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STATE OF THE RAW ORE RESOURCE AND TECHNOLOGICAL PACKAGE FOR POTASSIUM FERTILIZER PRODUCTION IN UZBEKISTAN

Abstract: The article shows the indicators of the production of potash fertilizers at potash enterprises and industries in Uzbekistan Tyubegatan deposit. The assortment and changes in its structure, as well as changes in product quality in terms of nutrient content (K_2O) in potash fertilizers, useful component (KCl) in potassium chloride, dust content and particle size distribution are considered. The factors that had the greatest impact on the growth of potash fertilizers production, improving their quality, increasing supplies of potassium chloride to the external market.

Key words: Potash fertilizers, production of potash salts, assortment, potash enterprises, potassium chloride, development dynamics, growth factors, export supplies.

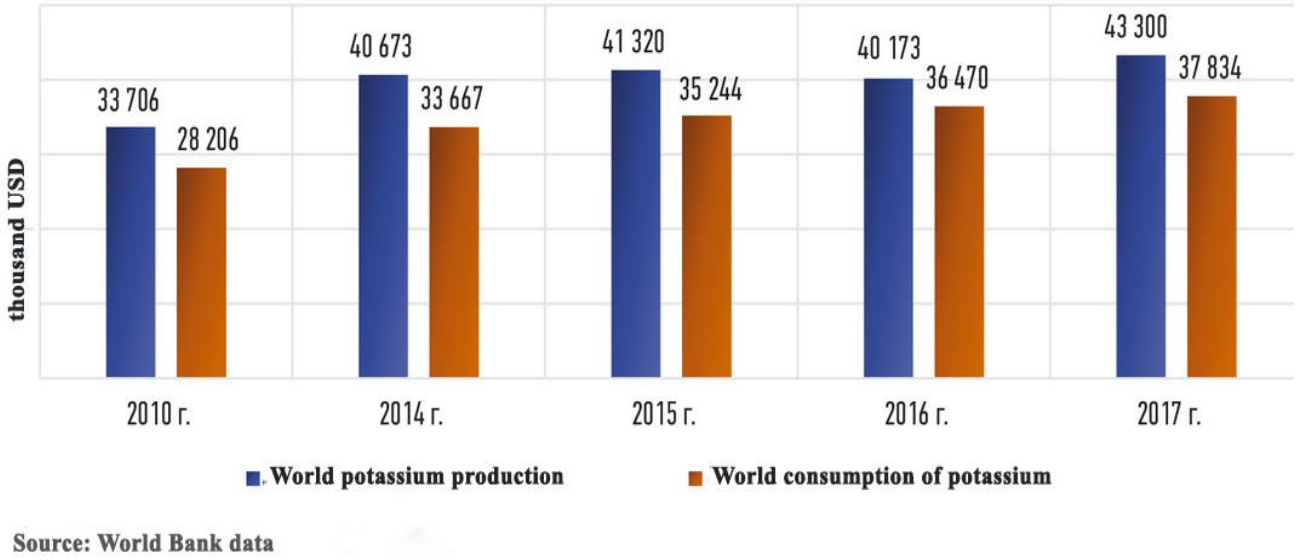
Uzbekistan is both an exporter and an importer of mineral fertilizers. Therefore, both the provision of agriculture with mineral fertilizers and the possibility of increasing the export of mineral fertilizers to the world market depend on the situation in the world market. From this perspective, it is of interest

to review the trends in the global mineral fertilizers market in comparison with the review of the mineral fertilizers market in Uzbekistan.

Population growth and reduction of acreage in the world leads to an increase in demand for mineral fertilizers, which is one of the leading factors in the growth of prices for these products.

Currently, the world's largest producers of mineral fertilizers are China, which occupies more than 25% of the global market, India (about 13%), the USA (about 10%) and Russia (about 8%). In recent years, the US share of the global fertilizer market has been gradually decreasing. The world market for mineral fertilizers includes three main segments of nitrogen, phosphate and potash fertilizers. The share of nitrogen fertilizers is about 59%, phosphorus - 24% and potash - 17% of the world market.

