

## Cold And Flu: Conventional vs Botanical & Nutritional Therapy

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### Abstract

Cold and flu (or Influenza) are both respiratory illnesses and the terms are used interchangeably. However, they are both caused by different viruses. There are two main types of flu viruses: influenza A and influenza B. The most serious and deadly flu outbreaks are caused by influenza A because of its ability to genetically shift into new forms against which no person has developed immunity. Influenza B generally causes less severe infection. Outbreaks of influenza B commonly occur in schools and military camps, where many people live or work in close contact. The flu is a more serious illness than common cold. With cold, the symptoms are centered around the nose and throat. But the flu affects the whole body. The symptoms of a cold include a runny or blocked nose, sneezing, minor throat irritation, mild fever, sore throat, a feeling of ears block, and finally coloured mucus or nasal discharge (which means that your immune system is fighting the infection). Symptoms of influenza usually start suddenly with a high fever. Other symptoms include, irritation in the throat, a dry cough, high fever, shivering, sweating and severe muscle aches. The conventional therapies for colds focus primarily on temporary symptom relief and include over-the-counter antipyretics, anti-inflammatory and decongestants but for influenza it also includes prescription antiviral agents and vaccines (for prevention). This review presents the comparison of conventional treatment options with selected botanicals under different categories -antiviral, diaphoretic, expectorant, febrifuge and immunostimulant- along with nutritional consideration (Vitamins A and C, zinc, propolis) that may help in the prevention and treatment of these conditions.

Colds, influenza, cough, herbal, conventional, nutritional.

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### INTRODUCTION

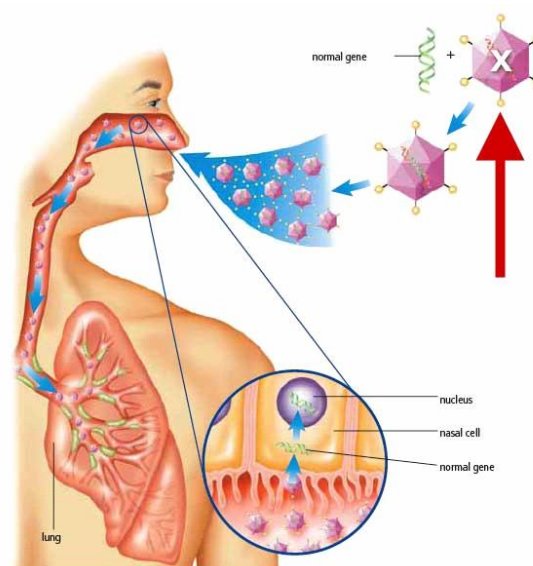
The common cold (also known as nasopharyngitis, acute viral rhinopharyngitis, acute coryza, or a cold) is a viral infectious disease of the upper respiratory system, caused primarily by rhinoviruses and corona viruses [1,2], whereas influenza is a contagious respiratory tract infection caused by one of three influenza viruses: A, B and C. Influenza C causes mild infections in infants and young children, which may confer life-long immunity, in adult cases are rare and usually asymptomatic. Influenza A & B viruses cause

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seasonal epidemics in people of all ages. Influenza B & C viruses are virtually restricted to humans and both have been isolated from other mammals, there are no natural animal reservoir of infection [1]. Although, both A & B viruses can be responsible for the annual winter epidemics of influenza ('seasonal flu') that occur around the world, only influenza A has the potential to give rise to global pandemic disease [2]. As per WHO report the most prevalent form of Influenza virus in India is B strain.

Viruses enter the body through the respiratory tract and attach to cells lining the nose, throat and bronchial tubes. Exposure to cold, damp, wind and rapid temperature change can make us more susceptible. During cold, virus particles penetrate the mucous layer of the nose and throat and attach themselves to cells there. The viruses punch holes in

the cell membranes, allowing viral genetic material to enter the cells. Within a short time, the virus takes over and forces the cells to produce thousands of new virus particles [4-5]. In response to this viral invasion, the body marshals its defenses. The nose and throat release chemicals that spark the immune system; injured cells produce chemicals called prostaglandins, which trigger inflammation and attract infection-fighting white blood cells; tiny blood vessels stretch, opening up space to allow blood fluid (plasma) and specialized white cells to enter the infected area; the body temperature rises, enhancing the immune response; and histamine is released, increasing the production of nasal mucus in an effort to trap viral particles and remove them from the body.



**Fig. 1:** Attack of virus on respiratory tract<sup>[3]</sup>

As the battle against the cold virus rages on, the body counterattacks with its heavy artillery: specialized white blood cells called monocytes and lymphocytes; interferon, often called the "body's own antiviral drug"; 20 or more proteins that circulate in the blood plasma and coat the viruses and infected cells, making it easier for the white blood cells to identify and destroy them. The symptoms experienced as a

cold are actually the body's natural immune response.

