MEDICINAL PLANTS APPLIED IN THE THERAPY OF ORAL MUCOSAL DISEASES

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Abstract: Oral mucosal diseases, including stomatitis, aphthous ulcers, and oral lichen planus, significantly affect patients' quality of life. Conventional treatments often involve synthetic drugs that may cause side effects or limited efficacy. Medicinal plants have emerged as promising alternatives due to their bioactive compounds, anti-inflammatory, antioxidant, and antimicrobial properties. This review investigates the application of various medicinal plants in the management of oral mucosal disorders. Clinical and experimental studies indicate that herbal extracts such as Aloe vera, Chamomilla recutita, Curcuma longa, and Salvia officinalis can reduce inflammation, accelerate healing, and improve patient outcomes. The findings support the incorporation of evidence-based herbal therapies as adjuncts or alternatives to conventional treatments for oral mucosal diseases.

Keywords: Oral mucosa; medicinal plants; herbal therapy; stomatitis; aphthous ulcers; inflammation; antioxidant.

ИСПОЛЬЗОВАНИЕ ЛЕКАРСТВЕННЫХ РАСТЕНИЙ В ТЕРАПИИ ЗАБОЛЕВАНИЙ СЛИЗИСТОЙ ОБОЛОЧКИ РТА

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Аннотация: Заболевания слизистой оболочки рта, включая стоматит, афтозные язвы и оральный лишай, существенно снижают качество жизни

пациентов. Традиционные методы лечения часто включают синтетические препараты, которые могут вызывать побочные эффекты или иметь ограниченную эффективность. Лекарственные растения рассматриваются как перспективная альтернатива благодаря своим биологически активным соединениям, обладающим противовоспалительными, антиоксидантными и антимикробными свойствами. Настоящее исследование рассматривает применение различных лекарственных растений в лечении заболеваний слизистой оболочки рта. Клинические и экспериментальные исследования показывают, что экстракты таких растений, как Aloe vera, Chamomilla recutita, Curcuma longa и Salvia officinalis, способны снижать воспаление, ускорять заживление и улучшать клинические исходы пациентов. Результаты исследования поддерживают использование основанных на доказательствах фитотерапевтических подходов в качестве дополнения или альтернативы традиционному лечению заболеваний слизистой оболочки рта.

Ключевые слова: Слизистая оболочка рта; лекарственные растения; фитотерапия; стоматит; афтозные язвы; воспаление; антиоксидант.

OG‘IZ SHILLIQ QAVAT KASALLIKLARINI DAVOLASHDA DORIVOR O‘SIMLIKLARDAN FOYDALANISH

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Annotatsiya: Og‘iz shilliq qavat kasalliklari, jumladan stomatit, aftoz yaralar va og‘iz liken planusi bemorlarning hayot sifatiga sezilarli darajada ta’sir qiladi. An’anaviy davolash usullari ko‘pincha sintetik dorilarni o‘z ichiga oladi, ular esa yon ta’sirlar yoki cheklangan samaradorlikka ega bo‘lishi mumkin. Dorivor o‘simliklar bioaktiv birikmalari, yallig‘lanishga qarshi, antioksidant va antimikrobik xususiyatlari tufayli istiqbolli alternativ sifatida e’tirof etilmoqda. Ushbu sharh og‘iz shilliq qavat kasalliklarini davolashda turli dorivor

o‘simliklardan foydalanishni o‘rganadi. Klinik va eksperimental tadqiqotlar shuni ko‘rsatadiki, Aloe vera, Chamomilla recutita, Curcuma longa va Salvia officinalis kabi o‘simlik ekstraktlari yallig‘lanishni kamaytiradi, yaralarning tuzalmishini tezlashtiradi va bemorlarning klinik natijalarini yaxshilaydi. Tadqiqot natijalari og‘iz shilliq qavat kasalliklarini davolashda an’anaviy davolash usullariga qo‘shimcha yoki alternativ sifatida ilmiy asoslangan o‘simlik terapiyasini qo‘llashni qo‘llab-quvvatlaydi.

Kalit so‘zlar: Og‘iz shilliq qavat; dorivor o‘simliklar; o‘simlik terapiyasi; stomatit; aftoz yaralar; yallig‘lanish; antioksidant.

Oral mucosal diseases are common conditions that involve inflammation or lesions of the oral lining. These disorders can cause pain, difficulty in eating, and reduced quality of life. Standard treatments typically include corticosteroids, antiseptics, and antibiotics. However, long-term use of synthetic drugs may lead to adverse effects and drug resistance.

