



USE OF ANISE HYSOP AND LICORICE IN MEDICINE

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ABSTRACT

*Phytotherapy remains a promising field of modern medicine due to its accessibility, safety, and broad spectrum of biological activity. The present study examines the pharmacological potential of two medicinal plants—anise hyssop (*Agastache foeniculum*) and licorice (*Glycyrrhiza glabra*). The botanical characteristics, chemical composition, and therapeutic properties of these plants were analyzed based on experimental and literature data. The results demonstrate that both plants possess pronounced anti-inflammatory, antibacterial, immunomodulatory, expectorant, detoxifying, and regenerative effects. Their biologically active compounds contribute to the regulation of metabolic and physiological processes, strengthening of the immune system, and restoration of cellular functions. The findings confirm the high therapeutic value of anise hyssop and licorice and support their use in complex therapy and preventive phytomedicine.*

Introduction. The scope of phytotherapy application in the treatment of various pathological conditions is steadily expanding. This trend is associated not only with the accessibility, natural origin, and low cost of herbal medicinal products, but also with the diversity of preparation methods and a high level of safety for the general population. Like other medicinal therapies, phytotherapy must ensure effective health improvement and restoration of the body's fundamental physiological processes. At present, the study of medicinal plants of natural origin that possess anti-inflammatory, antibacterial, immunomodulatory, diuretic, and analgesic properties represents one of the most promising areas of applied medical and pharmaceutical research. Anise hyssop and licorice are widely used in traditional medicine due to their broad spectrum of biological activity. Their comprehensive effects on the human body justify the growing scientific interest in these plants as potential therapeutic and preventive agents.

Materials and Methods. Botanical characteristics and chemical composition of anise hyssop. Anise hyssop (*Agastache foeniculum*) is a tall (1–1.5 m) perennial herbaceous plant belonging to the Lamiaceae family. The studied perennial herbaceous



crop is characterized by a large number of quadrangular shoots bearing small blue-lilac flowers. The fruits of the plant are smooth, oval-elongated nutlets of dark brown color. The seeds are small and dark-colored. Active vegetative growth begins in March; however, flower buds open by the end of May, with mass flowering occurring from June to August, and seeds maturing by late October. The leaves are lanceolate, elongated, or triangular in shape, with serrated margins, and are green or golden-green in color.

The plant is cultivated in the southern regions of the Russian Federation, the Caucasus, Central Asia, as well as in the western regions of the United States and Canada. Small plantations of anise hyssop are also found in Moldova and Crimea.

The main biologically active substances of anise hyssop include complex essential oils (containing methyl chavicol, borneol, camphene, anethole, terpinene, cineole, pulegone, linalool, and pinene), organic acids, flavonoids (including diosmin), glycosides, tannins, coumarins, bitter substances, as well as vitamins B and C, macroelements, and microelements (iodine, iron, potassium, magnesium, manganese, selenium, chromium, and zinc).

Botanical characteristics and chemical composition of licorice

Licorice (*Glycyrrhiza glabra* L.) is a perennial herbaceous plant belonging to the Fabaceae family, reaching a height of 50–100 (up to 150) cm and characterized by a powerful, deeply penetrating root system. Underground, the plant forms a complex, densely interwoven network of roots and rhizomes. The aerial stems are erect, highly branched, and covered with sparse glandular prickles.

The leaves are alternate, compound, short-petioled, odd-pinnate, with 3–8 pairs of oblong-elliptical, entire leaflets densely covered with glandular dots. The flowers are arranged in loose axillary racemes. The fruit is an oblong, straight or slightly curved legume, leathery in texture, either glabrous or covered with glandular prickles. The seeds are kidney-shaped and brown in color.

Flowering occurs from June to August, and fruits mature from August to September. The medicinal raw material consists of dried roots and underground shoots.

Licorice is widely distributed in the northern regions of the Russian Federation (Samara, Saratov, Orenburg regions), Kazakhstan, Central Asia, and the North Caucasus. Its preferred habitats include sandy and saline steppes, saline meadow steppes, river and lake banks, lowlands, and depressions.

The chemical composition of licorice varies depending on the plant part. Roots and rhizomes contain the saponin glycyrrhizin (up to 23%), which is a potassium and calcium salt of triterpene glycyrrhizic acid. In addition, licorice roots contain more than 20 flavonoid glycosides (liquiritin, liquiritoside, liquiritigenin derivatives, and others), glabridinic acid, steroids (β -sitosterol, estriol), asparagine, essential oil (0.03%), ascorbic acid, and other biologically active compounds. The aerial parts contain saponins, flavonoids, tannins, nitrogenous compounds, organic acids, sugars, and carotene.

