

Cough Suppressant Herbal Drugs: A Review

Shahnaz Sultana*, Andleeb Khan, Mohammed M Safhi And Hassan A. Alhazmi
College Of Pharmacy, Jazan University, Jazan, Saudi Arabia.

Abstract: A cough occurs suddenly and often repetitively which helps to clear the large breathing passages from secretions, irritants, foreign particles and microorganisms. Coughing can be due to a respiratory tract infection such as the common cold, acute bronchitis, pneumonia, pertussis, flu and smoking or health problems such as asthma, tuberculosis and lung cancer. Substantial uses of folk remedies for different medical conditions have been documented. The remedies included cinnamon, ginger, clove, cardamom, honey, lemon, garlic, onion, turmeric and licorice.

Keywords: Cough, Herbal drugs, Home remedies, Gastroesophageal reflux disease

I. Introduction

A cough is a sudden and often repetitively occurring process which helps to clear the large breathing passages from secretions, irritants, foreign particles and microorganisms. . When there is a blockage or irritation in the throat or upper air passage, the brain thinks a foreign element is present and tells the body to cough to remove that element. Generally coughing is perfectly normal. A cough can help to keep your throat clear from phlegm and other irritants. However, sustained coughing can also be symptomatic of a number of conditions. The cough reflex consists of three phases: an inhalation, a forced exhalation against a closed glottis, and a violent release of air from the lungs following opening of the glottis, usually accompanied by a distinctive sound. Coughing is either voluntary or involuntary [1].

It is one of the most common health problems. Coughing can also be due to a respiratory tract infection such as the common cold, acute bronchitis, pneumonia, pertussis, flu and smoking or health problems such as asthma, tuberculosis and lung cancer. In the vast majority of cases, acute coughs, i.e. coughs shorter than three weeks, are due to the common cold. Pertussis is increasingly being recognized as a cause of troublesome coughing in adults.

Some of the symptoms of a cough are itchy throat, chest pain and congestion. The repetition of coughing produces inflammation and discomfort, which in turn result in more coughing [2, 3]. With allergies, one can reduce flare-ups by identifying the allergens that affect them and avoiding exposure to them. Common allergens include trees, pollen grains, dust mites, animal fur, mold and insects.

Many microorganisms, bacteria and viruses, are responsible for causing a person to cough, which helps to spread the disease to new hosts. Most of the time, irregular coughing is caused by a respiratory tract infection but can also be triggered by choking, smoking, air pollution, asthma, gastroesophageal reflux disorder (GERD), post-nasal drip, chronic bronchitis, lung tumors, heart failure and medications such as Angiotensin-converting enzyme (ACE) inhibitors [4].

Gastro-oesophageal reflux is associated with a wide range of respiratory disorders, including asthma, isolated chronic cough, idiopathic pulmonary fibrosis, chronic obstructive pulmonary disease and cystic fibrosis [5]. In adults with a chronic cough, i.e. a cough longer than 8 weeks, more than 90% of cases are due to post-natal drip, asthma, eosinophilic bronchitis and gastroesophageal reflux diseases [6].

In people with unexplained cough, GERD should be considered. This occurs when acidic contents of the stomach come back up into the esophagus. Symptoms usually associated with GERD include heartburn, sour taste in the mouth, or a feeling of acid reflux in the chest, although, more than half of the people with cough from GERD don't have any other symptoms. An esophageal pH monitor can confirm the diagnosis of GERD. Sometimes GERD can complicate respiratory ailments related to cough, such as asthma or bronchitis. The treatment involves anti-acid medications and lifestyle changes with surgery indicated in cases not manageable with conservative measures. Proton pump inhibitor also recommended to improve this type of cough [2, 7]. Coughing may be caused by air pollution including tobacco smoke, irritant gases and dampness in a home. The human health effects of poor air quality are far reaching, but principally affect the body's respiratory system and the cardiovascular system. People, who exercise outdoors on hot, smoggy days, increase their exposure to pollutants in the air.

A foreign body can sometimes be suspected if the cough started suddenly when the patient was eating. Rarely, sutures left behind inside the airway branches can cause coughing. A cough can be triggered by dryness from mouth breathing or recurrent aspiration of food into the windpipe in people with swallowing difficulties.

ACE inhibitors are drugs used in diabetics, heart disease and high blood pressure. In 10-25% of the people who take it, it can cause them to have a cough as a side effect. Cessation of ACE Inhibitor use is the only way to stop the cough. Such medicines for hypertension are very common in use such as ramipril and quinapril. There are cases of "cough of unknown origin" which have resolution with stopping the drug.

A psychogenic cough may be the cause in the absence of a physical problem. In these instances, emotional and psychological problems are suspected. Psychogenic cough is thought to be more common in children than in adults. A possible scenario, psychogenic cough develops in a child who has a chronically ill brother or sister.

Some cases of chronic cough may be attributed to a sensory neuropathic disorder. Treatment for neurogenic cough may include the use of certain neuralgia medications [8].

Cough may also be caused by conditions affecting the lung tissue such as bronchiectasis, cystic fibrosis, intestinal lung disease and sarcoidosis. Coughing can also be triggered by benign or malignant lung tumors or mediastinal masses. Through irritation of the nerve, diseases of the external auditory canal (wax, for example) can also cause cough. Cardiovascular diseases associated with cough are heart failure, pulmonary infarction and aortic aneurysm. Nocturnal cough is associated with heart failure, as the heart does not compensate for the increased volume shift to the pulmonary circulation, in turn causing pulmonary edema and resultant cough. Coughing may also be used for social reasons, such as the coughing before giving a speech or entering into a house or to attract attention of other people. Cough may also be psychogenic, which is different from habit coughing and tic coughing. Coughing may occur in tic disorders such as Tourette syndrome, although it should be distinguished from throat-clearing in this disorder [2].

Given its irritant nature to mammal tissues, capsaicin is widely used to determine the cough threshold and as a tussive stimulant in clinical research of cough suppressants. Capsaicin is what makes chili peppers spicy, and might explain why workers in factories with these vegetables can develop a cough.

Treatment

The patients suffering from common cold and cough are the highest among 14 different respiratory ailments, followed by whooping cough, asthma, nosebleed and bronchitis which can be treated by medicinal plants.

The treatment of cough in children is based on an underlying cause. In children half of cases go away without treatment in 10 days and 90% in 25 days. A trial of antibiotics or inhaled corticosteroids may be tried in children with a chronic cough in an attempt to treat protracted bacterial bronchitis or asthma [9]. A cough is the most common reason for visiting a primary care physician in the United States. The important herbal drugs used as a cough remedy are discussed hereunder:

1. *Acacia catechu* (L.f.) Willd. (Mimosaceae)

A. catechu is prescribed to relieve common colds, cough, diarrhoea, dysentery, bronchitis, menstrual disorders, gonorrhoea, pulmonary affections, migraines and leprosy. Because of its catechins content, it is used as a mouthwash or gargle to combat pharyngitis, laryngitis, diarrhoea and throat infection.

