сферы психического, присущей человеку? [20].

Мы не знаем о человеческом сознании (и не можем оценивать подобного в FLAI) главного: является ли оно физическим феноменом, возможно ли неорганическое сознание, как связано сознание с нервной системой, как бессознательное влияет на сознание, мотивацию и в целом - на поведение человека [20].

Но обучая FLAI учиться без понимания механизма рождения и развития когнитивных функций (как функций психического), мы не сможем квалифицировать проявление их вовне (например, как правосознания), и тем более прогнозировать отдаленные последствия результатов машинной деятельности, закономерностей ее развития и самосовершенствования [20].

Здесь, как видит автор статьи [20], мы снова возвращаемся к двум взаимосвязанным и принципиальным для права и правосудия тезисам: «антропоцентричности права и сущности правосудия как справедливости».

Выводы. Автор работы [20] совершенно справедливо пишет, что право родилось как социальный регулятор человеческого сообщества: «весьма несовершенный и формализованный, но лучшего за прошедшие тысячелетия выработано не было. Правосудие - порождение потребности в справедливости, которая имеет вневременную ценность, несмотря на все исторические и современные трансформации. В силу своей сущности правосудие невозможно вне человеческого восприятия и оценки» [20].

В работе [20] отмечено, что FLAI (с учетом отсутствия у него морально – этических качеств) не может полноценно заменить судью-человека, но способен облегчить «рутинную» интеллектуальную работу: «помочь проанализировать большой массив документов по определенным и заданным критериям (письменных доказательств, допустим); выделить и описать существенные для исследуемого объекта признаки; отобрать наиболее пригодные для производства экспертизы образцы; помочь в квалификации (выборе нормы права) в бесспорных обстоятельствах (где достаточен метод поиска - как в приказном производстве) и т.п. Это одно из очевидных прикладных направлений развития ИИ для целей правосудия (но не взамен его)» [20].

Следует полностью согласиться с мнением автора статьи [3], который делает следующий вывод: «в рамках реализации судебного правоприменения в России ИИ должен рассматриваться как вспомогательный инструмент отправления правосудия, который не заменяет «таинство вынесения решения» и не посягает на верховенство права в части индивидуального подхода к принятию решения и внутреннего усмотрения судьи в этом процессе».

Великий русский философ И.Ильин за много десятилетий до появления ИИ, словно предчувствуя возможные искушения человечества, сказал: «Только человеку как творцу духовной жизни доступно нормальное

правосознание, только ему дано искать и находить правое право, ибо только ему открыта цель права и его живой источник» [22].

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СОВРЕМЕННЫЕ ТЕХНОЛОГИИ УПРАВЛЕНИЯ ОРГАНИЗАЦИЕЙ

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МАРКЕТИНГОВЫЙ АНАЛИЗ В СФЕРЕ СТРОИТЕЛЬНОГО БИЗНЕСА: МЕТОДЫ ИССЛЕДОВАНИЯ

Аннотация: *в статье исследуются методы маркетингового анализа, применяемые в строительном бизнесе, с акцентом на их роль в формировании стратегических решений и повышении устойчивости компаний в условиях цифровой трансформации. Целью исследования является систематизация подходов к использованию статистических, стратегических и цифровых методов анализа при управлении строительными предприятиями. В работе применены сравнительно-аналитический и структурный методы, факторный и корреляционно-регрессионный анализ, а также синтез данных отечественных и зарубежных кейсов. Показано, что сочетание инструментов PEST-, SWOT- и SNW-анализа с цифровыми технологиями (CRM, SEO, SMM, Big Data) обеспечивает повышение точности прогнозов, развитие имиджа бренда и оптимизацию коммуникаций. Обосновано, что комплексный маркетинговый анализ формирует основу стратегической устойчивости и конкурентоспособности строительных организаций.*

Ключевые слова: *маркетинговый анализ, строительный бизнес, цифровизация, SWOT-анализ, имидж компании, стратегическое управление, интернет-маркетинг.*

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MARKETING ANALYSIS IN THE CONSTRUCTION BUSINESS: RESEARCH METHODS

Abstract: *This article examines marketing analysis methods used in the construction industry, focusing on their role in shaping strategic decisions and enhancing company resilience in the context of digital transformation. The aim of the study is to systematize approaches to the use of statistical, strategic, and digital analytical methods in the management of construction companies. The paper utilizes comparative analytical and structural methods, factor and correlation-regression analysis, and a synthesis of data from domestic and international cases.*

It is demonstrated that combining PEST, SWOT, and SNW analysis tools with digital technologies (CRM, SEO, SMM, Big Data) improves forecast accuracy, develops brand image, and optimizes communications. It is also demonstrated that comprehensive marketing analysis forms the foundation for the strategic resilience and competitiveness of construction organizations.

