

Review on Formulation and Evaluation of Herbal Cough Syrup

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Abstract:

This study's primary goal was to remove dangerous synthetic ingredients from herbal cough medication. Formulation and use a natural, safe component in their place. In India, the number of people with asthma is growing daily for a variety of environmental factors. It helps those who have congestion in their chest. The study's objectives are to create a pure herbal syrup and assess and contrast its physicochemical characteristics with those of commercially available synthetic and herbal syrups. The market offers a large variety of synthetic cough syrups with various uses, but some of them have negative physiological effects. Such as disorientation, delusions, and difficulties urinating. The natural herbal syrup was created by combining the extracts of *Adhatoda vasica* nees, *Syzygium aromaticum*, *Vasicine*, *Vasicol*, and *Vasinone* with sugar, alcohol, and orange peel constituents. It may also act as a bronchodilator and as an expectorant. *Adhatoda Vasica* Nees leaf extract is a traditional medicine and has been used to treat cough. The plant may have properties like antimicrobial, antibacterial, anti-inflammatory, antiasthmatic, anticancer, antituberculars, and antioxidants. *Vasaka* leaves have the potential to provide compounds with strong antitussive efficacious and minimal side effects, allowing for the treatment of expectorants, especially dosage and monitoring of undesirable effects.

Keyword : *Expectorants, Antitussive, Vasaka, Adulsa, Acanthaceae, Cough Syrup*

Introduction:

Coughing is the term for inflammation and fluid in the lungs caused by a bacterial, viral, or fungal illness.[1] It can cause heat and difficulty breathing. When your throat or airways become irritated, your body reacts by coughing. Your brain receives a signal from your nerves when they are irritated. Usually a sugary beverage, *vasaca* cough syrup contains cough suppressant drugs. Asthma cases are increasing daily in India due to a combination of environmental and man-made reasons.[2] Asthma is a chronic lung disease that can impact individuals of any age. *Vasaca* plants like thyme have expectorant and antispasmodic qualities that assist clear the bronchi of mucus and relieve coughs. Because *Adhatoda vasica* leaves contain adhatodic acid, 6-hydroxy vasicine, vasicine, and vasicinone, they are used as expectorants and bronchodilators.[6] β -Caryophyllene, α -Humulene, and eugenol are present in *Syzygium aromaticum* fruit. Asthma, bronchitis, cough, and

other respiratory illnesses are treated with eugenol acetate.[7] All of these are used to treat skin infections, skin eruptions, and coughs. The respiratory system may be the source of coughing.[8] The purpose of this article is to discuss the function of *Vasaca* leaves in controlling cough aversions through analysis and research.

HISTORY:

The most recent cough syrup was introduced by German pharmaceutical company Bayer in 1895 and marketed under the name "Heroin." Conventional cough syrup formulations consist of 60–75% inverted syrup, which is composed of glucose, maltodextrin, sucrose, and invert syrup. In India, Fourrts Laboratories produced the cough syrup.

DIAGNOSIS OF COUGH

Methacholine challenge testing, sputum (mucus) testing, imaging examinations such as chest CT

scans or X-rays, spirometry, and blood tests are commonly among them.[9]To help your doctor make an accurate diagnosis, it could be a good idea to prepare the following information beforehand.[10]The most prevalent causes of acute cough in adults are acute bronchitis and acute viral upper respiratory infections, also known as the common cold. A bacterial infection is the cause of acute bronchitis in about 10% of cases, however viruses account for the majority of cases. August 2023.

TYPES OF COUGH

The simplest way to comprehend coughs is to categorize them as either wet or dry. Wet coughs, also known as mucus-filled coughs, are common in people who have the flu, a cold, pneumonia, or another illness. The patient feels sticky and moist in the back of their throat as a result of the respiratory system's mucus removal process. The throat feels dry and itchy when there is no mucus production from a cough.[25, 26] They frequently result from gastrointestinal tract irritation caused by allergies, croup, asthma, and other illnesses. You can choose a dry cough syrup or a wet cough syrup that is specifically made to treat the sort of cough you have.