2. *Acorus calamus* L. (Acoraceae)

Traditionally *A. calamus* is used for its effects on the digestive system and the lungs. This herb eliminates phlegm, clears congestion, and tranquilizes the mind. It is traditional used to comfort amnesia, cardiovascular disorders, insomnia, tinnitus, chronic bronchitis and asthma. The herb extracts showed cytotoxic effects [10, 11].

3. *Adhatoda vasica* Medic. (Acanthaceae)

Adhatoda vasica has various biological activities such as antioxidant, anti-inflammatory, immunomodulating, antispasmodic and antiallergic properties, and acts as a cough suppressant. Arabinogalactan samples extracted from the plant showed 67% cough suppression [12]. After oral administration to the guinea-pig the antitussive activity of *A. vasica* was similar to codeine against coughing induced by irritant aerosols [13].

4. *Allium sativum* L. (Amaryllidaceae)

Garlic (*A. sativum*) is an all rounder treatment for preventing wound infections, common cold, malaria, cough, lung tuberculosis, hypertension, sexually transmitted diseases, mental illness, kidney and liver diseases, asthma and diabetes. It prevents common cold and flu symptoms through immune enhancement and demonstrates anticancer and chemopreventive activities. In addition, aged garlic extract possesses hepatoprotective, neuroprotective and antioxidative properties, whereas other preparations may stimulate oxidation [14]. A garlic extract may enhance immune cell function which may be responsible for reducing

severity of colds and flu [15]. Allicin, a chemical constituent of garlic, is an effective remedy for the common colds [16].

5. *Angelica archangelica* L. (Apiaceae)

The herb, including the fruits and roots, is used in digestive complaints, flatulence and as a tonic for colds and respiratory system disorders. It is used to a great extent against indigestion, general debility and chronic bronchitis [17]. The imperatorin is the main active component of the herb extract which inhibited acetylcholinesterase effects [18].

6. *Astragalus membranaceus* (Fisch.) Bunge (Fabaceae)

Astragalus membranaceus extracts decreased inflammatory infiltration, mucus secretion and collagen deposition in the lung tissues. It has antiasthmatic effects [19] and suppressed the frequency of coughs [20]. It has an anti-allergic effect by modulating mast cell-mediated allergic responses in allergic rhinitis [21]. Its use in the attack or remission stage of asthma could restrain the development of inflammation by reducing the production of TNF-alpha and inhibiting NF-kappa B activity.

7. *Carum copticum* L. (Apiaceae)

Ajwain (*C. copticum*) seeds contains about 50% thymol, a well known antibacterial monoterpenes and thyme used to enhance the immune system to ward off colds and flu and other viral infections. An antitussive effect of *C. copticum* was even greater than that of codeine and the effect was due to its main constituent carvacrol. It had a bronchodilatory effect on the asthmatic airways which was comparable with the effect of theophylline [22, 23].

8. *Lavandula angustifolia* L. (Lamiaceae)

Lavender oil from *L. angustifolia* has a soothing and calming effects on the nerves. It relieves tension, depression, panic, hysteria and nervous exhaustion in general. It is effective to ameliorate headaches, migraines and insomnia. Lavender oil is beneficial for problems such as bronchitis, asthma, colds, laryngitis, halitosis, throat infections and whooping cough. The vapors of steamed flowers are inhaled as a cold remedy [24].

9. *Lobelia inflata* L. (Campanulaceae)

Lobelia is commonly associated with the treatment of lung-related ailments such as asthma, bronchitis, coughs, pneumonia, colds, flu and other upper-respiratory disorders [25, 26].

10. *Salvia officinalis* L. (Lamiaceae)

A *S. officinalis* (Echinacea or sage) preparation is as efficacious and well tolerated as a chlorhexidine/lidocaine spray for the treatment of acute sore throats [27]. The efficacy and tolerability profile of a 15% sage spray indicated that this preparation provides a convenient and safe treatment for patients with acute pharyngitis [28].

11. *Sambucus nigra* L. (Caprifoliaceae)

A liquid extract of *S. nigra* (elderberry) plant displayed an inhibitory effect on the propagation of human pathogenic influenza viruses [29]. It inhibited Human Influenza A (H1N1) infection in vitro. The Direct Binding Assay established that flavonoids from the elderberry extract bound to H1N1 virions and blocked the ability of the viruses to infect host cells [30]. Elderberry extract seems to offer an efficient, safe and cost-effective treatment for influenza [31].

12. *Tussilago farfara* L. (Asteraceae)

The flower buds of *T. farfara* are widely used for the treatment of coughs, bronchitis and asthmatic disorders in traditional Chinese medicine. In Europe, the plant has been used as a herbal remedy for virtually the same purposes, but the leaves are preferred over flower buds [32, 33].

13. *Valeriana officinalis* L. (Valerianaceae)

Most herbal medicines were used for pregnancy-related health ailments such as colds and nausea. Ginger, cranberry, valerian and raspberry are the most commonly used herbs in pregnancy [34].

14. *Verbascum thapsus* L. (Scrophulariaceae)

Verbascum thapsus, commonly known as mullein, is a medicinal plant readily found along roadsides,

meadows and pasture lands and has been used to treat pulmonary problems, inflammatory diseases, asthma, spasmodic coughs, diarrhoea and migraine headaches [35].

15. *Zingiber officinale* Rosc. (Zingiberaceae)

Ginger (*Z. officinale* rhizome) is widely used in Ayurveda to alleviate many illnesses including indigestion, nausea, vomiting, allergic reactions, cough, common colds, fever, allergic rhinitis, sinusitis, bronchitis, respiratory troubles, pain, headache, backache, painful tooth and swelled gum [36]. In Siddha, ginger is recommended to mitigate cough, nausea, pain and diarrhea. Trikatu is a very well known 'Rasayana' in Ayurveda and taken as a polyherbal Ayurvedic formulation in India. It consists of three well known plants, viz., *Piper longum*, *Piper nigrum* and *Zingiber officinale* in equal ratio. Trikatu has been prescribed to subside coughs, colds, fevers, asthma, respiratory problems and for improvement of the digestive disorders [37].

Substantial use of folk remedies for different medical conditions has been documented. The remedies included cinnamon, ginger, cloves, cardamom, sesame oil, poppy seeds, honey, lemon, table salt, eggs and curd. The medical conditions, in which folk remedies are used in patients' view, include conditions such as common colds, cough and flu to more serious conditions such as asthma, jaundice and heat stroke.