Keywords: *marketing analysis, construction industry, digitalization, SWOT analysis, company image, strategic management, internet marketing.*

Введение. Современная строительная отрасль России развивается в условиях высокой конкуренции, цифровизации и необходимости быстрой адаптации к изменяющейся макроэкономической среде. Успешное функционирование строительных компаний всё больше зависит от качества и глубины маркетингового анализа, который позволяет принимать стратегические решения на основе объективных данных. По мнению Д. Г. Петровой, именно системная аналитическая работа обеспечивает устойчивость бизнеса, снижает влияние рыночных рисков и способствует повышению эффективности коммуникаций[45].

Маркетинговый анализ в строительстве имеет ряд отраслевых особенностей: капиталоёмкость проектов, длительный цикл сделки, зависимость от государственной политики и территориальная неоднородность спроса. В таких условиях растёт значение статистических, стратегических и цифровых методов, обеспечивающих интеграцию анализа в систему управленческих решений. Целью настоящего исследования является систематизация методов маркетингового анализа в строительном бизнесе и выявление направлений их практического применения.

Методы и материалы исследования. Теоретико-методологическую основу исследования составили работы Л. С. Паршинцевой, М. В. Богдановой, Е. Д. Молодцовой, Р. С. Хана, В. В. Суркова, Р. Л. Юсубова, Д. С. Подкопая и М. А. Нагорного, освещающие различные подходы к анализу рыночных процессов в строительстве.

В исследовании использовались следующие методы:

сравнительно-аналитический – для сопоставления теоретических моделей и практических инструментов маркетингового анализа; статистический – для оценки динамики спроса, структуры рынка и предпринимательской уверенности; факторный и корреляционно-регрессионный – для выявления взаимосвязей между макроэкономическими и потребительскими показателями.

Результаты исследования. Проведённый анализ позволил выделить несколько ключевых направлений применения методов маркетингового анализа в строительном бизнесе:

[45] Петрова Д. Г. Особенности маркетинговой деятельности в строительстве // Экономика и парадигма нового времени. 2023. №3 (20). URL: https://cyberleninka.ru/article/n/osobennosti-marketingovoy-deyatelnosti-v-stroitelstve (дата обращения: 04.11.2025).

1. Статистический анализ. По данным Л. С. Паршинцевой, М. В. и В. Г. Богдановых, маркетинговое исследование включает последовательные этапы: постановку проблемы, формулирование целей, сбор и обработку данных, интерпретацию результатов[46]. На каждом этапе целесообразно применение выборочных, группировочных и корреляционно-регрессионных методов, что позволяет выявить закономерности спроса, динамику цен и предпринимательскую уверенность.

2. Стратегический анализ. Е. Д. Молодцова отмечает, что для малых и средних строительных компаний оптимальной является комбинация SWOT-, PEST- и SNW-подходов, дополненных портфельными моделями BCG и McKinsey[47]. Эти инструменты позволяют оценить внутренние ресурсы, потенциал роста и устойчивость к рыночным рискам, формируя основу долгосрочной стратегии развития.

3. Региональный анализ и коммуникации. Исследование Р. С. Хана и В. В. Суркова показало, что репутация застройщика и имидж бренда становятся третьим по значимости фактором выбора жилья после цены и местоположения[48]. Эффективные коммуникации требуют комплексного позиционирования корпоративного и продуктового бренда с учётом региональных особенностей и потребительских ожиданий.

4. Имидж как нематериальный актив. Р. Л. Юсубов рассматривает имидж строительной организации как результат взаимодействия корпоративной культуры, репутации и социальной ответственности[49]. Формирование положительного имиджа повышает доверие к компании и напрямую влияет на финансовые показатели.

