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Review article

Pharmacological treatment of catarrh in Iranian traditional medicine

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ABSTRACT

Catarrh is a condition that is carefully explained in Iranian traditional medicine. Medieval Iranian physicians used some medicinal plants in the treatment of the catarrh. Some of these substances are used in treatment today, although still more of these materials can be used in modern medicine.

In this study we searched known sources of Iranian traditional medicine and collected the ideas of former great scholars and physicians about medicinal plants that are used for treatment of catarrh. Then we searched PubMed, Google Scholar, Scopus, and Web of Science databases and found 10 medicinal herbs that have the ability to treat catarrh.

Plants discussed in this study are consistent with new research and can be used in modern treatments. According to rising bacterial resistance to antibiotics and complications of antibiotic and anti-inflammatory drugs, it seems that the various components of the medicinal herbs can be beneficial in producing new drugs. Also it is hoped that more investigations on medicinal plants will be conducted in the future treatment of catarrh and other diseases related to it.

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1. Introduction

Common cold or upper respiratory tract infection is an acute, minor, self-limiting, and viral infection¹ and a worldwide health problem that affects sleep, social life, and school and work efficiency. Common cold presumably imposes a significant economic burden on society because it causes time off school or work and reduced working capacity. Adults have an average of two or three episodes annually, and young children may have up to five episodes.^{2,3} The common cold is caused by various respiratory viruses, most commonly a rhinovirus and characterized by sore throat, rhinorrhea, sneezing, nasal congestion, cough, watery eyes, and sinus pain.^{4,5} Sore throat, malaise, and low-grade fever are developed at the beginning. These symptoms eliminate within a few days and are replaced with nasal congestion, rhinorrhea, and cough within 24–48 hours after onset of the first symptoms. The second group of symptoms is what stimulates most patients to see a

physician for alleviation. Symptoms usually peak on the 3rd–4th days and most symptoms resolve within 1 week. Nasal discharge, occurring at the peak of disease, can be thick or purulent and may be misdiagnosed as a bacterial sinusitis.⁶ Complications include otitis media, sinusitis, pneumonia, exacerbations of asthma and chronic obstructive pulmonary disease, and serious illness in immune-compromised patients.⁴ Currently, drugs such as corticosteroids, opioid analgesics, immunosuppressive agents, and nonsteroidal anti-inflammatory drugs are used to control the clinical manifestation. The use of these medications can cause side effects such as respiratory depression, renal and hepatic damage, tolerance, sedation, spasm, bone marrow depression, constipation, gastrointestinal disturbances, suppression of response to infection or injury, and osteoporosis.⁷

Despite great advances in medicine, the common cold is still a burden on society in terms of human anguish and economic waste.⁸ There is no proven cure for the cold and it is treated symptomatically.⁹

Iranian traditional medicine (ITM) has defined specific classification and treatment for types of cold and its complications. This study presents the most important herbal treatments that are used by Iranian traditional physicians.

ITM (humoral medicine) is one of the oldest forms of medicine. In early medieval times (Islamic course), Muslim physicians

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(frequently Persians) flourished.^{10,11} This aspect of medicine extended gradually to cover the world.¹² Iranian traditional physicians and scientists greatly aided medical science by their own observations and skills through > 7000 years of Persian history.¹³ The operation and study of medicine in Persia has a lengthy and strong history. The Persians not only collected existent medical data but also added to this science their own accurate observations and experimentation and presented many new scientific theories. The most influential Iranian physicians were Abu Bakr Muhammad Ebn Zakariya Al-Râzi (Rhazes; 865–925 CE), Ali Ebn Al-Abbas-al-Majusi (Haly Abbas; 949–982 CE), Abu Ali Al-Hossein Ebn Abdullah Ebn-e-Sina (Avicenna; 980–1037 CE), and Zinn-ol-Abedin Ismael Jorjani (Sorsanus; 1042–1137 CE). The texts of *Qanoon fel teb (The Canon)* by Ebn-e-Sina, Râzi's *Kitab al-hawi (The Continens)*, *Zakhireh Kharazmshahi (The Treasure of Kharazmshah)* by Jorjani, and *Kitab-al-Maliki (Liber Regius)* by Haly-Abbas were central to Western medical science from the 13th century to the 19th century.^{13–18}