CHRONIC COUGH TREATMENT

After examining the secondary sources that were not included in the Cochrane Collaboration, we decided not to include one since it did not satisfy the minimal systematic requirements [9,10,11].Instead, a substantial, thorough, and morally sound body of evidence is provided by the CDSR's "umbrella review," which is composed of up to 15 SRs and is updated frequently online. However, it currently lacks wide therapeutic value because there aren't enough well-structured trials on pharmaceutical and non-pharmacological therapy for childhood chronic cough. One of these fifteen SRs examined the management algorithms covered earlier in this study.

PHARMACOLOGICAL ACTION

Decongestants

Children's over-the-counter cold remedies contain decongestants such phenylephrine or pseudoephedrine. Systemic decongestants are

adrenergic receptor agonists, also known as sympathomimetics, which cause the respiratory tract's mucosa to constrict, momentarily lessening the swelling brought on by mucous membrane inflammation.[12,13] Sympathomimetic medications act on the heart's β -adrenergic receptors, which raise heart rate and contraction force, and the α receptors in the vascular smooth muscle, which cause vasoconstriction and presser effects.[14,15]Without first speaking with the patient's pediatric cardiologist, these medications should be used cautiously in children who have congenital heart disease, hypertension, or cardiac arrhythmias due to the cardiac consequences. Patients with diabetes mellitus and hyperthyroidism should also use oral decongestants cautiously. The nasal tissues are treated topically with topical decongestant medications. Topical decongestant medications are sprayed or dropped onto the nasal tissues. Topical decongestants cause vasoconstriction and nasal tissue shrinkage by activating the α -adrenergic receptors in the nasal mucosa's arterioles.[23, 24] When used as prescribed, there is very little systemic absorption. Infants with nasal blockage may have short-term relief with the use of isotonic saline nose drops and gentle aspiration. The general humidification of indoor air is also beneficial. Tenacious nasal mucus tends to be diluted by moisture, making removal easier.

Cough Suppressants

The expectorant guaifenesin is frequently coupled with dextromethorphan, the cough suppressant used in over-the-counter cough medicines. The D isomer of the codeine analog levorphanol, dextromethorphan, suppresses coughing by acting centrally in the medulla's cough center. Using dextromethorphan may also result in drowsiness, nausea, dizziness, and gastrointestinal distress.[27, 28] The antihistamine diphenhydramine is also sold as a cough suppressant for It is unknown exactly how first-generation antihistamines work to prevent coughing [29, 30].

Expectorants

Guaifenesin is the most often prescribed oral mucolytic agent as an expectorant in the United

States. [32] It works by decreasing the mucus's surface tension and viscosity, making expectoration easier. [36] Increased flow of the thinned secretions via ciliary action facilitates the removal of respiratory mucus. Studies on the medication's effectiveness have not shown either improved pulmonary function or decreased sputum viscosity, so its clinical utility is in doubt.

Antihistamines

Children's cold and allergy formulas contain the antihistamines diphenhydramine, chlorpheniramine, and brompheniramine.[21, 22] Antihistamines, sometimes referred to as H1 receptor antagonists, compete with histamine for its activity at the H1 receptor location on blood vessel, gastrointestinal, and respiratory tract cells. Antihistamines reduce allergy-related congestion in the respiratory tract.[40] In 1988, Naclerio et al. Investigated how inflammatory mediators react to viral infections. As the cold got worse, all factors—aside from histamine—became more strongly correlated with the symptoms [41]. This research suggests that antihistamines are useless for treating the common cold because they won't reduce the severity of symptoms. Nonetheless, they are useful in treating allergic rhinitis symptoms. [42, 43, 44]

RESEARCH METHODOLOGY

The following sources were selected in order to identify the primary research, secondary sources, and guideline searches: Medline (via the PubMed search engine) EMBASE DARE, which stands for Database of Abstract of Reviews of Effects, is the Cochrane Library's Cochrane Database of Systematic Reviews. Gruppo Italiano di Medicina Basata sulle Evidenze (GIMBE) has established its primary Guideline Banks (LG). We collected information from the PubMed (MeSH database) and Embase keyword registers using the following terms: In various search strings, the phrases "epidemiology," "prevalence," and "cough," "coughing," and "chronic," matched one another case-by-

case." Incidence, cause, diagnosis, outcome, and treatment" Using the clinical queries search engine and the pre-defined term "chronic cough children," we looked for particular clinical regions in PubMed. In addition to any current "clinical prediction guides," the fields of aetiology, diagnosis, prognosis, and therapy may all be the subject of separate research. Without a deadline, we conducted a literature search to get our results, and we were done on September 8, 2014.