Colds manifest slowly with cough, nasal congestion and sore throat, usually without fever. Flu comes on more suddenly with fever, sore muscles, fatigue and cough. These ailments can last from a few days to about a week, but can progress into bronchitis, strep throat or asthma if not properly treated. Mucus

coughing clears the mucus and viruses out of the body. Fever causes the body to heat up and destroy infection<sup>[3,4]</sup>. Table 1 compares the various aspects of cold and influenza.

**Table 1:** Comparison of characteristics of common cold and influenza

Features	Common cold	Flu (Influenza)
<b>Etiological Agent</b>	Mainly rhinoviruses and corona viruses	Three strains of influenza viruses: Influenza A, B and C
<b>Site of Infection</b>	Upper respiratory tract	Entire respiratory system
<b>Symptoms</b>	Develops within 1-2 days	Develops within few hours
<b>Fever</b>	Occasionally, low grade	Characteristic, higher
<b>Headache</b>	Frequent	Characteristic often severe
<b>Body ache</b>	Mild	Common may become severe
<b>Cough, congestion</b>	Mild to moderate	Sometimes present
<b>Sore throat</b>	Common	Sometimes present
<b>Runny nose</b>	Very common	Usually severe
<b>Fatigue and exhaustion</b>	Mild	Extreme

A recent review confirmed that simple physical measures, including frequent hand washing, wearing masks and gloves, and probably social distancing, can be highly effective in preventing the spread of epidemic respiratory viruses<sup>[5]</sup>.

**Conventional Therapy-** There are many medications available to treat cold and flu. The conventional therapy involves the symptomatic treatment<sup>[6]</sup>. The table 2 summarize various OTC medications.

**Table 2:** Examples of ingredients in over-the-counter cough and cold medications, by category<sup>[6]</sup>

CATEGORY	EXAMPLES OF INGREDIENTS
Antihistamines	Chlorpheniramine, diphenhydramine, hydroxyzine
Antipyretics	Acetaminophen, ibuprofen
Antitussives	Dextromethorphan
Decongestants	Pseudoephedrine, phenylpropanolamine, phenylephrine
Expectorants	Guaifenesin

**Antihistaminic:** Antihistamines can be used for symptoms such as runny nose, sneezing and itching. There are many formulas containing different drugs like diphenhydramine, loratidine etc. Precautions are necessary as most of these drugs cause drowsiness<sup>[6,9]</sup>.

**Pain relievers:** For fever, sore throat and headache, acetaminophen or mild pain relievers are beneficial<sup>[6]</sup>.

**Decongestant nasal sprays:** For nasal congestion irrigation with saline reduces congestion and some nonprescription decongestants are also prescribed. They generally contain pseudoephedrine or phenylephrine that helps to release congestion<sup>[6,10]</sup>.

**Cough syrups:** Cough can be suppressed by cough drops<sup>[6,7]</sup>.

**Various trials for assessment of Effectiveness of OTC drugs:-** The Cochrane Collaboration maintains 3 reviews directly related to the use of OTC medications to treat the common cold. The most relevant Cochrane meta-analysis reviewed OTC CCMs (Cough and cold medications) in ambulatory patients with viral-induced cough; this meta-analysis reviewed 25 studies, with 8 pediatric trials among them, representing 3492 people, including 616 children. The primary end points of this meta-analysis were frequency and severity of cough, cough counts, sputum production, and physician assessments. The evidence was neither for nor against the use of OTC medications in either pediatric or adult populations<sup>[8]</sup>.

**Various trials for assessment of Safety of OTC drugs-** Multiple studies suggest there is no benefit to the use of OTC CCMs, and these products have potential for harm. In recent years, several published reports have linked OTC CCM ingredients, when used both correctly and incorrectly, with morbidity and mortality. The United State National Electronic Injury Surveillance System reported that OTC CCM preparations were responsible for 7091 visits to emergency departments (EDs) during 2004 and 2005

in children younger than 12 years old. A quarter of cases were due to properly administered medications with undesired outcomes. While children aged 2 to 5 years represented the largest group in this study, children younger than age 2 had the highest rate of adverse reactions<sup>[11]</sup>.

**Antiviral:** Antiviral drugs are generally avoided because of resistance problem. There are several antiviral medications that can limit the course and duration of these infections. These include amantadine and rimantadine which are active against influenza A virus. Oseltamivir and zanamivir are active against influenza A & B. Tamiflu (oseltamivir phosphate) is approved to treat Type A & B influenza. It does have some contraindications and individuals with chronic heart or lung diseases, kidney disease, or other underlying high-risk conditions should use with extreme caution and only under medical advice. Side effects can include nausea, vomiting, diarrhea, bronchitis, stomach pain, dizziness, and headaches. Antiviral medications are generally more effective when given at the early onset of symptoms rather than later. They work by inhibiting viral replication rather than directly killing the viruses<sup>[15,16]</sup>. Influenza viruses change over time. Emergence of resistance mutations could decrease drug effectiveness. Other factors (for example, changes in viral virulence) might also diminish clinical benefit of antiviral drugs<sup>[17]</sup>.