2. ITM and catarrh

Traditional medicine is “the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, used in the maintenance of health and in the prevention, diagnosis, improvement or treatment of physical and mental illness. Traditional medicine covers a wide variety of therapies and practices which vary from country to country and region to region.”¹⁹

ITM was established by the four-humor theory (sanguine, phlegm, bile, and melancholy) and disease is based on an imbalance in humors. The history of the use of medicinal plants in ancient Persia can be traced back to about 10,000 years ago from the pre-historic times to 637 CE, and the development of pharmaceutical science and practice were particularly remarkable.²⁰ Medieval Persian physicians used plants with various therapeutic actions, such as anti-inflammatory and antimicrobial, to treat catarrh. In the medical texts of medieval Persia, such as *The Canon* by Ebn-e-Sina, the physicians classified catarrh as warm and cold. Each type of catarrh has a special clinical manifestation. Clinical manifestation of warm catarrh are redness of eye and face, warmth, sharpness, dilution and yellowness of discharges, burning sensation in nose and throat and in cold catarrh tension and heaviness in head, face, and forehead, thick whitish or livid discharge, roughness of tongue, discharges with cold and unsavory nature, heaviness of senses, malaise, feeling better after consuming foods of warm nature, nasal stuffiness, and losing the sense of smell.²¹ Also the classification system of catarrh was important for designing the treatment plan, which contained the prescription of medicinal herbs, topical treatments, and manual practices. Despite progress in the advancement of therapy in recent years, effective and potent drugs are still needed for the treatment of catarrh. The search for new pharmacologically active anti-inflammatory and antimicrobial

substances obtained from plants has led to the discovery of some clinically beneficial drugs that have played a major role in the treatment of human diseases. Recently, some of the medicinal herbs that were used in medieval Persia for treatment of catarrh have been evaluated with the application of modern scientific methods (Table 1). These studies have increased the feasibility of a revival of traditional treatments, and it is hoped that a review of the effect of some drugs that were prescribed in ITM will prompt further research into the clinical benefits of these treatments for catarrh.

3. Methods

In this study, known sources of ITM were searched and the ideas of former great scholars and physicians about medicinal plants that are used for the treatment of catarrh were collected. Then we searched PubMed and Google Scholar and found 10 herbal medicines that have the ability to treat the catarrh.

4. Compounds analyzed

4.1. Jujube

Jujube (*Ziziphus Jujuba* Mill.; 乾棗 gān zǎo) has a long history of usage as a fruit and remedy in ITM. It is used in the treatment of diseases such as warm catarrh, cough, asthma, and other inflammatory diseases of the lung, inflammatory diseases of eye, and inflammation and rash.²² The principal biologically active components are vitamin C, flavonoids, triterpenic acids, phenolics, and polysaccharides. New phytochemical studies of jujube fruit have indicated some clear biological effects, such as the anti-inflammatory, anticancer, antiobesity, immunostimulating, antioxidant, hepatoprotective, and gastrointestinal protective activities and inhibition of foam cell formation in macrophages.²³

4.2. Assyrian plum

Assyrian plum (*Cordia myxa* L.) is another drug in ITM that is used to treat warm catarrh, cough, and inflammatory diseases of the pharynx, gastrointestinal system, and lung.²² Recent studies on certain species of *Cordia* indicate that they have anti-inflammatory properties. One of the studies tested the effects of Assyrian plum fruit on experimentally induced colitis in rats and proved the anti-inflammatory effect of *Cordia myxa*.²⁴

4.3. Opium poppy

Opium poppy (*Popaver somniferum* L.; 罌粟 yīng sù) has been often used in ITM to treat warm catarrh, inflammatory lung diseases, and inflammatory gastrointestinal diseases,^{21,22,25,26} and for anesthesia.¹³

Table 1
Medicinal plants used in Iranian traditional medicine to treat catarrh.