The selection was further restricted to papers written in either Italian or English that included human participants ages 0 to 18. When searching for therapeutic literature, we limited our search to randomized controlled trials (RCTs). Non-systematic reviews, editorials, letters, pure study works, and grey literature were not included in our analysis.

HERBS USED IN COUGH SYRUP^[14,15]

1) Vasaka



Synonym : Adhtoda, Adulsa

Biological sources: It is dried and fresh leaves of Adhatoda vasica or Malabar nut

Family : Acanthaceae.

Chemical Constituents : Vasicine, Vasicinone, 6-hydroxy vasicine, and adhatodic acid

Uses :

- Expectorants
- In asthmatic patients
- cough syrup.

2) Tulsi



Synonym : Tulas ,Tulsi

Biological source: Tulsi consists of the fresh and dried leaves of Ocimum species like Ocimum sanctum

L. and Ocimum basilicum L.

Family:- Labiateae

Chemical Constituents :Phytochemical studies have shown that oleanolic acid, ursolic acid rosmarinic

Acid, eugenol carvacrol, linalool, and β -caryophyllene are some of the main chemical constituents of

Tulsi.

Uses :

- Expectorants
- In asthmatic patients
- Cough syrup
- Nasal decongestant



3) Clove

Biological Source: Cloves consist of dried flower buds of *Eugenia caryophyllus*,

Family: Myrtaceae

Chemical Constituents :Eugenol is the major compound, accounting for at least 50%. β -caryophyllene

Uses :

- In asthmatic patients
- Cough syrup
- Nasal decongestant

4) Zinger

Biological Source : Ginger is a flowering plant



whose rhizome of *Zingiber officinale* .

Family :Zingiberaceae

Chemical constituents :Ginger is abundant in active constituents, such as phenolic and terpene Compounds.and paradols. In fresh ginger, gingerols are the major polyphenols.

Uses :

- Expectorants
- Cough syrup
- Nasal decongestant.
- Expectorant

5) Honey



Biological Source :Honey is a natural product formed from nectar of flowers by honeybees Apis Mellifera.

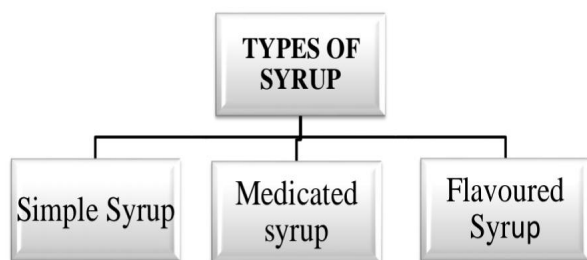
Family: Apidae

Chemical constituents :Honey contains trace amounts of the B vitamins riboflavin, niacin, folic acid, Pantothenic acid and vitamin B6. It also contains ascorbic acid (vitamin C), and the minerals calcium, Iron, zinc, potassium, phosphorous, magnesium, selenium, chromium and manganese.

Uses :

- Expectorants
- In asthmatic patients
- Cough syrup
- Nasal decongestant.

TYPES OF SYRUP



Simple Syrup :

When Purified Water alone is used in making the solution of sucrose, the preparation is known as “ Simple syrup,” Simple syrup contains only sucrose (sugar) & Purified water.

Example:Sucrose :- 66.7ml Purified water:- 100ml

Medicated syrup :

When Syrup contains medicinal substance is know as medicated cough syrup.