5. Международный маркетинг. На внешних рынках, по Д. С. Подкопаю, наибольший эффект дают наружная реклама и интернет-коммуникации, каждая из которых обеспечивает около 30 % обращений[50]. Эффективность достигается через системный мониторинг откликов аудитории и обратную связь, что способствует формированию устойчивого бренда.

6. Цифровой анализ и интернет-маркетинг. М. А. Нагорный выделяет SEO-оптимизацию, маркетинг в социальных сетях, контент-маркетинг и

[46] Паршинцева Л. С., Богданова М. В., Богданова В. Г. Особенности применения статистических методов в маркетинге строительства //Управленческий учет. – 2022. – №. 4-3. – С. 478-483.
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[48] Хан Р. С., Сурков В. В. Региональные особенности позиционирования строительной продукции в маркетинговых коммуникациях //ЦИТИСЭ. – 2021. – №. 2. – С. 500-509.
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аналитику данных как основные инструменты цифрового продвижения[51]. Их интеграция повышает узнаваемость бренда, конверсию и рентабельность инвестиций.

Обсуждение. Результаты анализа подтверждают, что маркетинговый анализ в строительстве является многоуровневым процессом, охватывающим стратегические, статистические и цифровые подходы. Он обеспечивает связь между корпоративными целями и операционными решениями, а также позволяет адаптировать стратегию компании к рыночным изменениям.

В отличие от промышленного сектора, где маркетинг часто носит продуктовый характер, строительные предприятия оперируют проектами с длительным жизненным циклом. Поэтому важна не только оценка спроса, но и постоянный мониторинг эффективности коммуникаций, каналов продаж и репутационных показателей. Цифровизация маркетинга трансформирует классические методы анализа, добавляя инструменты Big Data, CRM, SEO и SMM, что обеспечивает постоянную обратную связь с клиентом.

Анализ литературы показывает, что ключевыми тенденциями развития маркетингового анализа в отрасли становятся:

– переход от фрагментарного исследования к сквозной аналитике на всех этапах цикла проекта;
– рост значимости репутационных и имиджевых показателей;
– интеграция офлайн- и онлайн-каналов коммуникации;
– повышение роли прогнозирования на основе цифровых данных.

Таким образом, маркетинговый анализ становится инструментом стратегического управления, а не просто функцией маркетингового отдела.

Заключение. Маркетинговый анализ в строительной отрасли представляет собой комплекс методов, обеспечивающих научно обоснованное управление рыночной деятельностью предприятия. Он объединяет статистические, стратегические и цифровые подходы, направленные на повышение устойчивости и конкурентоспособности строительных компаний.

Исследование показало, что системное применение PEST-, SWOT- и SNW-анализов, факторных и корреляционно-регрессионных методов, а также инструментов интернет-маркетинга позволяет: обосновывать управленческие решения; оценивать риски и потенциал роста; формировать позитивный имидж и бренд компании; адаптировать коммуникации к региональной и международной специфике.

Современная модель маркетингового анализа должна основываться на интеграции данных, междисциплинарных подходах и цифровых технологиях. Это обеспечивает точность прогнозов, измеримость результатов и

[51] Нагорный М. А. Методы повышения эффективности интернет-маркетинга в сфере строительства // Практический маркетинг. 2023. №6. URL: https://cyberleninka.ru/article/n/metody-povysheniya-effektivnosti-internet-marketinga-v-sfere-stroitelstva (дата обращения: 04.11.2025).

устойчивость конкурентных позиций строительных компаний в условиях цифровой трансформации экономики.