The herbal drugs, their important chemical constituents and medicinal uses are tabulated in Table 1. Home remedies for coughs due to colds, allergies and sinus infections are treated with a number of over-the-counter medicines. However, for those who prefer to avoid chemicals, the following herbal remedies are recommended to suppress coughs:

Almonds (*Prunus amygdalus* Batsch, Rosaceae) have nutritional properties that play a proactive role in subsiding cough symptoms. Soak five to six almonds in water for 8 to 10 hours. Make a smooth paste out of the soaked almonds and add one teaspoon of butter. Eat it three to four times a day until your symptoms go away.

Pineapple (*Ananas comosus* (L.) Merr., Bromeliaceae) contains bromelain which is a mixture of protein-digesting (proteolytic) enzymes or proteases. It suppresses coughs, loosens the mucus in the throat and relieves sinusitis and allergy-based sinus issues, which can contribute to coughs and mucus. Bromelain supplements should not be taken by children or adults who take blood thinners. Along with honey drug showed immediate improvement.

Bryonia alba L. (Cucurbitaceae) grows in Europe and northern Iran. It is an effective Homeopathic remedy for bronchitis, coughs and pains, especially if the sputum is bloody or frothy. It should be given in small doses and at short intervals. It will subdue the pain and the cough promptly and exercises a marked effect on the fever as any special sedative known. It is also used to relieve abdominal pain, acute back spasms, sciatica, colic, fevers with chills, gas, heartburn, indigestion, headaches, flu with pains, sprains and pulled ligaments.

Cayenne or red pepper (*Capsicum annuum* L., Solanaceae) reduces chest pain due to continuous coughing. It is also warming and stimulating. A cough syrup is prepared by mixing cayenne pepper, ground ginger (one-fourth teaspoon each), honey, apple cider vinegar (one table spoon each) and two tablespoons of water. Drink the syrup two to three times a day. Carrot (*Daucus carota* ssp. *sativus* (Hoffm.) Schubl et G. Martens, Apiaceae) contains many vitamins and nutrients that can help to relieve various symptoms of a cough. Fresh juice of four to five carrots is diluted by adding some water. For taste, one teaspoon of honey is added. The juice is drunk three to four times a day until the symptoms improve.

Grapes (*Vitis vinifera* L., Vitaceae) are expectorant and release the mucus from the affected parts of the respiratory system. The faster to get rid of the mucus, the faster coughing will end. The grapes are eaten simply or some fresh grape juice is taken. Grape juice with a spoonful of honey will be soothing as well as effective.

Ginger (*Z. officinale*, Zingiberaceae) is one of the most popular natural cures for a cough. Crushed fresh ginger is boiled with water. This herbal solution is drunk three to four times a day for relief from sore throat, non-stop coughing and even congestion. Some lemon juice and honey may be added to it. Another option is to chew fresh raw ginger on and off throughout the day to reduce cough. Ginger in combination with tulsi (*Ocimum sanctum*) is also an effective remedy for cough. Crush about 10 leaves of tulsi, mix with juice extracted from a small ginger piece, add in an equal quantity of honey and mix; swallow about a single teaspoon of this mixture thrice a day to get relief from cough. For a dry cough, one of the easiest ways of finding relief is to cut a piece of fresh ginger, sprinkle some salt on it and chew it for a few minutes. However, not everyone likes the strongly aromatic taste of ginger and in such cases, a tea made with ginger is equally good. The pounded ginger into fine pieces is boiled with one cup of water till the volume reduces to half the original quantity. The liquid is strained, one teaspoon of honey added and drunk when warm to give a soothing effect against cough.

Honey is a time-honored remedy for a sore throat. It can alleviate coughs more effectively than over-the-counter medicines that contain dextromethorphan, a cough suppressant. Drinking tea or warm lemon water mixed with honey is beneficial to soothe the sore throat. But honey may be an effective cough remedy, too. Since honey is low-cost and widely available, it might be worth a try. Hot milk with honey can relieve a dry cough and reduce chest pain experienced from continuous coughing. For best results, it is drunk before going to sleep. For added benefits from the analgesic properties of honey, a teaspoon of plain honey is swallowed on empty stomach. This will help to clear the mucus and to soothe the throat. These home remedies can give relief from the various symptoms of a cough without the side effects that come with pills and cough syrups. But if anyone has continuous coughing for more than two weeks, a doctor should be consulted.

Jaggery remedies are useful to appease cough and congestion. Sputum buildup can lead to a feeling of congestion in the chest and the entire respiratory tract; expelling this sputum, therefore, provides relief from cough and congestion. A few corns of pepper are boiled with water for about 20 minutes; a little cumin and jaggery (*Canesugar of Saccharum officinarum* L., family Poaceae) are mixed and drunk. Cut a quarter part of an onion, keep a small bit of jaggery in the middle of it and chew on this for expelling sputum.

Lemon (*Citrus lemon* (L.) Burm. F., Rutaceae) fruits can be used for curing coughs. Lemons reduce inflammation and provide a dose of infection-fighting vitamin C. A simple cough syrup can be made by combining two tablespoons of lemon juice and one tablespoon of honey. Drink this healthy syrup several times a day. Another way to use lemons is to blend lemon juice with a little honey and a pinch of cayenne pepper and then drink it.

Licorice root is both an expectorant and demulcent, simultaneously soothing the airways while loosening and thinning mucous, easing congestion. It can also ease any inflammation that may be irritating the throat. Its main constituent, glycyrrhizin, is responsible for most of its effects. It is 30-50 times sweeter than sucrose (table sugar) and it inhibits an enzyme 11 β -hydroxysteroid dehydrogenase. This enzyme regulates access of glucocorticoid (a steroid hormone) to steroid receptors, ultimately slowing the conversion of cortisol to cortisone. This increases the effect of cortisol and reduces inflammation.

Marshmallow (*Althaea officinalis* L., family Malvaceae) is a perennial herb flowering in summer. The leaves and roots of the herb have been used since ancient times to treat sore throats and coughs. The marshmallow herb contains mucilage, which coats the throat and soothes irritation. Marshmallow root is taken in tea or as in a capsule form, although it is not recommended for children.

Onion (*Allium cepa* L., Amaryllidaceae) is one of the simplest home remedies for a cough. Breathing in the strong vapors can help stop coughing. A cough syrup is made from baked onion juice, comfrey tea and honey. Drink it daily to get relief from a dry cough. Another option is to combine one-half teaspoon of onion juice with one teaspoon of pure honey. Swallow this solution at least twice a day to alleviate a cough and soothe your throat.

