

Antimicrobial Botanicals that Enhance Immune Response in Acute Upper Respiratory Infections

Co-authored by Donald R. Yance, RH (AHG), CN
and Suzanne E. Sky, L.Ac., MTOM

Discussion

HERBS & ESSENTIAL OILS FOR RESPIRATORY ILLNESS

Influenza is considered a medical threat with significant influence on human health and mortality. It is estimated to affect about three to five million people with severe illness and to cause between 250,000 to 500,000 deaths worldwide yearly.¹ With the continuing emergence of drug-resistant viral and bacterial strains, scientists and researchers are turning to the plant world for help.

Plants have been used as foods and medicines to prevent and treat illness for millennia. Specific herbs are renowned in many cultures for their ability to treat colds, flu, respiratory, and other conditions caused by viral and bacterial infections. Traditional medicines including Chinese, Ayurvedic, and European successfully treat influenza, febrile conditions, respiratory illness, and seasonal colds with botanicals.

Passed down through generations because of their efficacy and safety, traditional herbal formulas are still in use worldwide. These botanicals are currently of great interest to researchers who are impressed with their potency, multi-targeting capacity, and their ability to treat illness and enhance health at the same time. Traditional herbalists combine herbs that work together to give a fuller range of activity. Blending herbs that support immune function, calm symptoms, and clear infection helps enhance recovery time.

Herbs contain a polypharmacy of compounds found to exert multiple influences on human physiology. Research finds that numerous botanicals exert powerful antimicrobial influence. Many show activity against gram-positive bacteria (such as *Staphylococci* and *Streptococci spp.*), and gram-negative bacteria (such as *Escherichia coli*, *Klebsiella pneumonia*, and others). Botanicals are also found to exert broad-spectrum antiviral activity and potent inhibitory influence against viral strains including influenza A H1N1, influenza B virus, and

others. Botanical medicines are often found to be efficacious even against drug-resistant bacterial and viral strains.¹⁻³

Essential oils have been used and recognized for their powerful activity and antimicrobial properties for centuries. High in natural terpene and phenolic compounds, essential oils are found to exert antibacterial, antifungal, and antioxidant influences.⁴ Essential oils such as Eucalyptus are used for their known influence against respiratory tract pathogens.^{4,5}

Traditional botanical medicine utilizes multi-faceted approaches to treating colds and flu. Key principles are to attack the pathogen, relieve symptoms, support the person's natural immunity, and evoke the healing response. This is accomplished through combining specific herbs in a focused therapeutic formula.

DIAPHORETIC THERAPY

Promoting diaphoresis is a traditional method of treating the early stages of a cold or flu. It utilizes herbs, hot baths, and hot teas. These raise body temperature slightly to evoke an immune response, induce sweating, and help clear the invading pathogens. Diaphoretic herbs are combined with immune-enhancing, antimicrobial, and other appropriate herbs for optimal benefit. A well-known European diaphoretic formula of Yarrow Flowers, Elder Flowers, and Peppermint Leaf are used as a hot tea before bed. Boneset is another herb well-known for its diaphoretic activity. Chinese and Ayurvedic herbal medicine also use diaphoretic therapy as a treatment principle in early stages of specific conditions to help clear the pathological influence out of the body.

Formulas that combine botanicals from these European and Asian traditions can be used as diaphoretic therapy in the

early stages of colds and flu. Traditionally, a person drinks a strong diaphoretic herbal tea before bed, often after a hot bath, and then goes to bed warmly dressed and stays warm under the blankets throughout the night. This raises the body's temperature naturally, engages the immune response, and evokes a natural sweat during the night. Often the onset of the cold is ameliorated with this natural therapeutic modality.⁵⁻⁷