**Antibiotics-** They does not kill viruses and they should not be used for colds or flu. They can treat bacterial complications such as sinus or ear infections. The overuse of antibiotics has become a very serious problem, which leads to a resistance in disease-causing bacteria that may decrease the effectiveness of antibiotics when really needed<sup>[7]</sup>.

**Vaccine-** Both inactivated and live, attenuated influenza vaccines are used. According to WHO recommendations 2005, existing internationally licensed vaccines contain the 2 A subtypes H<sub>3</sub>N<sub>2</sub> and H<sub>1</sub>N<sub>1</sub> and 1 type B virus<sup>[16]</sup>.

**Trivalent, inactivated influenza vaccines (TIV)**<sup>[18,19]</sup>:-There are 3 types of inactivated influenza vaccine, namely whole virus vaccines, split virus vaccines and subunit vaccines. In most countries, whole virus vaccines have been replaced by less reactogenic split virus and subunit vaccines. In split virus vaccines, the virus has been disrupted by a detergent. In subunit vaccines, HA and NA have been further purified by removal of other viral components. TIVs are injected into the deltoid muscle or the antero-lateral aspect of the thigh. These vaccines should not be given to children aged <6 months; those aged 6–36 months should receive half the adult vaccine injections. Previously, unvaccinated children aged <9 years should receive 2 injections, administered at least 1 month apart. A single dose of the vaccine is appropriate for school children aged >9 years and healthy adults. The flu vaccine is either a shot or nasal spray. The inhaled form is not for use by children under 2 years old, adults over 49, people with weakened immune systems, or people with asthma. The injected flu vaccine is made from a killed virus and the nasal flu vaccine is made from a weakened live virus. Influenza viruses undergo frequent changes in their surface antigens thus immunity resulting from infection by one influenza virus does not protect fully against antigenic of the same subtype (influenza A viruses) or type (influenza B viruses). As a consequence, influenza outbreaks occur every year. New influenza vaccines must be designed annually to match the circulating viruses which are expected to cause the next epidemic<sup>[18-19]</sup>. As per recent reports of WHO, it is recommended that vaccines for use in the 2011 influenza season (southern hemisphere winter) contain the following<sup>[19]</sup>: an A/California/7/2009 (H1N1)-like virus; an A/Perth/16/2009(H3N2)-like virus; a B/Brisbane/60/2008-like virus. Efficacious and safe inactivated vaccines remain the cornerstone of influenza prophylaxis in most countries<sup>[24]</sup>.

**Herbal treatment<sup>[20]</sup>-General introduction:**

Science has long stalked the chemical world within plants to uncover their amazing healing secrets. Lately, these investigations have yielded discovery after discovery of natural compounds with promising health and medical potential. The use of botanicals is well rooted in medical practice. Ancient doctors methodically collected information about herbs and developed well-defined pharmacopoeias to treat a variety of ailments. More than a quarter of all drugs

used today contain active ingredients derived from those same ancient plants.

**Classification of botanicals used in treatment of cold and Flu-** The classification is based on the mechanism of action of the botanical. The different mechanisms involved are antiseptic, diaphoretic, expectorant, febrifuge and immuno stimulant. Table 3 shows classification, mechanism of action along with examples of drugs under each category.

**Table 3:** Classification of botanicals for use in cold and flu [25].

CATEGORY	FUNCTION	BOTANICALS
Antiviral herbs	Inhibiting viral growth	Thyme leaf ( <i>Thymus vulgar</i> ) Honeysuckle flowers ( <i>Lonicera japonica</i> ) Andrographis ( <i>Andrographis paniculata</i> ) Yarrow ( <i>Achillea millefolium</i> ) Peppermint leaf and oil ( <i>Mentha piperita</i> ) Calendula ( <i>Calendula officinalis</i> )
Diaphoretic herbs	Promote sweating and the release of toxins	Boneset ( <i>Eupatorium perfoliatum</i> ) Elderberry ( <i>Sambucus nigra</i> )
Expectorants	Expels phlegm	Tulsi ( <i>Ocimum sanctum</i> ) Snake root ( <i>Polygala senega</i> ) Licorice Root ( <i>Glycyrrhiza glabra</i> ) Clove ( <i>Syzygium aromaticum</i> ) Slippery Elm and Marshmallow Osha root ( <i>Ligusticum porterii</i> ) Sage leaf ( <i>Salvia officinalis</i> )
Febrifuges	Reduces raised body temperature	Banafsha ( <i>Viola odorata</i> )
Immuno stimulant	Increase antibody production, raise white blood cell counts, and stimulate the activity of key white blood cells	Echinacea root ( <i>Echinacea purpurea</i> ) Eucalyptus ( <i>Eucalyptus globules</i> ) Garlic ( <i>Allium sativum</i> ) Ginseng ( <i>Panax quinquefolium</i> ) Marsh mallow ( <i>Althea Officinalis</i> ) Slippery elm ( <i>Ulmus fulva</i> ) Isatis root ( <i>Isatis tinctoria</i> ) Usnea lichen ( <i>Usnea barbata</i> ) Myrrh resin ( <i>Commiphora myrrh</i> ) Ginger root ( <i>Zingiber officinale</i> )