Example :-Ginger syrup Strong Ginger tincture5 mL Syrup q.s. 100 mL

Flavoured Syrup :

Syrups containing flavoring agents but not medicinal substances are called flavored vehicles; Containing

Aromatic/ Flavoured – Flavoured syrup

Example: Cherry & Raspberry syrup

MATERIALS AND METHOD :-

Collection of plant material

In June 2023, orange peel, Adhatoda vasica leaves, and O. sanctum leaves were gathered from the nearby area of Shrigonda (Ahemedngar). We bought Syzygium aromaticum fruits and Z. Officinale rhizomes from the Ahemednagar local market.

Preparation of extracts

1. After selecting four Syzygium aromaticum and removing their outer coatings, the pieces were combined with 100 milliliters of water, which was then slowly heated to extract the material. The extract was filtered and then let to cool. The entire extract is metered out into one milliliter.[52]
2. About 20g of two oranges' peels were broken into tiny pieces and mixed with 100ml of water to create the extract. After that, the mixture was slowly cooked. The extract was filtered and then let to cool. The entire extract is measured into a 5 ml solution.
3. About 20 grams of Vasaka and O. Sanctum leaves were combined with 100 milliliters of water and slowly cooked to create the extract. The extract was filtered and then let to cool. The entire extract is metered out to create a 5 ml solution.
4. Weigh 33.3 milliliters of sugar precisely.
5. Fifty milliliters of syrup were made when all the extracts were combined.
6. Following preparation, this syrup was placed in an amber bottle, sealed, and stored in a cool location. [15]

Preparation of herbal syrup

Following Indian Pharmacopoeia, 200 mg of each extract of Adhatodavasica, Zingiber Officinale, and 400 mg of each extract of O.sanctum Syzygium aromaticum, Honey, were dissolved in 100 ml of simple syrup I.P., and the volume was then increased to 100 ml before preservatives were added [53].

Evaluation of herbal cough syrup

According to the standard approach outlined in the Indian Pharmacopoeia, physicochemical parameters such as specific gravity, density, pH, refractive index, alcohol content, and acid value were analyzed. Additionally noted were the color, smell, and test.[2, 23, 24]

Colour	Greenish Brown
Odour	Sweet Aromatic
Test	Sweet
Specific Gravity	1.25
Density	1.37
Refractive Index	1.45
PH	4.8
Alcohol Contain	0.81
Acid Value	0.118

Colour examination

Five milliliters of the finished syrup were transferred into watch glasses and set up in white tube light against a white background. The color of it was visible to the unaided eye.

Odour examination

Two milliliters of the finished syrup were each smelled separately. Two minutes separated the two sniffs in order to counteract the effects of the first sniff.

Taste examination

A pinch of final syrup was taken and examined for its taste on taste buds of the tongue.

Determination of pH

10 milliliters of the finished syrup, precisely measured, were added to a 100 milliliter volumetric flask, and the remaining volume was filled with distilled water to reach 100 milliliters. For roughly ten minutes, the solution was sonicated. A digital pH meter was used to measure the pH.[54].

CONCLUSION

Vasaca is one medication that has been shown to have bronchodilator effects. An extract from Adhatoda vasaca Nees leaves is traditionally used to treat coughs. When study leaves were present, the flower had a medicinal impact on coughing and reducing inflammation in the airways. Adhatodic acid from Adhatoda vasaca Nees is also shown by the pharmacological results. Because they contain polyphenolic components, particularly flavonoids, they are good at relieving cough. Although coughing is widespread in the population, it is still challenging to determine the actual prevalence of these conditions. There is a greater chance that those supported by solid research may enhance clinical results. Better diagnosis, treatment, and prevention of cough in adults and children still require scientific and clinical research studies.

IN FUTURE SCOPE

It is expected that the cough syrup industry will continue to grow in the years to come. Important factors including product innovation, consumers' increasing desire for natural and healthier options, and the industry's developing applications in the food and beverage sector will all influence the industry's future. Because herbal and natural remedies for respiratory conditions are becoming more and more popular, the market for polyherbal cough syrup is anticipated to expand in the future. One of the main advantages of polyherbal cough syrup is that it is a natural product free of artificial components that could cause undesirable side effects.

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