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## THE USE OF EXPECTORANT PLANTS IN ALTERNATIVE MEDICINE

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## ИСПОЛЬЗОВАНИЕ ОТХАРКИВАЮЩИХ РАСТЕНИЙ В АЛЬТЕРНАТИВНОЙ МЕДИЦИНЕ

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**Abstract.** The use of expectorant substances is applied in the treatment of both bronchitis and cough. The combination of natural remedies with pharmaceutical preparations improves the course of the disease and accelerates recovery. Alternative medicine has consistently shown effectiveness in infectious diseases. Herbal remedies, tested in folk medicine, when used alongside pharmaceutical preparations, help to prevent complications. In many cases, synthetic drugs are discontinued before the disease is completely cured. Continuing treatment with medicinal plants after conventional therapy can lead to more favorable outcomes. This article provides a detailed review of expectorant plants. Research has demonstrated that the active compounds in these plants possess significant expectorant and antimicrobial properties. Preparations derived from them, or used in alternative medicine, are applied in the treatment of upper respiratory tract diseases due to their bactericidal, anti-inflammatory, and expectorant effects. The combined use of expectorant substances with pharmaceutical preparations in diseases such as bronchitis and pneumonia aims to prevent complications and the progression to chronic forms of illness. Phytopreparations based on the active substances of expectorant plants also demonstrate similarly high effectiveness. The preference for plant-based preparations is due to their broad therapeutic applications and minimal side effects. Studies have confirmed that plant-derived preparations are less harmful for long-term use compared to synthetic drugs.

**Аннотация.** Отхаркивающие средства используются при лечении как бронхита, так и кашля. Сочетание природных средств с фармацевтическими препаратами улучшает течение заболевания и ускоряет выздоровление. Растительные препараты, проверенные народной медициной, в сочетании с фармацевтическими средствами способствуют профилактике осложнений. Во многих случаях синтетические препараты отменяются до полного излечения болезни. Продолжение лечения с использованием лекарственных растений после медикаментозной терапии позволяет достичь более благоприятных результатов. Представлен обзор растений, имеющих отхаркивающие свойства. Вещества этих растений обладают выраженными отхаркивающими и антимикробными свойствами. Препараты, полученные на их основе или применяемые в медицине, используются при лечении заболеваний верхних дыхательных путей. Совместное применение отхаркивающих средств и фармацевтических препаратов при таких заболеваниях, как бронхит и пневмония, направлено на предотвращение осложнений и перехода болезни в хроническую форму. Фитопрепараты демонстрируют высокую эффективность. Предпочтение растительным препаратам обусловлено их широким спектром применения и минимальными побочными эффектами. Согласно проведённым исследованиям, доказано, что препараты растительного

происхождения менее вредны при длительном применении по сравнению с синтетическими средствами.

**Keywords:** cough, respiratory diseases, herbal remedies.

**Ключевые слова:** кашель, заболевания дыхательных путей, растительные препараты.

Cough is a pathological condition that develops during inflammation of the upper and lower respiratory tracts. It is frequently observed in various seasons, especially in cold weather, and can lead to multiple complications. Productive cough of viral and bacterial origin is considered one of the acute respiratory diseases. This type of cough is accompanied by the expulsion of mucous substances from the bronchi and bronchioles, contributing to the elimination of microbes from the respiratory tract. Depending on the type of disease, the color of the mucus may vary. Increased motility of bronchial epithelial cells facilitates mucus secretion; otherwise, difficulties in breathing, choking, and chest pain may occur. If treatment is not administered properly or the disease progresses to a chronic state, complications may arise [4].

Expectorant plants, inhalation therapy with essential oils, and other phytotherapeutic methods are widely used in treatment. Inhalation therapy softens the upper respiratory tract, promotes mucus expulsion, and reduces cough intensity. Dry and cold air, however, may hinder mucus secretion.