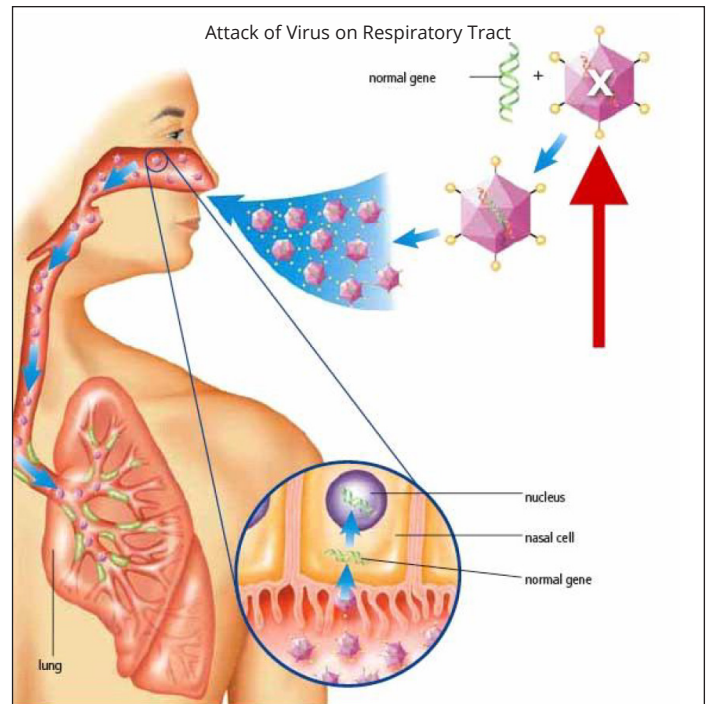


Image Source: See reference #5

Comparison of Characteristics of Common Cold and Influenza

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

Image Source: See reference #5

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Propolis

The remarkable bee resin propolis has been used worldwide since antiquity for a wide variety of health benefits. Propolis exerts natural antimicrobial properties that help prevent infections within the hive. The word propolis is from Greek origin and means defender of the city. The powerful medicinal attributes of propolis were well-known by the Greeks, Persians, and Romans of ancient times who valued it as a powerful antiseptic. Modern research reveals that propolis offers powerful antimicrobial, anti-inflammatory, and immune-modulating influence.⁸

Propolis is produced by bees from a mixture of wax, pollen, salivary secretions, and plant resins. The color and chemical composition of propolis varies widely and is influenced by geographical location, botanical species collected, and can even vary in each beehive. The color varies from yellowish green to red or dark brown. Crude propolis contains around 50% resin, 30% wax, 10% essential and aromatic oils, 5% pollen, and 5% other organic materials, such as wood fragments.

While over 300 compounds have been found in propolis, it is especially high in flavonoids, terpenes, and phenolic acids. Other compounds include aldehydes, amino acids, ketones, vitamins, and fatty acids. Since the exact profile of compounds determines its specific biological influence, propolis from a diversity of geographical areas is studied. The flavonoids are among the most researched compounds.⁸⁻¹²

Propolis is found to be immune-stimulatory and immune-modulatory with the ability to reduce inflammatory cytokines and chemokines.¹³ It exerts antiseptic, antibacterial, antifungal, astringent, and antiulcer qualities. Studies find that propolis exerts activity against Gram-positive bacteria, Gram-negative bacteria, *Helicobacter pylori*, fungi, and viruses (including influenza). These multiple actions are largely attributed to its flavonoid content.⁸

The main flavonoid constituents include quercetin, baicalin, and chrysin among others.¹²⁻¹⁴ The polyphenol CAPE (caffeic acid phenethyl ester) is a bioactive compound found in propolis that demonstrates antimicrobial, antioxidant, anti-inflammatory, and cytotoxic properties. CAPE is found beneficial for treatment of sore throat and common cold.¹⁵



Elderberry (*Sambucus nigra*)

Elderberry grows as a shrub or tall tree that blooms in early summer with berries that ripen in autumn.

Elder flowers and Elderberries are revered worldwide as valuable herbal medicines that enhance health and support immune response. They are traditionally used as preventive medicine to keep healthy during fall and winter when colds, influenza, and respiratory illness are more predominant. Elder flowers and Elderberries help alleviate symptoms and often help lessen the duration and intensity of these infections.¹⁶⁻¹⁸ Elder, used by many Greek physicians, was called by Hippocrates his medicine chest. It was revered by Galen and used by the herbalist Hildegard von Bingen in the 12th century.¹⁶

Elderberry, well-known as a nutritive tonic, is traditionally prepared as a fruit syrup or tincture. The berries contain an abundance of phenolic compounds and about 3% flavonoids, including quercetin, rutin, and isoquercitrin. They are rich in the plant-pigment anthocyanins, which give Elderberries their range of deep red to purple and violet colors. Phenolic acids and glycosides include caffeic acid and p-coumaric acids. They also contain carotenoids, sterols (including b-sitosterol), essential oils, and tannins. Elderberries contain vitamins (B-complex, C, and E) and minerals including copper, zinc, iron, calcium, magnesium, and potassium.^{5,16-19}

A traditional diaphoretic for treatment of fever and chills, Elderberry is widely used as a tonic for the respiratory and immune systems and also to enhance recovery from respiratory infections, which are common during colder seasons. Elderberry extract is found to be a potent antiviral that is active against influenza.^{17,20}