**1. Antiseptic herbs inhibiting microbial growth**

**Thyme leaf** [22-25]-Thyme leaf (*Thymus vulgaris*) expels phlegm and relieves congestion [34]. It is antiseptic and an immune stimulant. The primary chemical constituents of Thyme include essential oil (borneol, carvacrol, cymol, linalool, thymol), bitter principle, tannin, flavonoids (apigenin, luteolin), saponins, and triterpenic acids [26,29]. Thyme warms and stimulates the lungs, expels mucus, and relieves congestion. It also helps deter bacterial, fungal, and viral infections [27]. The thymol content of thyme

works as an expectorant and cough suppressant and is frequently used in cough syrups [27].

**Honeysuckle flowers** [22,24,28]- Honeysuckle (*Lonicera japonica*) cools fever by stimulating perspiration and clearing infection [29,30]. It is commonly known in Asia as the “gold-silver flower”. According to the Natural Medicines Comprehensive Database, honeysuckle is taken orally for cold and other upper respiratory tract infections, influenza, swine flu, pneumonia, encephalitis, fever, inflammation, viral and bacterial infections. Modern scientific studies revealed that the flower of this plant

has broad-spectrum antibacterial, antiviral and anti-inflammatory properties. The active constituents of Japanese honeysuckle include: iridoid glycosides; organic acids (quinic acid and caffeic acid and their derivatives); triterpene glycosides (saponins); flavonoids; and essential oil comprised mainly of monoterpenes and sesquiterpenes<sup>[31]</sup>.

**Andrographis** (*Andrographis paniculata*)- The major constituents are diterpene lactones (free and in glycosidic forms) including andrographolide, deoxyandrographolide, 11,12-didehydro-14-deoxyandrographolide, neoandrographolide, andrographiside, deoxyandrographiside and andropanoside<sup>[32]</sup>.

**Antiviral activity**-Andrographis compounds have shown antiviral properties which inhibit glycoprotein's in the virus<sup>[33]</sup>. This impedes the viruses' ability to invade cells in the body and replicate. It is used for prophylaxis and symptomatic treatment of upper respiratory infections, such as the common cold and uncomplicated sinusitis<sup>[34-35]</sup>, bronchitis and pharyngotonsillitis. A placebo-controlled, double-blind clinical trial assessed the efficacy of a standardized extract of the aerial parts for treatment of the common cold in 61 adult patients. A significant reduction ( $P < 0.0001$ ) in clinical symptoms such as sore throat, tiredness, muscular ache and malaise was observed on day 4 in the group receiving 1200 mg extract daily, as compared with the placebo group. No adverse reactions were reported in either group<sup>[34]</sup>. In another study, 50 adult patients received either 1020mg extract or a placebo daily for 5 days. The results showed that patients in the treated group took fewer sick leaves than those in the placebo group. A study was conducted on 107 schoolchildren during the winter season. The children received either 200 mg extract or a placebo daily for 3 months and were evaluated weekly by a physician. There was no difference in the occurrence of colds between the two groups during the first 2 months of treatment.

However, after the third month of treatment, there was a significant difference ( $P < 0.05$ ) in the occurrence of the common cold in the treated group (30%) as compared with the placebo group (62%). In a study without controls, treatment of patients with a standardized extract of *A. paniculata* (containing 4% andrographolides) reduced the incidence of fever associated with the common cold<sup>[34]</sup>. This finding was confirmed in a later study<sup>[35]</sup>.

**Immunostimulatory activity**<sup>[36]</sup>-Andrographis has immunostimulant property also. It is confirmed in a study conducted on mice. It stimulated antibody production and the delayed-type hypersensitivity response, in mice to sheep red blood cells. The extract was more effective than either andrographolide or neoandrographolide alone, suggesting that other constituents may be involved in the immunostimulant response.

**Yarrow leaf and flower**<sup>[23,24,25]</sup> -The herb is purported to be a diaphoretic, astringent, tonic, stimulant and mild aromatic. It contains [isovaleric acid](#), [salicylic acid](#), [asparagin](#), [sterols](#), [flavonoids](#), [bitters](#), [tannins](#), and coumarins. They have a mild stimulant effect thus used as a snuff. Today, yarrow is valued mainly for its action in colds and influenza. The dark blue essential oil, extracted by steam distillation of the flowers, is generally used as an anti-inflammatory or in chest rubs for colds and influenza. A chest rub can be prepared by combining yarrow with eucalyptus, peppermint, hyssop, or thyme oil, diluting a total of 20 drops of oil in 25 ml almond or sunflower oil. Yarrow intensifies the medicinal action of other herbs taken with it, and helps eliminate toxins from the body.