Production and consumption indicators in the potash fertilizers market



Source: World Bank data

From 2010 to 2017, the balance of production and consumption in the potash fertilizers market showed a slight prevalence towards production, which, in turn, implies its saturation. The dynamics of the production of mineral fertilizers based on potash compounds was provided by the growth of production in Canada, the average annual indicators of which amounted to about 27% of the total world

production. Canada is followed by Russia and Belarus, whose shares average about 16% of each of these countries. The share of China is about 13% and 8% - Germany. In general, there are no significant shifts in the context of countries. Consumer demand for mineral fertilizers of potash compounds over the same period showed an upward trend. Total demand from China, Brazil and the United States combined accounted for more than 50% of total global demand. The rest of the countries are also showing a stable growth trend.

The potash fertilizer plant was built on the basis of the Tyubegatan potash salt deposit, which is located in the Kashkadarya region on the border with Turkmenistan. The total commercial reserves of the deposit amount to 400.2 million tons of ore with a potassium chloride content of 36.8%. The most promising part of the deposit with reserves of 200 million tons of ore is located on the territory of Uzbekistan [4]. Until now, potash fertilizers were not produced in Uzbekistan and were imported mainly from Russia in the amount of about 50 thousand tons annually. According to the calculations of the specialists of Uzkhimprom State Joint-Stock Company, the new plant will not only provide for the internal needs of Uzbekistan in potassium fertilizers, but also export them to the countries of Central Asia and China. Earlier it was reported that in 2010-2013 SJSC "Uzkhimprom" plans to build the second stage of the Dekhkanabad potash fertilizer plant worth about $ 250 million and a design capacity of 400 thousand tons of potassium chloride per year. The Tyubegatan potash deposit is one of the largest in Central Asia. The Tyubegatan field is located near the city of Dehkanabad, Kashkadarya region, which is located in the southwestern part of the Republic of Uzbekistan. Location: NN 38 ° 00 -28 ° 12, VD 66 ° 15- 66 ° 30. The raw ore base of the processing complex in Dehkanabad with a capacity of 200 thousand tons of agricultural KCl per year.

The Tyubegatan potassium salt deposit is presented in the form of sylvinite occurrence, has a high content and insignificant admixture, and is one of the

world's rare deposits with valuable potash resources. Thermal dissolution or flotation is usually used in the production of KCl based on ores. Thermal dissolution is based on the difference in the solubility of KCl and NaCl at different temperatures, while K and Na are separated. The positive main side of this method: high frequency of production, good physical characteristics, tail salts without reagent content, by-product - edible salt, high adaptability to raw ores; Negative side: complicated technological process, high energy consumption, serious equipment corrosion, high requirements for materials, significant processing costs. Flotation is based on the difference in the hydrophobicity of KCl and NaCl, when K and Na are separated under the action of a collecting reagent.

The positive main side of this method: short technological process, affordable operation, production at normal temperature, low energy consumption, compared to thermal dissolution, less corrosion of equipment, low requirements for materials, low processing cost [1]. Negative side: low product quality, required consumption of reagents. This method is suitable for the production of agricultural KC1. Enrichment of sylvinite is a relatively developed technology in the world, but due to the difference in different properties of ore in deposits, there is a big difference for different deposits in terms of technological indicators of sylvinite enrichment. The Tyubegatan deposit in the Republic of Uzbekistan has a high content of K and Na, a good ore property, easily distinguishable.