Studies with Black Elderberry extract find it exerts an antimicrobial influence, inhibits the growth of human influenza viruses, and is active against human respiratory bacterial pathogens.¹⁶ It is found to be effective against several *Streptococci* including *S. pyogenes* and several influenza viruses.¹⁶ The flavonoid constituents in particular are thought to be responsible for its inhibitory influence against influenza A and B viruses. Elderberry flavonoids are found to bind to the viral envelope of influenza and to inhibit specific enzyme responses.¹⁶



Elder Flower (*Sambucus nigra*)

Elder flower is renowned throughout the Western world as a valuable herbal medicine. It was known to the Roman naturalist Pliny the Elder (23-79 BC) and to the Swiss physician Paracelsus (1493-1541 AD). It is long valued as a diaphoretic used to treat common colds, flu, and febrile conditions. A common herbal formula contained Elder flowers, Yarrow flowers, and Peppermint leaves administered

at the very beginning of a cold or flu to induce diaphoresis and break the fever to promote a safe and speedy recovery.²¹

Elder flowers are high in flavonoids, minerals, triterpenes, tannins, and volatile oils. Studies find Elder flowers exert anti-inflammatory, antiviral, and diuretic influence. The flavonoids and triterpenes are considered to be the biologically active components. German Commission E approves use of Elder flowers for colds and recognizes it as a diaphoretic medicine for treatment of common colds with fever.²¹



Forsythia (*Forsythia suspensa*)

Forsythia and Honeysuckle are famously combined together in traditional Chinese medicine formulas that address early stages of colds and flu, and also in formulas that address other infectious conditions to expel the pathogens. Considered as powerful herbs in Chinese medicine, they are tolerated very well with high efficacy. Forsythia is found to exert anti-inflammatory, antibacterial, and antiviral influence.^{1,22}



Honeysuckle (*Lonicera japonica*)

Honeysuckle, used for many purposes in Chinese medicine, is valued for its cooling action and ability to stimulate perspiration and clear infection. In combination with other appropriate herbs, it is included as a major ingredient in formulas for colds, upper respiratory tract infections, influenza, pneumonia, and other types of infections. Modern studies find it exerts broad-spectrum antibacterial, antiviral, and anti-inflammatory activity.^{3,5,23}

Studies report that Honeysuckle extract exerts antipyretic, cytoprotective, and antioxidative influence.^{23,24} The leaf and flower demonstrate strong inhibitory effects against *S. aureus* and other bacteria.^{3,25} Constituents include alkaloids, terpenoids, organic acids (including quinic acid and caffeic acid), flavonoids, and phenols.^{3,5,24} Its essential oils include linalool, geraniol, and eugenol.²²



Yarrow (*Achillea millefolium*)

Used medicinally for hundreds of years in Europe and North America, Yarrow flowers are revered as a diaphoretic to be used for colds, fevers, and respiratory conditions. Traditionally, the trio of Yarrow flowers, Elder flowers, and Peppermint leaves was taken as a hot tea before bed at the onset of a cold to promote diaphoresis. This was considered very effective as an herbal compound taken at the first signs of a cold to drive out the infection and help prevent progression of the illness.²⁶

The German Commission E recognizes Yarrow flower for its antibacterial, astringent, and antispasmodic influence. Other studies report its anti-inflammatory, diaphoretic, and

antipyretic activity.²⁶ Yarrow flower contains phytosterols, triterpenes, tannins, amino acids, fatty acids, polysaccharides, and coumarins. Its volatile oils include linalool, borneol, and camphor, among others.²⁶ Yarrow flower contains isovaleric acid, salicylic acid, sterols, flavonoids, bitters, tannins, and coumarins.⁵



Boneset (*Eupatorium perfoliatum*)

Boneset is prized in traditional American and European herbal medicine for its profound effectiveness at treating mild to severe cases of influenza. Native Americans used Boneset infusions to treat colds and fevers, including “break-bone fever” (also known as Dengue fever). Physicians used Boneset with great success during the flu epidemic of around 1800 and again in the great influenza epidemic of 1918-1919. These early 19th century and later Eclectic physicians noted that Boneset induces profuse sweating with the ability to break fevers and alleviate the deep-seated aches (called “bone pain”) associated with many types of influenza.²⁷

Boneset is highly valued for its diaphoretic activity. Its traditional use is to relieve fevers, aches and pains, and respiratory infections. It acts as a mild laxative and diuretic and thus helps lead infections out of the body. Traditional herbalists used Boneset to stimulate the immune response.⁵ Research find it acts as an immune-stimulant with immune-modulating influence. It also exerts antioxidant activity. Boneset contains volatile oils, caffeic acid compounds, flavonoids, tannins, sterols, and polysaccharides.^{5,28}