**Calendula**<sup>[22]</sup> (*Calendula officinalis*)- The major constituents are triterpene saponins (2-10%) based on oleanolic acid (i.e. calendulosides) and flavonoids (3-O-glycosides of isorhamnetin and quercetin), including astragalgin, hyperoside, isoquercitrin and rutin. Other constituents include essential oil, sesquiterpenes (e.g. caryophyllene) and triterpenes

(e.g. a- and b-amyrins, lupeol and lupenone). Polysaccharides have also been reported [37]. A tincture of the flowers suppressed the replication of herpes simplex, influenza A2 and influenza APR-8 viruses in vitro. However, an aqueous extract of the flowers was not active. A chloroform extract of the flowers inhibited the replication of HIV-1.

**Peppermint leaf and oil** (*Menthae Piperitae*) [23-25]-The major constituents are menthol and menthone. Menthol occurs mostly in the free alcohol form, with small quantities as the acetate and valerate esters. Other monoterpenes present include isomenthone, 1,8-cineole,  $\alpha$ -pinene,  $\beta$ -pinene, limonene, neomenthol and menthofuran [22,38]. Internally and externally for the symptomatic treatment of catarrh and coughs. It promotes sweating, has antiviral properties. It also provides a local anaesthetic action on lungs and throat thus suppresses cough reflex. The peppermint has some antitussive effect also. It relieves pain, muscle spasms, reduce inflammation, clear congestion and helps indigestion [38].

## 2. Diaphoretic herbs promote sweating and the release of toxins

**Boneset** [40] (*Eupatorium perfoliatum*) an important immune stimulant and is one of the most effective herbs due to its diaphoretic properties. It is extremely bitter so tincture or capsules is a good method of ingestion.

Boneset is primarily herb to help relieve fevers, aches and pains, and respiratory infections. Its flowers and leaves contain volatile oils, bitter elements such as eupatorin, tannins, flavonoids, sterols, and gallic acid. Boneset also acts as a mild laxative and a diuretic, thus assisting the body in cleansing, a necessary step in healing any infection. There has been some scientific research which has shown that boneset can be used to treat the [common cold](#), and as a [natural treatment for the flu](#), due to possible stimulation of [the immune system](#). It is also thought

that boneset can increase the resistance to infections, loosen phlegm.

**Elderberry** [22] (*Sambucus nigra*)-The major characteristic constituents (up to 3.0%) are the flavonoids (kaempferol, astragalin, quercetin, rutin, isoquercitrin, hyperoside). Other secondary metabolites include about 1% triterpenes ( $\alpha$ - and  $\beta$ -amyrin ursolic acid, oleanolic acid), about 1% sterols ( $\beta$ -sitosterol, campesterol, stigmasterol), about 3% phenolic acids and their corresponding glycosides (chlorogenic, ferulic, caffeic and *p*-coumaric acids), and up to 0.15% essential oil. In traditional systems of medicine it acts as a diaphoretic for treatment of fever and chills, and as an expectorant for treatment of mild inflammation of the upper respiratory tract. Diaphoretic activity is reported to be due to increase the response of the sweat glands to heat stimuli, and increase diaphoresis in healthy subjects.

**3. Expectorants:** facilitate the removal of phlegm.

**Tulsi** [22] (*Ocimum sanctum*) - The main components are tannins and essential oil. The amounts of the primary constituents of the essential oil vary according to the geographical distribution and variety of the source plant material: eugenol, methyleugenol, and  $\alpha$ - and  $\beta$ -caryophyllene. Also present are methylchavicol, linalool and 1,8-cineole[41]. It is used for treatment of arthritis, asthma, bronchitis, common cold, diabetes, fever, influenza, peptic ulcer and rheumatism [42-44].

**Antispasmodic activity-** A 50% ethanol extract of the leaves inhibited histamine-induced bronchospasms and pre-convulsive dyspnoea in guinea-pigs when administered by gastric lavage. Intragastric administration of the leaf essential oil or fixed oil to guinea-pigs inhibited bronchospasms induced by both histamine and acetylcholine, and pre-convulsive dyspnoea [45].

**Immunostimulatory activity** - Intragastric administration of an aqueous or methanol extract of the leaves to rats increased antibody titre in both sheep erythrocyte and Widal agglutination tests, thus

demonstrating stimulation of the humoral immune response.

**Snake root** <sup>[48-49]</sup> (*Polygala senega*) - Methyl salicylate (0.1–0.3%) is the compound responsible for the characteristic odour of the drug. The major reported biologically active constituents are triterpene saponins (6-16%). The saponins are 3-glucosides of presenegenin, It acts as an expectorant for symptomatic treatment of coughs due to bronchitis, emphysema and catarrh of the upper respiratory tract.