Medicinal plants have been traditionally used in various cultures for their healing properties. Active phytochemicals such as flavonoids, phenols, and essential oils provide anti-inflammatory, antimicrobial, and antioxidant effects. Recent research has focused on scientifically validating the therapeutic potential of these herbal remedies for oral mucosal diseases. This study aims to review and summarize current evidence on the use of medicinal plants in the management of oral mucosal disorders.

The oral mucosa lines the oral cavity and consists of a superficial squamous epithelium with an underlying lamina propria. Beneath the mucosa is the submucosa, which consists of fibrous tissue and adipose tissue and contains lobules of the minor salivary glands and neurovascular bundles. In some areas, the submucosa is absent, and the lamina propria is continuous with the periosteum, forming an elastic mucosa that covers the upper and lower jaws. The squamous epithelium consists of keratinocytes arranged in layers: a basal cell layer resting on

the basement membrane, a spiny cell layer, and usually a keratinized layer. Keratinocytes are attached to each other by desmosomes, and basal keratinocytes are attached to the basement membrane by hemidesmosomes.

The work consists of developing the composition and technology of a gel with an extract of the roots of comfrey (Symphytum officinale, Linnaeus, 1753) for the treatment of the oral mucosa.

Lesions of the oral mucosa in acute and chronic diseases of the body (measles, scarlet fever, chickenpox, tuberculosis, syphilis, etc.). Proper infectious and parasitic diseases of the oral mucosa and lips: viral (herpes, warts, etc.); fusospirochetosis; bacterial (streptococcal and staphylococcal, gonorrheal, etc.); fungal (candidiasis, actinomycosis, etc.).

Oral mucosal lesions have a variety of etiologies, including viral or bacterial infections, local trauma or irritation, systemic disorders, and even excessive alcohol and tobacco use. Folk knowledge about medicinal plants and phytochemicals in the treatment of oral mucosal lesions has attracted particular attention from the scientific community. Researchers are focusing on plants such as chamomile, aloe vera, green tea and coffee, and plant-derived bioactive compounds (e.g., curcumin and lycopene) with anti-oral mucosal activity.

Comfrey root (Symphytum officinale L.) is traditionally used for the topical treatment of bruises. Allantoin is considered the pharmacologically active compound in this herbal remedy. Allantoin, a 5-urea hydantoin, has been documented to possess numerous pharmacological properties, including the removal of necrotic tissue, stimulation of cell mitosis, and stimulation of epithelial growth. Recently, researchers have shown that allantoin at a concentration of 5% in an oil/water soft lotion emulsion exerts a wound-healing effect compared to control groups. The healing mechanism stimulated by allantoin occurs through the regulation of inflammatory responses and the stimulation of fibroblast proliferation and extracellular matrix production. A pilot study evaluated the wound-healing activity of comfrey leaf extracts. Three topical preparations were used: carbomer

gel, glyceroalcohol solution, and emulsion (soft lotion). The 5% oil/water emulsion was shown to be the most effective in stimulating healing activity. This can be evidenced by an increase in collagen deposition from 40 to 28 days (240%) and a decrease in cellular inflammatory infiltrate from 3 to 46%. However, the best efficacy was demonstrated by the 8% prepared extract in emulsion [

Gels can be single-phase or biphasic. Single-phase gels use high-molecular-weight hydrophilic polymers as gelling agents. Examples of such polymers include carbomers (cross-linked acrylic acid polymers). These gels are considered single-phase systems because there are no defined boundaries between the dispersed macromolecules and the liquid. Biphasic gels may contain a gelatinous, cross-linked precipitate of a single substance in the aqueous phase. For example, milk of magnesia consists of a gelatinous precipitate of magnesium hydroxide.