White Willow Bark (*Salix alba*)

The bark of White Willow, used for thousands of years by many cultures, is known to alleviate pain, calm inflammation, and reduce fever. Hippocrates (400 BC) was said to advise his patients to chew on the bark to reduce fever and inflammation. In modern times, German chemist Felix Hoffman first isolated the compound salicin from the bark. This was later modified to the chemical acetylsalicylic acid, or aspirin. Salicin, a potent anti-inflammatory agent, inhibits over-expression of COX-2 and NF-kB factors.²⁹⁻³¹ The advantage of White Willow bark extract is that it does not irritate the stomach lining. This is because the salicin naturally found in White Willow bark is only converted to the acid form after absorption by the stomach.

Native Americans used White Willow bark to calm joint pain and modern studies confirm its effectiveness and safety as an analgesic.³²⁻³⁶ Researchers attribute White Willow bark's diverse array of polyphenols and flavonoids to its mechanisms of action and clinical benefits.^{31,37}



Ginger Essential Oil (*Zingiber officinale*)

Ginger, a world-renowned and well-loved herb, has been used as cooking spice, herbal remedy, and revered medicine for centuries. It is a common household remedy for digestive upset, sore throat, colds, and flu. Known as a valuable anti-nausea remedy, it is also a digestive carminative. Ginger aids circulation and is used to warm the system during cold weather. Herbalists also use Ginger to enhance the effectiveness of other herbs in a formula by supporting digestion and circulating the herbs.³⁸ Its active ingredients are its many volatile oils.³⁹⁻⁴¹

Ginger has a thermogenic and diaphoretic effect.⁴² Modern studies find it beneficial for many types of nausea⁴³⁻⁴⁴, which is one of its traditional uses. It demonstrates impressive antioxidant⁴⁵⁻⁴⁷ and anti-inflammatory activity.⁴⁸ Ginger is found to contain nearly a dozen antiviral compounds. The sesquiterpenes in Ginger are found to exert specific influence against the rhinoviruses that cause the common cold. Traditionally, ginger is found to warm chills, alleviate infection, reduce pain and fever, and to exert a mild sedative influence.⁵



Peppermint Essential Oil (*Mentha piperita*)

Peppermint essential oil (EO) is found to demonstrate some of the strongest antimicrobial activity of studied essential oils.⁴⁹⁻⁵¹ Peppermint EO demonstrates analgesic, antibacterial, and mucolytic actions. It relaxes smooth muscle, catarrh of the respiratory tract, exerts a cooling activity, and calms inflammation of the oral mucosa. Peppermint EO oil contains menthol, phenolic acids, and is rich in terpenes.^{52,53}



Eucalyptus Essential Oil (*Eucalyptus globulus*)

The evergreen Eucalyptus, native to Australia and Tasmania, is now grown worldwide and especially thrives in the Mediterranean climate. There are over 500 aromatic trees and shrubs in the Eucalyptus family, many of which are known for their medicinal benefits and potent essential oils. The constituents of Eucalyptus essential oil (EO) vary according to species, terrain, and climate. Of these, Eucalyptus globulus is most widely used for its medicinal qualities and is one of the most widely studied for its antimicrobial benefits.^{4,54-57}

Eucalyptus leaf extract and Eucalyptus EO are found to exert powerful antimicrobial influence against many viruses, fungi, and bacteria (both gram-negative and gram-positive).^{4,54-57} Multiple studies report its potent effectiveness against a large number of respiratory bacteria and viruses.^{54,58} Eucalyptus EO is found to increase respiratory tract secretions, to act

as an expectorant, and to exert an antitussive influence in studies.^{5,59}

The profound antimicrobial activity of Eucalyptus EO is attributed to its monoterpenes (which include limonene and pinene). It also contains triterpenes, sesquiterpenes, and aldehydes.⁵⁹ The active constituents are considered to be 1,8-cineole (also known as eucalyptol) and linalool.^{4,54,56} 1,8-cineole is highly studied for its antimicrobial influence. It is found in most Eucalyptus species and is present in other plants including Tea Tree and Rosemary. Studies find 1,8-cineole, which is especially rich in *E. globulus*, effects monocytes and macrophages.^{54,55} It is found to inhibit cytokine production and to modulate airway mucus hypersecretion. This partially explains its beneficial role in respiratory conditions such as asthma and sinusitis.⁵⁵

For more information on any of the ingredients listed here, including extensive research or individual monographs compiled by Donnie Yance, please email info@naturaedu.com.

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