Glycyrrhiza is derived from the ancient Greek term glykos, meaning sweet, and rhiza, meaning root. Glycyrrhiza glabra is known as mulaithi in north India. Glycyrrhiza glabra, also known as licorice and sweet wood, is native to the Mediterranean and certain areas of Asia. Glycyrrhiza glabra belongs to genus Glycyrrhiza and is commonly called as licorice which is available in India. A numbers of traditional healers have claimed the efficacy of Glycyrrhiza species for a variety of pathological conditions as a diuretic, choleric and used as insecticide and indicated in traditional medicine for coughs, colds and painful swellings. Quince (*Cydonia oblonga*) is a well-known fruit valued not only for its aroma and vitamins but also for its medicinal properties. Its chopped fruits, leaves, and seeds exhibit strong expectorant and anti-cold effects. One medium-sized quince is chopped and boiled in a cup of hot water; the warm infusion is then consumed. *Cydonia oblonga* commonly known as Quince is rich in useful secondary metabolites such as phenolics, steroids, flavonoids, terpenoids, tannins, sugars, organic acids, and glycosides. A wide range of pharmacological activities like antioxidant, antibacterial, antifungal, anti-inflammatory, hepatoprotective, cardiovascular, antidepressant, antidiarrheal, hypolipidemic, diuretic, and hypoglycemic have been ascribed to various parts of *C. oblonga*. The polysaccharide mucilage, glucuronoxylan extruded from seeds of *C. oblonga* is used in dermal patches to heal wounds. This review focuses on detailed investigations of high-valued phytochemicals as well as pharmacological and phytomedicinal attributes of the plant [2, 6].

Licorice (*Glycyrrhiza glabra*) is among the most widely used medicinal plants in alternative medicine. Its roots are rich in glycyrrhizin, flavonoids, essential oils, steroids, vitamin C, B vitamins, sugars, pigments, resins, and mucilage, which make it useful in treating various diseases. It is particularly effective in respiratory tract conditions and gastritis. Due to its natural sweetness, licorice is often combined with bitter-tasting herbs in equal proportions (1:1). Infusions made from licorice root should be consumed several times daily: one teaspoon of crushed root is boiled in one cup of water and taken one hour before meals. Pharmaceutical licorice syrups and dry extracts are also widely used in conventional medicine for cough treatment [1, 5].

The WHO recognized medicinal uses as being described in pharmacopeias and in traditional systems of medicine e.g., demulcent for sore throats, expectorant in treatment of cough and

bronchial catarrh; prophylaxis, gastric and duodenal ulcers, dyspepsia; anti-inflammatory, rheumatism, arthritis, liver toxicity and to treat tuberculosis and adrenocorticoid insufficiency [7].

Plantain (*Plantago major*) is another commonly used medicinal plant. Aqueous extracts from its aerial parts, leaves, and seeds, as well as pharmaceutical syrups such as Herbion Plantain Syrup, are recognized as effective remedies for respiratory diseases. According to a number of studies of various leaf extracts, (petroleum ether, methanol, ethyl acetate, n-butanol and aqueous) 51 components were isolated. Most components in petroleum ether extract were phytol, benzofuranone, pentanediol and benzene propanoic acid and in methanol extract, group of diglycerol and glycol contain organic acids, such as fumaric acid, syringic acid, vanillic acid, p-hydroxy benzoic acid, ferulic acid, p-coumaric acid, gentisic acid, traces of salicylic acid, benzoic acid and cinnamic acid were found. In ethyl acetate extract, glycerine, benzene and dibutyl phthalate were isolated and in n-butanol extract, there were phthalic acid, benzene propanoic acid and groups of phenols. Finally, in aqueous extract ethnophenol, diathiapentene, naphthalenone and glycerine were found. [1]. The medicinal benefits of *Plantago major* have been acknowledged around the world for hundreds of years. This plant contains a number of effective chemical constituents including flavonoids, alkaloids, terpenoids, phenolic acid derivatives, iridoid glycosides, fatty acids, polysaccharides and vitamins which contribute to its exerting specific therapeutic effects. Correspondingly, studies have found that *Plantago major* is effective as a wound healer, as well as an antiulcerative, antidiabetic, antidiarrhoeal, anti-inflammatory, antinociceptive, antibacterial, and antiviral agent. It also combats fatigue and cancer, is an antioxidant and a free radical scavenger.