Probiotics are microorganisms that can provide a host of health benefits. While they don't relieve a cough directly, they help to balance gastrointestinal flora. This can support immune system function throughout the body. *Lactobacillus*, a bacterium in dairy, can reduce the likelihood of a cold or flu, and sensitivity to certain allergens like pollens. Fortified milk is a great source of *Lactobacillus*. It should be cautious, however, as dairy may make phlegm thicker.

Peppermint (*Mentha piperita* L., Lamiaceae) leaves and the oil of eucalyptus (*Eucalyptus citriodora* Hook., family Myrtaceae) are both well known for their healing properties. Menthol in peppermint soothes the throat and acts as a decongestant, helping to break down mucus. One can benefit by drinking peppermint tea or by inhaling peppermint vapors from a steam bath. An ointment prepared from the Eucalyptus oil, coconut oil and beeswax is rubbed to get relief from coughs.

Thyme (*Thymus vulgaris* L., Lamiaceae) is used to cure respiratory diseases. The essence extracted from thyme leaves helps to relieve coughing and short-term bronchitis. The leaves contain flavonoids that relax the throat muscles involved in coughing and also lessen inflammation. Thyme tea is prepared at home by taking two teaspoons of crushed thyme leaves and one cup of boiling water. The cup is covered, steeped for 10 minutes and strained. Thyme relaxes the muscles of the trachea and bronchi and also opens up airways. The result is less coughing and increased comfort.

The herb turmeric (*Curcuma longifolia* L., Zingiberaceae) has a therapeutic effect on coughs, particularly a dry cough. Turmeric powder mixed with black pepper (one tea spoon each) is boiled in half cup water. Cinnamon sticks may be added. One table spoon of honey is mixed. It is drunk daily until the condition improves. Alternatively, make an herbal tea by adding one teaspoon of turmeric powder and one teaspoon of carom seeds to a cup of water, and boil it until water reduces to one-half cup. Add some honey and drink this herbal solution two to three times a day. Another way to use turmeric is to roast turmeric root and grind it into a smooth powder. Mix it with water and honey, and drink it twice a day. A glass of hot milk, mixed in half a teaspoon of turmeric powder is drunk warm to find relief from cough. A turmeric gargle also gives good

results. To one cup of hot water, half a teaspoon of turmeric powder and half a teaspoon table salt are added. Use this liquid as a throat gargle to alleviate cough. For a dry cough, turmeric powder mixed with a teaspoon of honey is taken three to four times a day. Turmeric tea is prepared by adding one tablespoon of turmeric powder into 4 cups of boiling water. Keep for a few minutes, strain and mix in some lemon and honey to the liquid and drink. Inhaling the smoke of burning turmeric called the dhooma paan is also considered to be an effective remedy for cough and cold. Take a dried turmeric root, burn it and inhale the smoke. Another way out is to place a few pieces of red hot charcoal in a small mud pot that has been placed in a cup of water. Add a few dried leaves of turmeric over the charcoal and a spoonful of turmeric powder over the leaves. Gently blow to ignite the turmeric powder and inhale the smoke emitted.

Table 1. Herbal drugs as cough suppressant

S.No.	Botanical name (Family) Common name Part used	Phytoconstituents	Medicinal uses
1.	<i>Abrus precatorius</i> L. (Fabaceae) Rosary pea Seeds, leaves	Abrusoside A-D, abrus agglutinin, abruassic acid, abruquinone A-F, abrin A-D, abrectorin, abridin, abrine, abrasine	Antibacterial, analgesic, antiviral, antimicrobial, antitumour, antifungal, antidiarrheal, cough, tuberculosis
2.	<i>Acacia catechu</i> (L.f.) Willd. (Mimosaceae) Catechu Wood (stem)	Catechin, epicatechin, epicatechin gallate, procatechinic acid, tannins, alkaloids quercetin and kaempferol, sterol glucosides	Diarrhoea, swelling of the nose and throat, cough, dysentery, swelling of the colon (colitis), bleeding, indigestion, osteoarthritis, and cancer.
3.	<i>Acanthospermum hispidum</i> (Roxb.) Willd. (Asteraceae) Kannada Roots	Guaianolides, melampolides, terpenoids, carbohydrate, alkaloids, glycosides, flavonoids, tannins, saponins	Diarrhoea, antimicrobial, Cough.
4.	<i>Acorus calamus</i> L. (Acoraceae) Calamus root Rhizome	Camphene, camphor, choline, δ -cadinene, Cineole, α -pinene, α -terpineol, azulene, β -asarone, elemicin, ethanol, eugenol, galangin, limonene, magnesium, menthol, terpenes, tannin, zinc	Amenorrhoea, aphrodisiac, asthma, colds, congestion, cough, headache/migraine, sore throat, for stoppage of smoking
5.	<i>Adhatoda vasica</i> Medic. (Acanthaceae) Vasaka Leaf, flowers, bark	Pyroquinazoline alkaloids including vasicine, vasicol and vasinone	Asthma, bronchitis, anti-ulcer, antitussive, cough, expectorant
6.	<i>Agrimonia eupatoria</i> L. (Rosaceae) Agrimony Root	Catechin, palmitic acid, quercitrin, silicic acid, tannin, thiamin, ursolic acid	Sore throat, bladder infection, cuts, wounds, liver diseases, longevity tonics, diarrhoea, cough, menorrhagia, parasitic and worm infections
7.	<i>Allium sativum</i> L. (Amaryllidaceae) Garlic Bulb cloves	Allicin, citral, geraniol, linalool, phellandrene, s-methyl-l-cysteine sulfoxide	Allergies, asthma, bronchitis, burns, cancer Prevention, candida/yeast infection,