**Expectorant activity-** Intra-gastric administration of a fluid extract of Senegae enhanced the production of respiratory tract fluid in decerebrate or anaesthetized animals. Three to four hours after administration, the output of respiratory tract fluid increased by up to 173% in cats and 186% in guinea pigs, but no effect was observed in rabbits. In another study, administration of syrup of the root to anaesthetized dogs significantly increased the volume of respiratory tract fluid within 5–30 minutes ( $P < 0.001$ ); after 2 hours, the fluid volume in the treatment group was 0.114ml as compared with 0.01 ml in control animals treated with saline.

The expectorant activity of the crude drug is due to the constituent saponins which produce local irritation of the mucous membranes of the throat and respiratory tract. This irritation stimulates an increase in bronchial secretions, thereby diluting the mucus, reducing its viscosity and facilitating expectoration. Saponins may also reduce the surface tension of mucus, thus reducing its viscosity. Oral administration of a fluid extract of the root was shown to reduce the viscosity of mucus in patients with bronchiectasis.

**Licorice Root** <sup>[23-25]</sup> (*Glycyrrhiza glabra*) is anti viral, anti-inflammatory, soothes gastric mucous membranes. The root cleanses the colon, increases fluidity of mucous in the lungs and bronchial tubes and stimulates interferon production. Glycyrrhizin is

changed in the liver to glycyrrhetic acid. Both these compounds promote the activation of interferon, a potent, naturally produced antiviral compound. Licorice has an expectorant effect, which benefits people with asthma or chest colds with tight coughs or difficulty breathing. Due to the adverse reaction profile of licorice, many studies have been performed using the deglycyrrhinated licorice (DGL) extract, which is free of glycyrrhizin and has had no significant reported adverse effects.

**Clove** <sup>[22]</sup> (*Syzygium aromaticum*) -The major constituent (up to 20%) is an essential oil, which is characterized by the presence of eugenol (60–95%), eugenol acetate (2–27%), and a- and b-caryophyllene (5–10%). It is used in the form of lozenges, for sore throats and coughs associated with the common cold. Mucilage herbs, such as Slippery Elm and Marshmallow, are often helpful for symptomatic relief of coughs and irritated throats. Mullein has expectorant and demulcent properties, which accounts for this herb's historical use as a remedy for the respiratory tract, particularly in cases of irritating coughs with bronchial congestion.

**Marshmallow root** <sup>[25,50]</sup> (*Althaea officinalis*) - The demulcent effects of Althaeae are due to its high content of polysaccharide hydrocolloids, mixture of acidic galacturonorhamnans, neutral glucans and neutral arabinogalactans, which form a protective coating on the oral and pharyngeal mucosa, soothing local irritation and inflammation <sup>[24,56]</sup>.

**Antitussive activity-** Intra-gastric administration of a polysaccharide fraction, isolated from an aqueous root extract, to cats (50 mg/kg body weight) suppressed the intensity and the frequency of coughs induced by mechanical irritation of laryngopharyngeal and tracheobronchial mucosa. The antitussive activity of this polysaccharide fraction was as effective as Syrup Althaeae and more effective than prenoxidiazine.



**Osha root** <sup>[23,24]</sup> (*Ligusticum porterii*) - Relieves respiratory congestion and improves immunity as well as help in sore throat pain. Osha has been clinically verified to possess anti-viral properties and is very effective for treating cold and flu of the upper respiratory tract, and other viral infections of the respiratory system. The plant is also a powerful stimulant if consumed to excess. Taking a tincture or decoction of osha root, or chewing directly on the root, causes perspiration and enhances the body's immune function. Although osha has a bitter taste, its root has a numbing effect that soothes sore throats. Since it is also an expectorant, it is very useful for coughs and pharyngitis, and can also be used for very early stages of tonsillitis.

**Sage leaf** <sup>[23,24]</sup> (*Salvia officinalis*) also dries excessive mucus secretions thus improving colds, congestion, fever, flu, sore throat and tonsillitis. The strongest active constituents of sage are within its [essential oil](#), which contains [cineole](#), [borneol](#), and [thujone](#). Sage leaf contains [tannic acid](#), [oleic acid](#), [ursolic acid](#), [ursolic acid](#), [cornsole](#), [cornsolic acid](#), [fumaric acid](#), [chlorogenic acid](#), [caffeic acid](#), [niacin](#), [nicotinamide](#), [flavones](#), [flavonoid glycosides](#), and [estrogenic](#) substances.

#### 4. **Febrifuges** lower fever.

Banafsha (*Viola odorata*) - is an antipyretic herb as well as suppresses vata, pitta and cough thus act as expectorant <sup>[24,25]</sup>.

5. **Immuno stimulant** develops our natural immunity. The polysaccharides and proteins stimulate the immune system. This might account for its role against the common cold and flu. Many other herbs which can help fight infection by stimulating white blood cell production and by their direct antiseptic properties.

**Echinacea root** (*Echinacea purpurea*) <sup>[25,51,52]</sup> - There are three main species of Echinacea: *Echinacea purpurea*, *Echinacea angustifolia*, and *Echinacea pallida*. *E. purpurea* is the most widely

used. Echinacea is also used to prevent and treat the common cold. The alkylamide, alkaloid, and polyacetylene fractions are thought responsible for stimulating leukocytes and increasing the release of TNF and interleukin.