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РАЗРАБОТКА И ВНЕДРЕНИЕ КОМПЛЕКСНОЙ МАРКЕТИНГОВОЙ СТРАТЕГИИ СТРОИТЕЛЬНОЙ КОМПАНИИ

Аннотация: *в статье рассмотрены подходы к разработке и внедрению комплексной маркетинговой стратегии строительной компании в условиях цифровой трансформации отрасли. Цель исследования – систематизация методов маркетингового анализа, используемых при стратегическом управлении строительными предприятиями, и определение способов интеграции цифровых инструментов в классическую модель стратегического планирования. В работе использованы сравнительно-аналитический метод, синтез макроэкономических факторов и анализ кейсов строительных организаций. Показано, что сочетание инструментов PEST-, SNW- и SWOT-анализа с цифровыми технологиями (CRM, Big Data, IoT, интернет-маркетинг) позволяет формировать устойчивые и адаптивные стратегии. Предложена трехуровневая модель стратегического управления, объединяющая макро-, мезо- и микроуровни анализа.*

Ключевые слова: *маркетинговая стратегия, строительная компания, цифровизация, SWOT-анализ, сегментация, стратегия развития, управление.*

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DEVELOPMENT AND IMPLEMENTATION OF A COMPREHENSIVE MARKETING STRATEGY FOR A CONSTRUCTION COMPANY

Abstract: *This article examines approaches to developing and implementing a comprehensive marketing strategy for a construction company in the context of the industry's digital transformation. The objective of the study is to systematize marketing analysis methods used in the strategic management of construction companies and to identify ways to integrate digital tools into the classical strategic planning model. The paper utilizes a comparative analytical method, a synthesis of macroeconomic factors, and an analysis of construction organization cases. It is demonstrated that combining PEST, SNW, and SWOT analysis tools with digital technologies (CRM, Big Data, IoT, internet marketing) enables the development of*

sustainable and adaptive strategies. A three-level strategic management model is proposed, combining macro-, meso-, and micro-levels of analysis.

Keywords: *marketing strategy, construction company, digitalization, SWOT analysis, segmentation, development strategy, management.*

Введение. Современная строительная отрасль характеризуется высокой конкуренцией, проектным характером деятельности и множественностью участников производственного цикла. По мнению И. С. Хашиева, именно эффективность маркетинговой системы предприятия определяет его способность удерживать позиции на рынке и адаптироваться к изменяющимся условиям[52]. В отличие от промышленного сектора, маркетинг в строительстве сочетает коммерческую, производственную и управленческую функции: он обеспечивает не только продвижение услуг, но и организацию внутренних процессов, включая планирование, логистику и коммуникации.

В условиях цифровой экономики маркетинговая стратегия становится неотъемлемой частью общего стратегического управления предприятием. Как отмечают О. С. и Л. Ю. Александровы, маркетинговый анализ – это «стартовая точка» формирования корпоративной стратегии, от качества которой зависит устойчивость бизнеса и корректность управленческих решений[53]. Разработка комплексной стратегии требует системного подхода: от анализа внешней среды до внедрения цифровых инструментов мониторинга и коммуникации.

Методы и материалы исследования. Методологическую основу исследования составили труды О. С. и Л. Ю. Александровых, К. А. Райтер, И. С. Хашиева, О. Г. Солнцевой, Е. В. Хороховой и В. А. Колясникова, в которых раскрыты подходы к стратегическому маркетингу в строительной сфере и цифровой трансформации бизнеса.

В исследовании применены следующие методы: сравнительно-аналитический метод – для сопоставления теоретических и практических подходов к маркетинговому анализу строительных предприятий; структурный анализ – для выделения трехуровневой системы маркетингового анализа (макро, мезо, микро); метод кейс-анализа – при рассмотрении примеров АО «СЗ ЖБК-1» (Александрова О.С., Александрова Л.Ю.) и малых строительных предприятий Санкт-Петербурга (Райтер К.А.); синтез цифровых практик – для интеграции CRM-систем, Big Data и контекстной аналитики в модель управления.

Результаты исследования. Анализ источников позволил определить три уровня построения маркетинговой стратегии строительной компании:

1. Макроуровень. Согласно О. Г. Солнцевой, стратегия компании должна соотноситься с государственной политикой капитальных вложений,

[52] Хашиев И. С. Маркетинг в строительстве //Economics. – 2020. – №. 2 (45). – С. 35-37.

[53] Александрова О. С., Александрова Л. Ю. Использование инструментов маркетингового анализа в системе управления строительным предприятием //Journal of Monetary Economics and Management. – 2024. – №. 4. – С. 73-80.