			flu, cardiovascular, cholesterol, cough, colds, diabetes, sores, sinus, sore throat
8.	<i>Angelica archangelica</i> L. (Apiaceae) Choraka roots, stems, seeds, leaves	Essential oils, bitter principles, coumarin compounds	Amenorrhea, colds, digestion, cough, cramps/abdominal disorders, depression, dysmenorrhea, hypertension, pregnancy/childbirth
9.	<i>Astragalus membranaceus</i> (Fisch.) Bunge (Fabaceae) Astragalus root Root	Astragalosides and other immunostimulant polysaccharides, β -sitosterol, flavonoids, and trace minerals, especially selenium.	Cancer prevention, cardiovascular, colds, fatigue, immunostimulant, kidney diseases, cough, longevity tonic, sinus problems
10.	<i>Carum copticum</i> L. (Apiaceae) Caraway Seed, Ajwain Seeds, Essential Oil	Essential oil containing α -pinene, β -pinene, calcium, camphene, carvacrol, chromium, fiber, limonene, thymol	Analgesic, anticancer, antispasmodic, aromatic, carminative, digestive, emmenagogue, febrifuge, galactagogue, cough.
11.	<i>Cinnamomum camphora</i> (L.) Presl. (Lauraceae) Camphor Essential oil	1,8-Cineole, α -terpinene, borneol, camphor, carvacrol, caryophyllene, citronellol, eugenol, geraniol, kaempferol, limonene, p-cymene, safrole, vanillin	Aromatherapy, arthritis, bronchitis, bruises, sprains, cardiovascular, colds, congestion, IBS, lupus, sleep, insomnia, cough.
12.	<i>Cinnamomum Zeylanicum</i> Blume (Lauraceae) Cassia Bark Bark	Volatile oil, eugenol, tannins, resin, mucilage, coumarins, complex sugars	Aromatherapy, athletes, diabetes, ringworm, Candida/yeast infection, colds, cough, culinary/kitchen,
13.	<i>Citrus limonum</i> Risso (Rutaceae) Lemon Rind, juice, essential oil	Fruit peel, limonene, antioxidants, flavonoids, pectin, vitamin C	Acne, air freshner cellulite, culinary/kitchen, facial care, sore throat, hypertension, varicose veins, wrinkles, cough.
14.	<i>Commiphora myrrha</i> (Nees) Engl. (Burseraceae) Myrrh Resin	Volatile oil, gum heerabolene, limonene, resins, dipentene, pinene, eugenol, cinamaldehyde, cuminaldehyde, commiphoric acids,	Aromatherapy, athletes ingworm, Candida and yeast infections, colds, cuts, wounds, dental /oral care, hemorrhoids, sore throat, cough.
15.	<i>Echinacea angustifolia</i> de Candolle (Asteraceae) Echinacea Roots, stems and flowers	Humulene, inulin, caryophyllene, resin, glycoside, betaine, polysaccharide, polyacetylenes, isobutylalkyl amine, sesquiterpene.	Candida/yeast infection, colds, immunostimulant, insect/flea bites, sinus, sore throat, cough.
16.	<i>Eucalyptus globules</i> Labill. (Myrtaceae) Eucalyptus	α -Pinene, β -pinene, α -phellandrene, 1,8-cineole, limonene, terpinen-4-ol, aromadendrene,	Allergies, burns, arthritis, bronchitis, colds, congestion, flu, Herpes/cold, cough,

	Leaves	epiglobulol, piperitone and globulol	sores, insect, lice, repellent, pain relief, sinus, rheumatoid arthritis, sore throat
17.	<i>Eupatorium perfoliatum</i> L. (Asteraceae) Boneset Aerial parts	Quercetin, kaempferol, rutin, eupatorin, terpenoids sesquiterpene lactones, volatile oil, resin	Bronchitis, colds, cough, flu, immunostimulant
18.	<i>Filipendula ulmaria</i> (L.) Maxim. (Rosaceae) Meadowsweet Aerial parts	Salicylic acid, flavone glycosides, essential oils, tannins.	Arthritis, colds, cough, congestion, diarrhea, flu, gastritis ulcer, lupus, rheumatoid arthritis
19.	<i>Foeniculum vulgare</i> Mill. (Apiaceae) Fennel seed Seed	Essential oil, anethole (50 to 80%), limonene, fenchone, and estragole; seeds fiber and complex carbohydrates.	Aromatherapy, congestion, cough, culinary/kitchen, weight loss, digestion, halitosis, lupus, menopause
20.	<i>Forsythia suspense</i> (Thunb.) Vahl. (Oleaceae) Forsythia Fruit Fruit	Phenylethanoids, forsythiaside, suspensaside, lignans, phillyrin, (+)-pinoresinol O- β -D-glucoside, phenylethanoids	Antiscrofulous, diuretic, emmenagogue, febrifuge, skin tonic, vermifuge, colds, cough.
21.	<i>Glycyrrhiza glabra</i> L. (Fabaceae) Licorice. Root	Liquiritigenin, isoliquiritigenin, liquiritin, chromenes, coumarins, dihydrostilbenes, dihydrophenanthrenes	Addiction, anxiety bronchitis, colds, Candida/yeast infection, fatigue, congestion, psoriasis, sore throat, stoppage of smoking, cough.
22.	<i>Helianthus annuus</i> L. (Asteraceae) Sunflower Flowers, seed	1,8-Cineole, amyirin, pinenes, α -terpinene, terpineol, tocopherol, arginine, carotene, sitosterol, choline, cinnamic acid, citric acid, copper, magnesium	Culinary/kitchen. massage oils, nutrition, cough.
23.	<i>Hydrastis Canadensis</i> L. (Ranunculaceae) Goldenseal root, leaves	Hydrastine, resin, berberine, meconin, berberastine, canadine, candaline, hydrastinine, fatty acids, polyphenolic acids, chlorogenic acid, phytosterins	Foot/ringworm, bronchitis, colds, cuts, wounds, diarrhoea, eczema, eyes/vision, gastritis/ulcer, immunostimulant, parasites/worms infections, psoriasis, sore throat, cough.
24.	<i>Hyssopus officinalis</i> L. (Lamiaceae) Hyssop Flower leaves, essential oil	Volatile oil, hyssopin pinocamphone, gum isopinocamphone, pinenes, camphene, terpinene, tannin, flavonoids, insoluble acid, oleanolic acid, resin, marrubiin,	Bronchitis, burns, bruises/sprains, flu, cardiovascular, IBS, congestion, facial care, dental/oral care, cough, Herpes/cold, sores, hypertension, insect repellent