A double-blind, randomized study for the treatment of the common cold suggest that, if initiated within 24 hours of onset, echinacea may shorten the duration of colds, but may not reduce the severity of symptoms. Fresh pressed juice of the flowers of Echinacea (*E. purpurea*) preserved with alcohol and tinctures of root of echinacea (*E. pallida*) have been shown to reduce symptoms of the common cold. Echinacea (*E. angustifolia*) root tinctures have been shown to reduce symptoms of the common cold. The minimum effective amount of Echinacea tincture or juice that is necessary to take is 3 ml three times per day. Recent studies indicate that regular use of Echinacea to prevent colds does not work. Therefore, it is currently recommended to limit use of echinacea to the onset of a cold and to use it for only 7 to 10 days consecutively.

The constituent found in echinacea was found to increase antibody production, raise white blood cell counts, and stimulate the activity of key white blood cells.

**Eucalyptus** <sup>[22]</sup> (*Eucalyptus globules*) - The major constituent is 1,8-cineole (54–95%). In addition, there are  $\alpha$ -pinene (2.6%), *p*-cymene (2.7%), aromadendrene, cuminaldehyde, globulol and pinocarveol.

**Respiratory tract effects** - Intra-gastric administration of the essential oil increased respiratory tract secretions in cats, guinea-pigs, rabbit and rats. Administration of non-lethal doses of the essential oil by steam inhalation to urethane-treated rabbits did not enhance the output of respiratory tract fluid.

**Antitussive effects** - The antitussive effect of the essential oil was compared to that of codeine in guinea-pigs in which coughs were induced by

mechanical stimulation. Inhalation of the essential oil (5% emulsified in normal saline) had a significant antitussive effect relative to codeine (15mg/kg body weight) of 0.68 ( $P < 0.05$ ). When the essential oil was administered by intraperitoneal injection (50mg/kg body weight), the antitussive effect relative to codeine was 0.57, which was also significant ( $P < 0.001$ ).

**Nasal decongestant activity-** A clinical trial without controls assessed the effects of Eucalyptus as a nasal decongestant in 31 healthy volunteers. Inhalation of the essential oil (10 ml) over a period of 5 minutes had no effect on nasal resistance to airflow. However, the oil had a stimulant or sensitizing effect on nasal cold receptors, and the majority of subjects reported a sensation of increased airflow. In other clinical studies of patients with acute common colds, no significant differences in nasal decongestant activity were reported between the essential oil (1.3%) in petrolatum and a petrolatum placebo. Leaf has antiviral activity also. An aqueous leaf extract inhibited the replication of influenza virus A, in vitro at a concentration of 0.1%.

**Garlic** <sup>[22,53]</sup> (*Allium sativum*) - Contains several helpful compounds, including allicin, one of the plant kingdom's most potent, broad-spectrum antibiotics. This herb's aromatic compounds are readily released from the lungs and respiratory tract, putting garlic's active ingredients right where they can be most effective against cold viruses. Garlic's antiviral effects have been well studied. In vitro, fresh garlic killed herpes simplex types 1 and 2, Para-influenza virus type 3, vesicular stomatitis virus, and human rhinovirus type 2. Fresh garlic extract was virucidal against all viruses tested but the virucidal activity of commercial products depended how they were prepared.

**Ginseng** <sup>[22,54-56]</sup> - There are actually three different herbs commonly called ginseng: Asian or Korean ginseng (*Panax ginseng*), American ginseng (*Panax*

*quinquefolius*), and Siberian "ginseng" (*Eleutherococcus senticosus*).

**Immunologic Effects** - Several reports have addressed the immunologic activity of ginseng, it has been found to induce interferon production, increase natural killer cell and cytotoxic activity in human lymphocytes. While a human double-blind study with 36 healthy volunteers showed a substantial increase in T-lymphocytes with eleutherococcus, there were no significant effects in leukocyte or lymphocyte counts found after administration of standardized ginseng extract (300 mg qd for 8 weeks) to 20 young Thai men.

**Usnea** <sup>[56]</sup> lichen (*Usnea barbata*) acts as a wide spectrum herbal antibiotic. Usnea has a traditional reputation as an antiseptic and was sometimes used for people with common colds.

**Myrrh resin** <sup>[23,24]</sup> (*Commiphora myrrha*)- increases white blood cell motility and facilitates mucus drainage. [Myrrh resin](#) has been shown to kill various microbes and to stimulate macrophages (a type of white blood cell).

Evidence is also there that eleuthero enhances and supports the immune response. Eleuthero may be useful as a preventive measure during cold and flu season. General immune strengtheners can be used over fairly long periods of time to strengthen and build the immune system.