Results and Discussion. It has been established that anise hyssop preparations exhibit antibacterial, anti-inflammatory, bronchodilatory, blood-purifying, regenerative, relaxant, hypotensive, and general tonic effects. Anise hyssop is an essential component of phytotherapy for chronic and acute infectious respiratory diseases, including acute



respiratory viral infections, bronchitis, bronchial asthma, pneumonia, and tonsillitis. It is also used in the treatment of atherosclerosis, vegetative-vascular dystonia, metabolic disorders, and conditions associated with nervous system dysfunction.

Anise hyssop contributes to blood thinning and strengthening of the vascular wall, making it beneficial in circulatory disorders, headaches, varicose veins, couperose, and hypertension. Tea prepared from anise hyssop improves physical and mental performance, supports cognitive function in individuals engaged in intellectual work, and is especially beneficial for elderly patients. Unlike other adaptogenic herbs, anise hyssop has a mild effect and does not cause excessive excitability or an increase in blood pressure, making it suitable for use during menopause.

The analysis of its chemical composition revealed that the effectiveness of anise hyssop in the treatment of infectious respiratory diseases (influenza, bronchitis, tracheitis, laryngitis, pharyngitis, pneumonia, tuberculosis, tonsillitis, and bronchial asthma) is largely associated with the high content of complex essential oils. Due to its combined blood-purifying, anti-inflammatory, and regenerative properties, anise hyssop is effective in the treatment of dermatitis, neurodermatitis, eczema, seborrhea, and other inflammatory skin conditions.

The synergistic action of methyl chavicol, B and C vitamins, selenium, and flavonoids improves the function of detoxification organs (liver, kidneys, and lymphatic system), promotes the elimination of toxins in cases of poisoning, alcohol intoxication, and prolonged use of chemical medications. Regular consumption of anise hyssop tea contributes to sustained health improvement and maintenance of vitality in elderly individuals, residents of environmentally unfavorable regions, and workers exposed to harmful occupational conditions.

Licorice preparations exhibit expectorant, anti-inflammatory, wound-healing, mild laxative, choleric, and diuretic effects. Licorice root is widely used to enhance the secretory activity of the bronchopulmonary system and is therefore effective in the treatment of bronchitis, tracheitis, pneumonia, tuberculosis, and bronchial asthma.

As an adjunctive therapy, licorice root is used in the treatment of adrenal cortex hypofunction and Addison's disease. It has been shown to stimulate adrenal cortex activity and is successfully applied in the treatment of allergic dermatitis, systemic lupus erythematosus, and eczema. Subsequent studies revealed that licorice root preparations exert beneficial effects on the functions of other organs and systems in various pathological conditions, including gastritis, peptic ulcer disease of the stomach and duodenum, and liver diseases. Licorice promotes pain reduction in the gastrointestinal tract and accelerates ulcer healing.

Experimental studies demonstrated that licorice has antibiotic activity against streptococci, staphylococci, viruses, protozoa, and fungi. In addition, licorice neutralizes toxic substances entering the body, regulates water-salt metabolism, enhances the effects of other medicinal plants and pharmaceuticals, and accelerates their absorption from the intestine. The results obtained indicate that the therapeutic efficacy of anise hyssop and licorice is determined by their complex chemical composition and synergistic interaction of biologically active substances. The multifaceted pharmacological activity of these



plants ensures their effectiveness in the regulation of metabolic processes, immune responses, and cellular functions.

The long-standing use of licorice in traditional medicine and its ability to enhance the effects of other medicinal plants explain its frequent inclusion in herbal formulations. The extensive industrial application of licorice in pharmaceutical, food, textile, chemical, and metallurgical industries further confirms its economic and therapeutic significance.

Conclusions. Thus, the presented data confirm the versatile biological activity of medicinal plants and their potential for successful application in the treatment of various diseases and pathological conditions. The complex of active chemical compounds present in anise hyssop and licorice directly affects cellular functions, protects tissues from damage, improves metabolism, and promotes the restoration of impaired structures.

The results of the study demonstrate that the biological effects of these plants are closely related to their chemical composition and lead to deep normalization and restoration of cellular processes, ultimately resulting in overall health improvement.

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