25.	<i>Juniperus communis</i> L. (Cupressaceae) Juniper Berries berries	α -Pinene, myrcene, sabinene, limonene, terpinene, camphene, thujone, sugars, vitamin C, flavonoids, resin, gallotannins	Acne, bladder infection, cellulite, colds, cough, gout, congestion, eczema, detoxification, facial care, hemorrhoids, nerve/back pain, rheumatoid arthritis
26.	<i>Lavandula angustifolia</i> L. (Lamiaceae) Lavender Flowers, leaves and stems	Linalool, linalyl acetate, lavendulyl acetate, hemiarin, terpinenol, pinene, cineole, camphor, borneol, limonene, tannins, coumarin, umbelliferone, hemiarin, flavonoids, triterpenoids, rosmarinic acid	Acne, anxiety, burns, colds, lice infection, lupus, cuts, wounds, skin care, depression, facial care, nausea, headache, fibromyalgia, migraine, insect repellent
27.	<i>Lobelia inflata</i> L. (Campanulaceae) Lobelia Aerial parts, dried flower, seed	Lobeline, isolobinine, lobelanidine, resin, fats, lobinaline, lobelacrin, labelianin, gum, chelidonic acid.	Addiction, asthma, bronchitis, cough, sore throat, stoppage of smoking
28.	<i>Marrubium vulgare</i> L. (Lamiaceae) Horn Aerial part	Marrubiin (a bitter principle), diterpene alcohols (marrbiol, murrubenol), alkaloids, sesquiterpene, tannin, saponins, resin	Bronchitis, colds, cardiovascular, cough, sore throat.
29.	<i>Melaleuca alternifolia</i> (Maiden et Betche) Cheel (Myrtaceae) Tea Tree oil essential oil distilled from leaves	α -Pinene, cymene, cineole, terpenes, terpinene, alcohols	Acne, athletes foot/ringworm, Candida/yeast infection, cuts, wounds, scabies, dental/oral care, Herpes/cold, cough, sores, insect repellent, insect/flea bites, sore throat
30.	<i>Melaleuca leucadendron</i> L. (Myrtaceae) Cajeput Oil Essential Oil	Essential oil, α -terpineol, azulene, benzaldehyde, cajeputol, nerolidol, limonene	Aromatherapy, arthritis, colds, bronchitis, cough, congestion, gout, eczema, insect repellent, lice infection, pain reliever, rheumatoid arthritis, sinusitis, sore throat
31.	<i>Melissa officinalis</i> L. (Lamiaceae) Lemon balm Whole herb	Citral, citronellal, eugenol acetate, geraniol, tannin, polyphenols, flavonoids, rosmarinic acid, triterpenoids	Aromatherapy, cardiovascular, colds, depression, cough, dysmenorrhea, Herpes, sores, hypertension, insect/flea bites, nausea, pregnancy/childbirth, sore throat, sun burns
32.	<i>Mentha piperita</i> L. (Lamiaceae) Peppermint Whole herb	Menthol, menthone, 1,8-cineole, methyl acetate, methofuran, isomenthone, limonene, β -pinene, α -pinene, germacrene-D,	Aromatherapy, bronchitis, halitosis, cardiovascular, cold, congestion, fatigue, flu, gastritis/ulcer, cough,

		<i>trans</i> -sabinene hydrate, pulegone	headache/migraine, lice infection, nausea, sinus nerve/back pain,
33.	<i>Nepeta cataria</i> L. (Lamiaceae) Catnip leaves and flowering tops	Volatile oil, carvacrol, nepetol, thymol, nepetalactone, citronellol, geraniol); tannins, rosmarinic acid	Anxiety, children diseases, colds, cough, cramps/abdominal, dysmenorrhea,
34.	<i>Ocimum sanctum</i> L. (Lamiaceae) Tulsi Leaves, essential oil	Ascorbic acid, β -carotene, β -sitosterol, carvacrol, tannin, eugenol, linoleic acid, methyl chavicol, oleic acid, palmitic acid, saponins, stearic acid,	Colds, cough, congestion, flu, IBS, Memory/Focus, nausea, stress
35.	<i>Paeonia albiflora</i> Pall. (Paeoniaceae) White Peony Root	Astragalol, tannin, gallic, benzoic and linoleic acids, paeonol, paeoniflorin,	Colds, cough, cuts, wounds, headache, migraine.
36.	<i>Papaver rhoeas</i> L. (Papaveraceae) Corn poppy Flower, seeds	Red coloring matter, rhoeadic and paaveric acids, alkaloid rhoeadine	Cough, sleep/insomnia
37.	<i>Pelargonium sidoides</i> . DC. (Geraniaceae) Umckaloaba Aerial part	Coumarin, 5,6-dimethoxy-7-hydroxy-coumarin,	Acute bronchitis, tonsillopharyngitis (sore throat), common cold, sinusitis, cough.
38.	<i>Petasites vulgaris</i> Desf. (Asteraceae) Butterbur Root	Pyrrrolizidine, senecionine, integerrimine, quercetin, astragalin, petasin, tannins, volatile oil; sesquiterpene	Asthma, cardiovascular, colds, headache/migraine, cough.
39.	<i>Phytolacca Americana</i> L. (Phytolaccaceae) Poke Root Tincture of the root	Jaligonic acid, oleanolic acid, tannin, starch, xylose	Cancer prevention, colds, cough, flu, psoriasis, scabies, sore throat
40.	<i>Pimenta racemosa</i> (Mill.) J.W. Moore (Myrtaceae) Bay Rum Tree essential oil	Terpinen-4-ol, eugenol, myrcene, 1,8-cineole, chavicol, limonene	Alopecia/baldness, aromatherapy, colds, cough, flu, insect repellent
41.	<i>Pimpinella anisum</i> L. (Apiceae) Anise seed Seed	Choline, sugar, mucilage, essential oil containing anethole (90%).	Aromatherapy, colds, congestion, cough, cramps/abdominal, ulinary herb, digestion, IBS, lice infection, scabies.
42.	<i>Pinus sylvestris</i> L. (Pinaceae) Scot's pine Needles	Pine oil, borneol, bornyl acetate, α - and β -phallandrenes, α - and β -pinenes, 3-carene, , sylvestrene	Antimicrobial, analgesic, antineuralgic, antirheumatic, antiseptic, antiviral, diuretic, expectorant, hypertensive, insecticidal, restorative, aromatherapy, arthritis, circulation, colds, cough, congestion, gout,