**Ginger** <sup>[23,24]</sup> - When nausea accompanies an illness, ginger root (*Zingiber officinale*) warms chills, fights infection and alleviates stomach distress. Ginger contains nearly a dozen antiviral compounds. Scientists have isolated several chemicals (sesquiterpenes) in ginger that have specific effects against the most common family of cold viruses, the rhinoviruses. Some of these chemicals are remarkably potent in their anti-rhinovirus effects. Other constituents in ginger, gingerols and shogaols, help relieve cold symptoms because they reduce pain and fever, suppress coughing and have a mild sedative effect that encourages rest.

**Astragalus root** [23,24] - Astragalus root is "the most powerful immunity-boosting herb". It enhances immune function by increasing the activity of certain white blood cells which increases the production of antibodies (IgA and IgG), Increases the production of interferon (an anti-viral and anti-tumor agent naturally produced by the body) and stimulates natural killer cells. Astragalus has antibacterial, adaptogenic, anti-inflammatory, and anti-viral effects. It contains numerous components, including polysaccharides, flavonoids, triterpene glycosides, amino acids, and trace minerals. It owes most of its immune enhancing effects to polysaccharides. Astragalus increases white blood cell production of the body's own anti-viral compounds alpha-and gamma-interferon, which generally protect against viral invasion.

#### **Nutritional Consideration** [57]

**Vitamin C** - Stimulates antibody response. Regular use can prevent colds before they happen. Eating plenty of fruits and vegetables that are loaded with vitamin C, such as citrus fruits, melons, berries, parsley, and bell peppers is helpful. Vitamin C acts as a mild natural antihistamine and supporting the function of white blood cells. Antihistamines reduce mucus secretion and inflammation in airways and sinuses, making it easier to breathe. The capsaicin in cayenne pepper diminishes pain messages from nerve endings, offering relief from sore throat pain; use it in a gargle.

**Gargling** with mucilaginous herbs relieves an irritated throat and constant cough. Use a strong, warm infusion as a gargle. The drugs include marshmallow, licorice, red raspberry, or calendula to soothe the irritation and make swallowing a little easier.

**Vitamin A** and/or beta carotene strengthen the mucus membranes making them more resistant to infection. Vitamin A is a nutrient vital to the mucous membranes throughout the respiratory system during a cold or flu. It can be taken in the form of

beta carotene, a precursor of vitamin A, in higher dosages.

**Vitamins B-6 & B-12** foods rich in the B vitamins, which help regulate metabolism, are also beneficial, as diets high in sugar tend to burn these vitamins at a faster rate. These foods include wheat germ, yogurt, and liver.

**Zinc** especially in the form of lozenges helps prevent viral replication in the throat by stimulating T-cell response. Zinc works best if start sucking the lozenges at the first sign of a tickle in your throat. One lozenge every 2 hours until symptoms subside, unless the lozenges give an upset stomach. The lozenges should not be used for more than one week. Zinc can suppress the immune system is used for an extended period of time.

**Propolis** a substance produced by bees from tree resins helps fight infection and can be sucked in lozenges.

**Alpha Lipoic Acid** It is a unique antioxidant that is both water and fat soluble, which allows it to enter all parts of the cell to neutralize free radicals. Alpha Lipoic Acid is important for the production of energy inside the cell by utilizing sugar to produce energy for mental and physical stamina, reducing muscle fatigue and neutralizing free radicals. Alpha Lipoic Acid recycles and enhances the effects of Vitamin C.

**Lysine** an amino acid, have a general antiviral, tonifying effect that fortifies the immune system. Take 1,000mg daily in divided doses.

**Probiotic** fortify intestinal flora, which are essential for proper digestion and nutrient absorption. This is keys to good health and a strong immune system. Foods beneficial during illness include vegetable soup, apple sauce with cinnamon and winter squash. The foods are easy to eat, when need some nourishment, with no appetite. An aromatherapy diffuser in a sick person's room can clear the congested person's sinuses. Essential oils used include eucalyptus, juniper, lavender, marjoram, peppermint, pine, rosemary, sage and tea tree.

**Conclusion**

Common cold viruses and influenza infection are leading causes of doctor visits, afflicting a significant portion of the population. The common cold, although relatively mild in symptomology and severity, accounts for a significant number of lost work or school days. Influenza, considered a preventable disease cured by vaccinations and antiviral drugs but their scope and effectiveness are limited. Consequently, most conventional therapies for colds and flu involve symptomatic relief with over-the-counter medications. The number of patients seeking alternate and herbal therapy is growing exponentially. Herbal medicines are now in great demand in the developing world for primary health care not because they are inexpensive but also for better cultural acceptability, better compatibility with the human body and minimal side effects. Several herbs, including osha, yarrow and ginger, help to avert colds when taken at the first sign of infection. Other herbs are recommended to reduce cold symptoms include mullein, marshmallow, and peppermint. The immune stimulant drugs can support the body's natural defenses potentially decreasing the incidence of colds and flu, shortening the duration and decreasing intensity of symptoms and preventing complications. All this treatment supported with rest, relaxation and nourishment help us to be more resistant.

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