Marshmallow (*Althaea officinalis*) is rich in mucilage and starch. *Althaea officinalis* (*A. officinalis*) is a medicinal plant consumed in case of lipemia, inflammation of nasal and oral cavities, gastric ulcer, platelet aggregation, cystitis, and irritating coughs. Its antioxidant activity has also been demonstrated. The extract of *A. officinalis* exhibited strong antioxidant activity in different antioxidant tests. This plant belongs to family Malvaceae, native to Europe and parts of Asia and is cultivated throughout the world. The flowers are terminal and axillary, with short peduncles, each bearing one, two, or three flowers. The petals are pale pink, reddish pink, and rarely, white, in color. Cold infusions prepared from its roots and aqueous extracts from its leaves (containing up to 35% mucilage, glucose, pectin, starch, and fatty acids) are prescribed for upper and lower respiratory tract diseases. Syrups and tablets derived from marshmallow roots possess expectorant and cough-suppressant properties, while syrups from its flowers are also effective [6].

*Eucalyptus* (*Eucalyptus globulus*) leaves contain up to 80% essential oils, flavonoids, tannins, and other active compounds. *Eucalyptus globulus* is a shrubby plant or a flowering tree belonging to the family Myrtaceae. Genus *eucalyptus* is known to contain more than 700 species and has widely been used for various purposes since thousands of years in the history of mankind. *Eucalyptus* is basically native to Tunisia and Australia but has also been evident to be found in Africa and from tropical to southern temperate regions of America. Genus *eucalyptus* further consists of four subspecies which are *Eucalyptus bicostata*, *Eucalyptus pseudoglobulus*, *Eucalyptus globulus* and *Eucalyptus maidenii* among which *Eucalyptus globulus* is a medium to large sized evergreen and broadleaf tree that can grow upto the height of 70 m and its diameter can be about 4 to 7 feet. Different parts of this plant are nutritionally very important and therapeutically highly valuable due to specific chemical composition as its essential oil contain esters, ethers, carboxylic acids, ketones, aldehydes, alcohols and hydrocarbons along with monoterpenes and sesquiterpenes. Phytochemical analysis of this plant has revealed that leaf oil contain 1,8-cineole,  $\alpha$ -pinene, p-cymene, cryptone and spathulenol. In contrast, essential oil extracted from buds, branches and fruits constitutes  $\alpha$ -thujene, 1,8-cineole and aromadendrene as major components. Due to these chemical compounds,

*Eucalyptus glabrous* is found to be a potential anti-microbial, anti-fungal, anti-viral, anti-inflammatory, analgesic, anti-nociceptive and anti-oxidant agent of nature. Some recent scientific investigations have also revealed that essential oil of *Eucalyptus glabrous* also have anti-diabetic potentials that enhances its market value due to excessive usage in number of pharmaceutical products of traditional and advanced system of medicines. The increasing awareness of synthetic antioxidants motivated a number of scholars, on a global scale, to identify alternative antioxidants of plant origin, to avoid the unfavorable effects of synthetic antioxidants. The antioxidant potential of different *Eucalyptus* plant parts (leaves, fruits, roots, and stump wood) as well as their essential oils were formerly reported as being able to be utilized to diminish oxidative stress-associated diseases, and also as food preservatives. They are primarily used for gargling and inhalation, which help to dilate the bronchi and clear the respiratory tract. Oil-based eucalyptus solutions are widely used in inhalation therapy [3, 5].

### Conclusion

Since productive cough often has a bacterial origin, the use of alternative medicine should complement pharmacological therapy. Phytotherapeutic products not only help preserve immune function but also protect the liver from the toxic effects of synthetic drugs. This article describes the therapeutic applications of expectorant plants and phytopreparations derived from them. Plants rich in mucilage promote mucus expulsion, while essential oil-containing species demonstrate antiseptic effects by destroying respiratory pathogens. Such remedies may be taken internally or applied in inhalation therapy.

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