			rheumatoid_arthritis
43.	<i>Piper nigrum</i> L. (Piperaceae) Black Pepper dried peppercorns	Volatile oil, alkaloids piperine,	Aromatherapy, colds, digestion, cough, flu, lupus, nausea, rheumatoid arthritis.
44.	<i>Prunus serotina</i> Ehrn. (Rosaceae) Whild Black cherry Fruit, Bark	Acetylcholine, kaempferol, p-coumaric acid, prunasin, quercetin, scopoletin, tannins.	Bronchitis, colds, congestion, cough, sleep/insomnia.
45.	<i>Rosmarinus officinalis</i> L. (Lamiaceae) Rosemary Leaves, stems and flowers	Essential oil, borneol, camphene, camphor, cineole, limonene, linalool, flavonoids, rosmarinic and other phenolic acids; diterpenes, triterpenes	Aromatherapy, arthritis, bronchitis, cardiovascular pain, colds, cough, circulation, hair tonic , fatigue, lice infection, hypertension, scabies, rheumatoid arthritis,
46.	<i>Salix alba</i> L. (Salicaceae) White Willow Bark	Tannin, salicin, fragilin, salidroside, salicortin, populin, tremulacin saligenin, flavonoids, syringin, caffeic and ferulic acids	Arthritis, colds, cuts, wounds, weight Loss, fibromyalgia, cough, headache/migraine, lupus, pain relief, osteoporosis, rheumatoid arthritis
47.	<i>Salvia officinalis</i> L. (Lamiaceae) Sage Leaves, small stems and flowers	Volatile oils, thujone, cineole, borneol, linalool, camphor, pinene, tannin oestrogenic s ubstances, salvin, carnosic acid, flavonoids, phenolic acids, rosmarinic acid,	Cellulite, colds, cough, dental/oral care, deodorants, perfumes, digestion, facial care, hair tonic, insect repellent , lice infection, menopause, menorrhagia, sore throat
48.	<i>Sambucus nigra</i> L. (Caprifoliaceae) Elder berry Flower, berries	Eessential oil, palmitic, linoleic and linolenic acids, triterpenes, flavonoids (flowers); pectin, sugar, vitamin C, flavonoids (berries); cyanogenic glycosides (leaves).	Bronchitis, colds, congestion, cough, eyes vision, flu, sinus, sore throat
49.	<i>Saponaria officinalis</i> L. (Caryophyllaceae) Soapwort Rhizome	Saponins	Colds, cough, eczema, gout, psoriasis.
50.	<i>Taraxacum officinale</i> F.H. Wigg. (Asteraceae) Dandelion root roots, flowers, leaves	taraxacin, taraxol, taraxasterol, sterols, inulin, sugars, pectin, vitamins, choline, phenolic acids, asparagine, lutein, violaxanthin, carotenoids	Acne, warts, cough, alcoholism, bruises, sprains, cholesterol, colds, diabetes, digestion, hypertension, liver disorders, longevity tonics, osteoporosis,
51.	<i>Thymus vulgaris</i> L. (Lamiaceae) Thyme Leaves	Tymol, carvacrol, cymene, β -pinene, menthone, borneol, linalool	Aromatherapy, congestion, cough, cuts, wounds, dental/oral care, facial care, insect repellent.

52.	<i>Tilia cordata</i> Mill (Tiliaceae) Linden Flowers	α -Pinene, astragalin, amyrrin, hesperidin, β -sitosterol, caffeic acid, geraniol, isoquercitrin, limonene, linalyl acetate, nerolidol, p-coumaric acid, phenylalanine	Anxiety, colds, cough, cardiovascular, sore throat.
53.	<i>Trachyspermum ammi</i> Sprague (Apiaceae) Ajwain Seed	α -Pinene, β -pinene, camphene, carvacrol, thymol, limonene	Culinary, digestion, cough.
54.	<i>Tussilago farfara</i> L. (Asteraceae) Coughwort Seeds, stem	Mucilage, alkaloid, saponins, tannin (especially in the leaf).	Asthma, bronchitis, colds, congestion, cough, smoking inhibitor
55.	<i>Valeriana officinalis</i> L. (Valerianaceae) Velerien root Root	Acetic acid, ascorbic acid, β -ionone, caffeic acid, quercitin, valeric acid	Addiction, cardiovascular, cough, insomnia, stoppage of smoking
56.	<i>Verbascum Thapsus</i> L. (Scrophulariaceae) Mullein Flower, Leaves,Root	Verbathasin A, crocetin, hesperidin, ascorbic acid, coumarin, verbascoside	Congestion, cough, ear, sore throat, stoppage of smoking
57.	<i>Verbena hastata</i> L., <i>V. officinalis</i> L. (Verbenaceae) Vervain Leaves, flowering heads	tannins	Anxiety, colds, cough, depression, lupus, back pain
58.	<i>Veronica officinalis</i> L. (Plantagenaceae) Sleepwel Flower part	Organic acids, sugars, flavonoids, resin and tannins.	Cough, cuts, wounds
59.	<i>Viburnum opulus</i> L. (Caprifoliaceae) Cramp Bark Bark	Scopoletin, viburnin, triterpenoid saponins, salicosides, resin, valeric acid, tannin, arbutin.	Dysmenorrhea, menopause, cough, menorrhagia, pregnancy/childbirth
60.	<i>Zingiber officinale</i> Roscoe (Zingiberaceae) Ginger Rhizome	Zingiberone, bisabolene, Gingerols, shogaol, paradols, fats, protein, starch, vitamins, amino acids.	Amenorrhea, colds, lupus, nausea, cough, aromatherapy, arthritis, digestion, bruises/sprains, cardiovascular, flu, dysmenorrhea, fibromyalgia, rheumatoid arthritis

II. Conclusion

Among respiratory track disorders cold and cough are common symptoms having variety of reasons behind them. It can lead to the serious disease if not treated in time. Proper diagnoses can cure this problem by different types of medicinal drugs commonly found around us alone or in combination.

Acknowledgement

My sincere thanks to Authors and Editors of various scientific research articles for assisting me to compile this review.