The ore is usually dark pink and orange sylvinite, sometimes there are inclusions of carnal lite, does not contain sulfate potassium and sulfate magnesium, contains a little anhydrite and carbonate clay, the average water content is 0.3% [2]. The technological package for this project is presented by Joint-stock company “All-Union Scientific Research Institute of Halurgy”, which consists of 3 parts:

First part:

- Description of the technological scheme for flotation processing of potash ore when grinding it to a size of -1 + 0 mm;

- Qualitative and quantitative scheme of flotation processing of potash ore at the DZKU when grinding it to a size of -1 + 0 mm;

Second part:

- Recommendation on the choice of the main technological equipment;

- Required (working / reserve) amount of equipment;

Data of technical conditions for reagents and equipment used at potash flotation plants.

The third part:

- Carrying out laboratory tests comparing the technological properties of reagents (sludge depressor, amine for flotation KCl, foaming agent, apolar reagent, flocculant) produced in China and reagents used at potash flotation factories in Russia when preparing reagent solutions using water with increased salinity;

Correction of the qualitative and quantitative scheme of flotation processing of potash ore when grinding it to a particle size of -1 + 0 mm and subject to the use of reagents produced in the PRC and the preparation of reagent solutions using water with increased mineralization;

- Issuance of technological material and technological water balances of production and heat balance of drying finished products;

Issuance of these technical specifications for reagents used at potash flotation factories in Russia and reagents made in China, used at DZKU (CITIC has already provided CJSC All-Union Scientific Research Institute of Halurgy with reagent samples for comparative tests);

- Adopted the final technological package for the construction project of the DZKU processing complex in the Republic of Uzbekistan.

The following composition of crude ore is used:

KC1 -31.93%;

NaCl -61.37%;

MgCl -0.51%;

$CaS0_4$ -l, 25%;

water -1.69%.

The annual consumption of sylvinite is about 700 thousand tons.

The capacity of the flotation potash plant for the initial (raw) ore is 2121 tons/day.

The size of the raw ore is 0-50 mm.

The finished product is small potassium chloride (GOST 4568-95 "Potassium chloride").

The content of K2O in finished products (in kind) is at least 60% (95% KC1); humidity not more than 1% (in kind).

According to the experience of potash flotation factories in Russia, the water consumption for flushing equipment is 1.79 m3 / hour, the value of mechanical losses is taken as 3-4% [3].

The used circulating mother liquor with a temperature of 31 ° C and the content of KC1-12%, the amount of salts 31.9%.

The scheme includes: crushing and screening, grinding and classification, desliming, flotation, leaching and dehydration of concentrate, drying and cooling, dewatering of tailings.

This technological package has been developed in the production practice of Russian flotation factories, taking into account the properties of raw ores supplied to the PC DZKU. It features advanced technology and reliable raw data. The key content of the technological package is coarse-grained flotation. The fraction of incoming materials is -1 mm, which allows to significantly reduce the loss of KC1 in the sludge and ensure its removal in the finished product. At the same time, an increase in the fraction of ores creates great convenience for completing subsequent

separations (filtration, drying, packaging and transportation, etc.) and contributes to the improvement of product characteristics.

References:

1. Application of potash fertilizers to cotton in Central Asia. Publishing house of the Academy of Sciences of the UzSSR, Tashkent 1953

2. The physiological role of potassium and the importance of potash fertilizers in obtaining a high yield and improving the quality of raw cotton. Sat Issues of nutrition and biology of cotton. Tashkent 1960

3. Azimova M.K. Mineralogical composition and potassium in irrigated soils of the Kashkadarya region basin and their dispersed fractions. -In the book: Materials of the republican meeting on the problems of increasing the fertility of irrigated soils in Uzbekistan. Tashkent, 1982, p. 154-158

4. KazTag Kazakh Telegraph Agency. Electronic journal. Article: Uzkhimprom completed the construction of a potash fertilizer plant in the south of the country worth $123.7 million. - URL: https://kaztag.info/ru/news/uzkhimprom-zavershil-stroitelstvo-zavoda-kaliynykh-udobreniy-na-yuge-strany-stoimostyu-123-7-mln