Medicinal plant	Common name	Traditional name	Part used	Pharmacological effect	Type of catarrh
<i>Althea officinalis</i> L. (Marshmallow)	Hollyhock (蜀葵 shǔ kuí)	Khatmi	Flower	Anti-inflammatory	Warm
<i>Alpinia galangal</i>	Galangal (高良薑 gāo liáng jiāng)	Ghost	Root	Anti-inflammation, antimicrobial activity	Cold
<i>Aquilaria agallocha</i> Roxb.	Aloeswood (沉香 chén xiāng)	Oud	Stem	Anti-inflammatory activity, antimicrobial activity	Cold
<i>Cordia myxa</i> L.	Assyrian plum	Sepestan	Fruit	Anti-inflammatory activity	Warm
<i>Cassia fistula</i> L.	Purging cassia	Fuloos	Fruit	Anti-inflammatory activity, anti-shigellosis activity, antibacterial activity, antifungal activity	Warm
<i>Hyssopus officinalis</i> L.	Hyssop	Zoophā	Flower	Antifungal, antimicrobial activity	Cold
<i>Matricaria chamomilla</i> L.	Chamomile	Babooneh	Flower	Antimicrobial activity, anti-inflammatory activity	Warm–cold
<i>Popaver somniferum</i> L.	Opium poppy (罌粟 yīng sù)	Khashkhash	Seed	Analgesic	Warm
<i>Viola odorata</i> L.	Violet	Banafsheh	Flower	Antibacterial activity	Cold
<i>Zyzyphus jujube</i> Mill.	Jujube (乾棗 gān zǎo)	Anab	Fruit	Immunostimulating, anti-inflammatory	Warm

4.4. Hollyhock

Hollyhock (*Althea officinalis* L. (Marshmallow); 蜀葵 shǔ kuí) is one of the most famous and important drugs in ITM. It is used to treat warm catarrh, inflammatory diseases of the respiratory system, gastrointestinal, urinary tract, nervous system, joints, and breast, and inflammations of the neck and eye.^{21,25,26}

Hollyhock contains flavonoids, polysaccharides, quercetin, volatile oil, glycosides and organic acids. Pharmacological studies on hollyhock confirm anti-inflammatory, antipyretic, and antibacterial effects against *Escherichia coli*, *Staphylococcus aureus*, *Bacillus cereus*, and *Listeria monocytogene*.²⁷

4.5. Violet

Violet (*Viola odorata* L.) is another therapeutic drug used for warm catarrh, inflammatory lung and gastrointestinal diseases, inflammations of the neck and head, headache, and insomnia in ITM.^{25,26} It is also an important medicinal plant that is used to treat bronchitis, common cold, and gastrointestinal diseases. In an *in vitro* study, the antimicrobial effect of violet was evaluated on three microbial species (*S. aureus*, *E. coli*, and *Pseudomonas aeruginosa*); the maximum antimicrobial effect was on *S. aureus* and the least effect on *P. aeruginosa*. The antimicrobial effect is low in the leaves and roots of the violet high in the flowers. Violet also has anti-inflammatory properties, so it is useful in the treatment of inflammatory and infectious diseases (Fig. 1).²⁸

4.6. Purging cassia

Purging cassia (*Cassia fistula* L.) is a well-known compound used as a laxative in ITM, and for warm catarrh, lung diseases, gastrointestinal diseases, and joint diseases. It is also used as an antipyretic.^{21,22,26}

In vivo and *in vitro* studies on purging cassia show that it has hepatoprotective, hypolipidemic, antimutagenic, anti-inflammatory, antibacterial, antiulcer, antifungal, and antioxidant activities. Antimicrobial properties are against *E. coli*, *Bacillus mycoides*, *Bacillus subtilis*, *Mycobacterium smegmatis*, *Klebsiella aerogenes*, *P. aeruginosa*, and *Proteus vulgaris*, and antifungal effects are against *Trichophyton mentagrophytes* and *Epidermophyton floccosum*.^{29–31}

4.7. Chamomile

Chamomile (*Matricaria chamomilla* L.) has been used for warm and cold catarrh, inflammatory diseases in different parts of the body such as the lungs, gastrointestinal, and brain and also used for infectious fever in ITM.^{21,25,26} According to research, the basic constituents of chamomile include several phenolic compounds, primarily the flavonoids apigenin, patuletin, quercetin, glucoside, and luteolin. Based on *in vitro* studies, chamomile has moderate antioxidant and antimicrobial effects, and significant antiplatelet effect. According to animal model studies, chamomile has potent anti-inflammatory, antimutagenic, cholesterol-lowering, anxiolytic, anticonvulsant, and antispasmodic effects.^{32,33}

4.8. Hyssop

Hyssop (*Hyssopus officinalis* L.) is a well-known compound in ITM that is used for cold catarrh, pneumonia, cough, asthma, and other inflammatory lung diseases.^{25,26,34} The studies on hyssop have proved antimicrobial and antifungal effects against *E. coli*, *P. aeruginosa*, *S. aureus*, *Staphylococcus pyogenes*, and *Candida albicans* and also anti-inflammatory effects.³⁵