References

- [1]. Chung KF, Pavord ID. Prevalence, pathogenesis and causes of chronic coughs. *Lancet* 371 (9621), 2008, 1364-74.
- [2]. Irwin RS, Glomb WB, Chang AB. Habit cough, tic cough and psychogenic cough in adult and pediatric populations: ACCP evidenced-based clinical practice guidelines. *Chest* 129 (1 Suppl), January 2006, 174S-179S.
- [3]. Thompson M, Vodicka TA, Blair PS, Buckley DI, Heneghan C, Hay AD. Duration of symptoms of respiratory tract infections in children: systematic review. *BMJ (Clinical research ed.)* 347, 2013, f7027.
- [4]. Dicipinigaitis PV, Colice GL, Goolsby MJ, Rogg GI, Spector SL, Winther B. Acute cough: a diagnostic and therapeutic challenge, *Coughs* 5, 2009, 11.
- [5]. Houghton LA, Lee AS, Badri H, DeVault KR, Smith JA. Respiratory disease and the oesophagus: reflux, reflexes and microaspiration. *Nat Rev Gastroenterol Hepatol.* Aug;13(8), 2016, 445-60.
- [6]. Goldsobel AB, Chipps BE. Cough in the pediatric population. *J. Pediatr.* 156(3), 2010, 352-358.
- [7]. Rhee CK, Jung JY, Lee SW, Kim JH, Park SY, Yoo KH, et. al.,. The Korean Cough Guideline: Recommendation and Summary Statement. *Tuberc Respir Dis (Seoul).* 79(1), 2016, 14-21.
- [8]. Paul IM, et al. Effect of honey, dextromethorphan, and no treatment on nocturnal cough and sleep quality for coughing children and their parents. *Archives of Pediatrics and Adolescent Medicine.* 161, 2007, 1140.
- [9]. Gibson PG, Ryan NM. Cough Pharmacotherapy. Current and Future Status. *Expert Opin. Pharmacother*, 12, 2011, 1745-1755.
- [10]. Shah AJ, Gilani AH. Blood pressure-lowering and vascular modulator effects of *Acorus calamus* extract are mediated through multiple pathways. *J Cardiovasc Pharmacol.*, 54(1), 2009, 38-46.
- [11]. Kim DY, Lee SH, Kim WJ, Jiang J, Kim MK, Shin YK, et. al.,. Inhibitory effects of *Acorus calamus* extracts on mast cell-dependent anaphylactic reactions using mast cell and mouse model. *J Ethnopharmacol.* 141(1), 2012, 526-9.
- [12]. Nosalova G, Fleskova D, Jurecek L, Sadlonova V, Ray B. Herbal polysaccharides and cough reflex. *Respir Physiol Neurobiol.* 187(1), 2013, 47-51.
- [13]. Dhuley JN. Antitussive effect of *Adhatoda vasica* extract on mechanical or chemical stimulation-induced coughing in animals. *J Ethnopharmacol.*, 67(3), 1999, 361-5.
- [14]. Amagase H. Clarifying the real bioactive constituents of garlic. *J Nutr.* 136(3), 2006, 716S-725S.
- [15]. Nantz MP, Rowe CA, Muller CE, Creasy RA, Stanilka JM, Percival SS. Supplementation with aged garlic extract improves both NK and $\gamma\delta$ -T cell function and reduces the severity of cold and flu symptoms: a randomized, double-blind, placebo-controlled nutrition intervention. *Clin Nutr.* 31(3), 2012, 337-44.
- [16]. Nahas R, Balla A. Complementary and alternative medicine for prevention and treatment of the common cold. *Can Fam Physician.* 57(1), 2011, 31-6.
- [17]. Bhat Z A, Kumar D, Shah M Y. *Angelica archangelica* Linn. is an angel on earth for the treatment of diseases. *Int J Nutr Pharmacol Neurol Dis*, 1, 2011, 36-50.
- [18]. Sigurdsson S, Gudbjarnason S. Effect of oral imperatorin on memory in mice. *Biochem Biophys Res Commun.*, S0006-291X(13), 2013, 01708-7.
- [19]. Jin H, Luo Q, Zheng Y, Nurahmat M, Wu J, Li B, Lv Y, Wang G, Duan X, Dong J. CD4+CD25+Foxp3+ T cells contribute to the antiasthmatic effects of *Astragalus membranaceus* extract in a rat model of asthma. *Int Immunopharmacol.*, 15(1), 2013, 42-9.
- [20]. Zhou TN, Tang LH, Huang SC, Lu DD, Wang Y, Liu LF, Lai P, Ye MR. Study on the antitussive and antiasthmatic effects of Radix Fici Hirtae. *32(4)*, 2009, 571-4.
- [21]. Matkovic Z, Zivkovic V, Korica M, Plavec D, Pecanic S, Tudoric N. Efficacy and safety of *Astragalus membranaceus* in the treatment of patients with seasonal allergic rhinitis. *Phytother Res.*, 24(2), 2010, 175-81.
- [22]. Boskabady MH, Alizadeh M, Jahanbin B. Bronchodilatory effect of *Carum copticum* in airways of asthmatic patients. *Therapie.*, 62(1), 2007, 23-9.
- [23]. Boskabady MH, Jandaghi P, Kiani S, Hasanzadeh L. Antitussive effect of *Carum copticum* in guinea pigs. *J Ethnopharmacol.* 97(1), 2005, 79-82.
- [24]. Prusinowska R., Smigielski, KB. Composition, biological properties and therapeutic effects of lavender (*Lavandula angustifolia* L.). A review. *Herba Polica*, 60 (2), 2014, 56-66.
- [25]. Balch, James F., MD. Prescription for Nutritional Healing. Garden City, N.Y.: Avery Publishing Group, 1997.
- [26]. Dvoskin, L. P., and P. A. Crooks. A Novel Mechanism of Action and Potential Use for Lobeline as a Treatment for Psychostimulant Abuse. *Biochemical Pharmacology* 63, 2002, 89-98.
- [27]. Schapowal A, Berger D, Klein P, Suter A. Echinacea/sage or chlorhexidine/lidocaine for treating acute sore throats: a randomized double-blind trial. *Eur J Med Res.*, 14(9), 2009, 406-12.
- [28]. Hubbert M, Sievers H, Lehnfeld R, Kehrl W. Efficacy and tolerability of a spray with *Salvia officinalis* in the treatment of acute pharyngitis - a randomised, double-blind, placebo-controlled study with adaptive design and interim analysis. *Eur J Med Res.*, 11(1), 2006, 20-6.
- [29]. Krawitz C, Mraheil MA, Stein M, Imirzalioglu C, Domann E, Pleschka S, Hain T. Inhibitory activity of a standardized elderberry liquid extract against clinically-relevant human respiratory bacterial pathogens and influenza A and B viruses. *BMC Complement Altern Med.*, 25, 2011, 11-16.

- [30]. Roschek B Jr, Fink RC, McMichael MD, Li D, Alberte RS. Elderberry flavonoids bind to and prevent H1N1 infection in vitro. *Phytochemistry.*, 70(10), 2009, 1255-61.
- [31]. Zakay-Rones Z, Thom E, Wollan T, Wadstein J. Randomized study of the efficacy and safety of oral elderberry extract in the treatment of influenza A and B virus infections. *J Int Med Res.*, 32(2), 2004, 132-40.
- [32]. Li ZY, Zhi HJ, Xue SY, Sun HF, Zhang FS, Jia JP, et. al., Metabolomic profiling of the flower bud and rachis of *Tussilago farfara* with antitussive and expectorant effects on mice. *J Ethnopharmacol.*, 6;140(1), 2012, 83-90.
- [33]. Cho J, Kim HM, Ryu JH, Jeong YS, Lee YS, Jin C. Neuroprotective and antioxidant effects of the ethyl acetate fraction prepared from *Tussilago farfara* L. *Biol Pharm Bull.*, 28(3), 2005, 455-60.
- [34]. Kennedy DA, Lupattell A, Koren G, Nordeng H. Herbal medicine use in pregnancy: results of a multinational study. *BMC Complement Altern Med.*, 12, 2013, 13:355.
- [35]. Turker AU, Gurel E. Common mullein (*Verbascum thapsus* L.): Recent advances in research. *Phytother Res.*, 19 (9), 2005, 733-9.
- [36]. Khare CP, *Indian Medicinal Plants - An Illustrated Dictionary*, Springer Science+BusinessMedia, LLC, 2007, 733-734.
- [37]. SPI, *The Siddha Pharmacopoeia of India, I Part, I Vol*, Published by Central Council for Research in Ayurveda and Siddha, New Delhi, India, 2008, 69-71.