Gelling agents in single-phase gels may be (a) synthetic macromolecules, such as carbomer 934; (b) cellulose derivatives, such as carboxymethylcellulose; and (c) natural gums, such as tragacanth. Carbomers are high-molecular-weight, water-soluble polymers of acrylic acid cross-linked with sucrose allyl esters and/or pentaerythritol. Their viscosity depends on their polymer composition. They are used as gelling agents at concentrations of 0.5%-2% by weight in water. In addition to the gelling agent and water, gels may also contain the drug, cosolvents (such as alcohol and/or propylene glycol), antimicrobial preservatives (such as methylparaben and propylparaben or chlorhexidine gluconate), and stabilizers (such as the chelating agent disodium edetate). Gels typically exhibit non-Newtonian flow characteristics, meaning they exhibit a nonlinear relationship between shear stress and strain rate, which may also be time-dependent. Depending on their flow characteristics, gels can be shear-thinning (pseudoplastic, i.e., viscosity decreases and flow rate increases with stirring), shear-thickening (dilatant, i.e., viscosity increases and flow rate decreases with stirring), or thixotropic (e.g., a decrease in stress is required to maintain a constant strain rate over time; or, in other words, viscosity decreases and flow rate increases over time

at the same stirring rate). Inorganic gels consist of flakes of small particles, as in aluminum hydroxide gel or bentonite magma. Such gels can be thixotropic, exhibiting a higher viscosity and a semi-solid state upon standing and transforming into low-viscosity liquids upon stirring.

The object of our study is the extract of comfrey roots (Symphytum officinale, Linnaeus, 1753)

Comfrey contains allantoin, tannins, flavonoids, vitamin B12, mucus, starch, various plant acids, triterpenes, and some pyrrolizidine alkaloids. No other plant contains so much allantoin. The roots of common comfrey contain 0.2-0.3% alkaloids, while the herb contains up to 0.1%; the roots of common comfrey contain 0.1% alkaloids, while the herb contains 0.2%.

The accumulation of alkaloids in comfrey biomass closely correlates with climatic and orographic factors. In comfrey biomass in polluted ecotopes, the level of alkaloid accumulation depends primarily on the content of mobile heavy metals in the soil.

Many of the therapeutic properties attributed to comfrey are due to the various key components present in the root, leaves, and flowering tops of the plant. These include anti-inflammatory properties, pain reduction and relief, the ability to stop bleeding, and effective anti-exudative, astringent, and emollient properties. Indeed, comfrey contains a wide range of critically important biologically active components, including allantoin, triterpene saponins, tannins, alkaloids, amino acids, flavonoids, triterpenes, terpenoids, tannins, saponins, sterols, mucopolysaccharides, digallic acid, and traces of essential oil.

Research methods: The study was conducted in several stages. First, the comfrey root sample was weighed on a scale, yielding a mass of 26 g. Grinding was performed in a disc mill for 5 minutes. After maceration, the sample was weighed again, yielding a mass of 19.6 g. Grinding for 10 minutes yielded a post-grinding mass of 20.2 g, despite the additional grinding being 30 g. Grinding for 20 minutes was less effective – the sample mass before grinding was 40 g, and

after grinding, it was 9.96 g. Next, a 70% ethanol solution was added to the ground sample (Fig. 2.3) in a 1:5 ratio and left to infuse for 24 hours. After 24 hours, the resulting solution was filtered using paper filters, yielding an extract. A 70% ethanol solution was also used to determine flavonoids. A 100 ml portion of the extract (3 ml) was added and exposed to ultrasound. Ultrasound waves destroy the cell walls of comfrey rhizomes, facilitating the release of biologically active substances into the solution.

After ultrasonication, the mixture was filtered (Fig. 2.4), and the spectrum and wavelength of the resulting filtrate were determined using a LOMO SF-56 spectrophotometer. 3 ml of extract and 70% alcohol were added to another flask, and the optical density was measured using a spectrophotometer.

The raw material obtained from the 10-minute maceration was used to obtain a thick extract. The thick extract was obtained by evaporation in a vacuum evaporator, yielding 3 g of thick comfrey rhizome extract.

Finally, a gel with comfrey rhizome extract was obtained. For this, 15 g of Na-CMC (sodium carboxymethylcellulose) was dissolved in 300 ml of water, 3 ml of thick comfrey root extract (Symphytum officinale, Linnaeus, 1753) and 0.1 g of citric acid were added as an antioxidant. The resulting gel had a greenish color. The viscosity of the gel was determined using a viscometer.

Conclusions:A comprehensive literature review revealed that the use of comfrey root (Symphytum officinale, Linnaeus, 1753) as a potential source of extract for a therapeutic dental gel is feasible, but further pharmacognostic study is required. A dental gel formulation for the treatment and prevention of oral diseases has been developed, using a thick extract of comfrey (Symphytum officinale, Linnaeus, 1753). The main components are the extract itself, a Na-CMC base, and citric acid. Key criteria were developed for the samples to be tested against. These include appearance, acidity, homogeneity, viscosity, microbiological purity, and others.

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