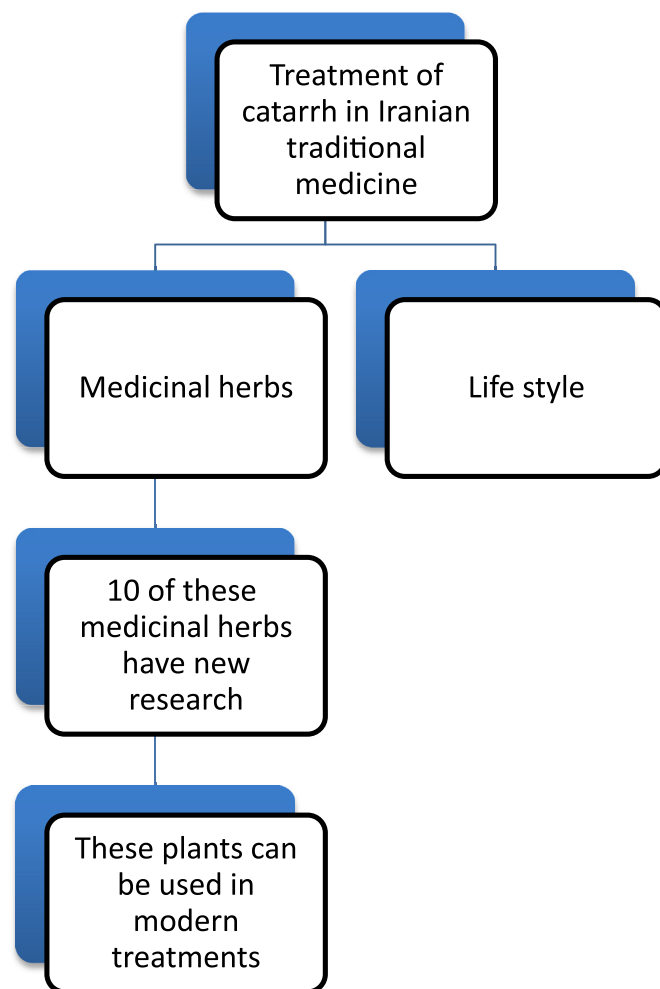


Fig. 1. Treatment of catarrh in Iranian Traditional Medicine.

4.9. Galangal

Galangal (*Alpinia galangal*; 高良薑 gāo liáng jiāng) has been used for cold catarrh, asthma, chronic cough, and other diseases of lung, joint pain, ear pain, urinary tract diseases, nervous system diseases, and amnesia in ITM.^{21,25,26}

New research on galangal shows that its components include 1'-acetoxychavicol acetate (galangal acetate) and it also has antibacterial effects, especially against *S. aureus*.^{36,37}

4.10. Aloeswood

Aloeswood (*Aquilaria agallocha* Roxb; 沉香 chén xiāng) has been one of the most important drugs in the ITM. It is used to treat cold catarrh, inflammatory lung diseases, heart disease, gastrointestinal and genitourinary diseases, and toothache.^{21,25,26} The research on *Aquilaria agallocha* has shown *in-vivo* (by carrageenan-induced paw edema in a rat model) and *in-vitro* (by human red blood cell membrane stabilization method) anti-inflammatory effects of aloeswood. *Aquilaria agallocha* exerts its anti-inflammatory properties via two mechanisms: (1) erythrocyte membrane stability—this causes lysosomal membrane stability and as a result limits the inflammatory response; and (2) inhibition of serotonin, histamine, or prostaglandins synthesis.³⁸ It is reported as a treatment for anaphylactic reactions and also has an antihistamine effect. The plant is used to treat inflammation, arthritis, vomiting, cardiac

disorders, cough, asthma, leprosy, and anorexia traditionally and is used to treat headache, inflammation, gout, and arthritis in folk medicine.⁷

5. Conclusion

Plants discussed in this study are consistent with new research and can be used in modern treatments. According to the antimicrobial resistance and complications of antibiotic and anti-inflammatory drugs, it seems that the various components of the medicinal herbs are effective in producing new drugs. We hope that further research on medicinal plants will benefit the future treatment of catarrh and other diseases related to it.

Conflicts of interest

All authors declare no conflicts of interest.

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