инфраструктурными кредитами и мерами поддержки строительных предприятий[54]. На этом уровне важна оценка законодательных, экономических и социально-технологических факторов (PEST-анализ).

2. Мезоуровень. Е. В. Хорохова и В. А. Колясников выделяют три модели маркетинговых стратегий в градостроительном контексте – нормативную, бизнес- и мультиполезную, каждая из которых соотносится с целями позиционирования и развития территорий[55]. Для строительных компаний это уровень взаимодействия с городской средой, девелоперскими проектами и имиджем бренда.

3. Микроуровень. Внутренний уровень анализа охватывает инструменты PEST-, SNW- и SWOT-оценки, сегментацию и цифровую аналитику (Александрова О.С.[56]; Райтер К.А.[57]). Исследования показали, что применение CRM-систем, Big Data, IoT и контекстной рекламы способствует росту эффективности коммуникаций и управляемости проектами.

Итогом является формирование трехуровневой комплексной модели маркетинговой стратегии, обеспечивающей взаимосвязь стратегического планирования, позиционирования компании на рынке и цифрового контроля над бизнес-процессами.

Обсуждение. Результаты анализа подтверждают, что устойчивость строительных предприятий определяется интеграцией классических и цифровых методов маркетинга. Модель «PEST – SNW – SWOT + сегментация + цифровые метрики» демонстрирует высокую адаптивность к рыночным изменениям.

Как отмечает К. А. Райтер, уровень цифровизации строительных МСП напрямую связан с цифровой грамотностью руководителей и готовностью инвестировать в инновации[58]. В этой связи ключевыми условиями внедрения комплексной маркетинговой стратегии становятся:

– формирование единой цифровой экосистемы компании (CRM, ERP, веб-аналитика);

– разработка системы KPI и сквозной аналитики для контроля эффективности коммуникаций;

– обучение сотрудников и цифровая адаптация организационной культуры;

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[54] Солнцева О. Г. Стратегия развития строительной отрасли России //Гуманитарные, социально-экономические и общественные науки. – 2023. – №. 5. – С. 283-285.

[55] Хорохова Е. В., Колясников В. А. Актуализация моделей маркетинговых стратегий при формировании архитектурно-пространственной среды городов //Вестник Южно-Уральского государственного университета. Серия: Строительство и архитектура. – 2020. – Т. 20. – №. 1. – С. 5-13.

[56] Александрова О. С., Александрова Л. Ю. Использование инструментов маркетингового анализа в системе управления строительным предприятием //Journal of Monetary Economics and Management. – 2024. – №. 4. – С. 73-80.

[57] Райтер К. А. Цифровая трансформация маркетинговых стратегий строительных МСП //Теоретическая и прикладная экономика. – 2021. – №. 3. – С. 30-45.

[58] Райтер К. А. Цифровая трансформация маркетинговых стратегий строительных МСП //Теоретическая и прикладная экономика. – 2021. – №. 3. – С. 30-45.

– увязка стратегических целей компании с государственными и городскими программами развития.

Таким образом, комплексная маркетинговая стратегия в строительстве должна учитывать отраслевую специфику – проектный цикл, кооперацию участников, сезонность и длительность реализации проектов – и одновременно интегрировать инструменты цифровой аналитики, что обеспечивает синхронизацию управленческих и маркетинговых решений.

Заключение. Разработка и внедрение комплексной маркетинговой стратегии в строительной компании представляет собой многоуровневый процесс, включающий аналитическую, организационную и цифровую составляющие. На основе анализа трудов И. С. Хашиева, О. С. И Л. Ю. Александровых, К. А. Райтер, О. Г. Солнцевой, Е. В. Хороховой и В. А. Колясникова обосновано, что успешная стратегия должна опираться на сочетание традиционных инструментов (PEST, SNW, SWOT, сегментация) с цифровыми технологиями управления (CRM, Big Data, IoT, интернет-маркетинг).

Комплексная модель, объединяющая макро-, мезо- и микроуровни анализа, позволяет синхронизировать цели предприятия с тенденциями государственной политики и потребностями рынка. Это обеспечивает стратегическую устойчивость, конкурентоспособность и возможность долгосрочного развития строительных организаций в условиях цифровой трансформации.

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