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Review on Formulation and Evaluation of Herbal Cough Syrup

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ABSTRACT:
The main objective of this study was to eliminate harmful synthetic ingredient from herbal cough syrup. Formulation and substitute them with safe natural ingredient. Asthmatic patients are increasing day by day in India due to various environmental reasons. It is beneficial for people suffering from chest congestion. The study aim to formulate a pure herbal syrup and to evaluate and compare its physicochemical properties with the marketed synthetic and herbal syrup. There are wide range of synthetic cough syrup available in the market with different functions, But there synthetic cough syrup show harmful effect on the body. Such as confusions, hallucinations, trouble urinating. Due to there reasons cough syrup has evolved as an alternative to synthetic cough syrup because of the safe and traditionally used ingredients. The natural herbal syrup was formulated by adding the extracts of Adhatoda vasica nees. Syzygium aromaticum,Vasicine,Vasicol, and Vasinone, Sugar, Alcohol,Orange peel Constituents. It may also act as a bronchodilators nad as an expectorant. Adhatoda Vasica Nees, Leaves extract is a traditional medicine and reported to use in the management of cough. The vasaca plant may have properties such as antimicrobial, antibacterial, anti inflammatory, antiasthmatic, anticancer, antituberculars, antioxidants. Vasaka leaves have the potential to provide compounds with strong antitussive efficacy and little side effectsAllowing for treatment of expectorants,particularly dose and monitoring of unwanted effects. Hence, the results of the present study indicted the Cooperative effect of vasaca leaves in the management of cough aversions.

KEYWORDS: Expectorants, Antitussive, Vasaka, Adulsa, Acanthaceae, Cough Syrup.

INTRODUCTION:

A bacterial, viral, or fungal infection can result in inflammation and fluid in the lungs, which is known as a cough.[1] It can induce fever and make breathing difficult. Your body produces a cough as a reaction to irritation of the throat or airways. An irritant causes your nerves to fire, sending a signal to your brain. Vasaca cough syrup is typically a sweetened beverage that contains cough suppressant medication. In India, the number of people suffering from asthma is rising daily for a variety of man-

made or environmental factors.[2] A chronic lung condition that affects people of all ages is asthma.[3,4] It is brought on by inflammation and constriction of the muscles around the airways, which makes coughing symptoms more difficult to exhale.[5] Thyme, a vasaca plant, has expectorant and antispasmodic properties that help loosen mucus in the bronchi and soothe coughs. Adhatoda vasica leaves are utilised as bronchodialators and expectorants because they contain vasicine, vasicinone, 6-hydroxy vasicine, and adhatodic acid.[6] Eugenol, β-Caryophylene, and α-Humlene are found in Syzygium aromaticum fruit. Eugenol acetate is used to treat respiratory infections, including asthma, bronchitis, and cough.[7]These are all used to treat coughs, skin infections, and skin eruptions. Coughing may be caused by the respiratory tract.[8]This article's goal is to present, via analysis and research, the role that Vasaca leaves play in managing cough aversions.

HISTORY:

In 1895, German drug manufacturer Bayer released its latest cough syrup, which they sold under the brand name “ Heroin’’ Traditional cough syrup mixtures are formulated around in syrup at 60-75 % concentration which is made from sucrose, maltodextrin, glucose , invert syrup. The cough syrup was manufactured by Fourrts Laboratories in india.

DIAGNOSIS OF COUGH

These frequently include methacholine challenge testing, sputum (mucus) testing, imaging studies including CT scans or X-rays of the chest, spirometry, and blood tests.[9]It could be a good idea to have the following information ready in advance to aid your doctor in making an accurate diagnosis.[10]Acute bronchitis and acute viral upper respiratory infections, commonly referred to as the common cold, are the most frequent causes of acute cough in adults. The aetiology of acute bronchitis is mostly viral, however in around 10% of cases, bacterial infection is the cause. August 2023.

TYPES OF COUGH

Classifying coughs as wet or dry is the easiest method to understand them. Mucus-filled coughs, or wet coughs, are frequently happen when one has the flu, a cold, pneumonia, or another sickness. The process of clearing the respiratory system of mucus causes the patient to feel sticky and moist in the back of their throat. When a cough doesn't generate mucus, the throat feels dry and tickly.[25,26] They often arise from inflammation of the digestive tract brought on by asthma, croup, allergies, and other diseases. Depending on the type of cough, you can select a dry cough syrup or a suitable wet cough syrup designed to address the particular issue.

CHRONIC COUGH TREATMENT

Upon reviewing the secondary sources excluded from the Cochrane Collaboration, we found one that did not meet the minimal systematic criteria, which we opted not to include[9,10,11]Rather, the CDSR offers a "umbrella review," which is made up of up to 15 SRs and is updated on a regular basis on the internet, offers a substantial, comprehensive, and ethically sound body of evidence. However, due to the overall dearth of well-structured trials on pharmaceutical and non-pharmacological therapy for childhood persistent cough, it currently lacks broad therapeutic value. Among these fifteen SRs, one looked at the management algorithms that were previously discussed in this study.

PHRMACOLOGICAL ACTION

Decongestants

The decongestants found in children's OTC cold medication are either pseudoephedrine or phenylephrine. Systemic decongestants are adrenergic receptor agonists (sympathomimetics) that produce vasoconstriction within the mucosa of the respiratory tract, temporarily reducing the swelling associated with inflammation of the mucous membranes.[12,13] Sympathomimetic drugs work on the α receptors in the vascular smooth muscle causing vasoconstriction and presser effects and on the β-adrenergic receptors in the heart causing increased heart rate and force of contraction.[14,15]Because of the cardiac effects, these agents should be used with caution in children with congenital heart disease, hypertension, or cardiac arrhythmias without consulting the patient's pediatric cardiologist.. Oral decongestants also should be used with caution in patients with hyperthyroidism and diabetes mellitus. Topical decongestant products are applied topically to the nasal tissues via spray or drops. Topical decongestants stimulate the α-adrenergic receptors in the arterioles of the nasal mucosa, leading to vasoconstriction and shrinkage of nasal tissues.[23,24] There is minimal systemic absorption if used as directed. The use of isotonic saline nose drops and gentle aspiration can be effective in the temporary relief of nasal obstruction in infants. Also useful is the general humidification of room air. Moisture tends to dilute tenacious nasal mucus so that it is easier to remove.

Cough Suppressants

Dextromethorphan is the cough suppressant found in OTC cough medications, and it often is combined with the expectorant guaifenesin. Dextromethorphan, the D isomer of the codeine analogue levorphanol, acts centrally in the cough center in the medulla to suppress cough. Drowsiness, dizziness, nausea, and gastrointestinal upset also may be seen with dextromethorphan use.[27,28] Diphenhydramine, an antihistamine, also is marketed as a cough suppressant for The exact mechanism of action of first-generation antihistamines antitussive effects is unknown[29,30].

Expectorants

Guaifenesin is the most commonly prescribed oral mucolytic agent as an expectorant in the United States.[32] Its mechanism of action is to reduce the surface tension and viscosity of the mucus, which increases the ease of expectoration. Respiratory mucus removal is facilitated by increased flow of the thinned secretions via ciliary action.[36]Studies on the efficacy of guaifenesin have failed to demonstrate either improved pulmonary function or decreased sputum viscosity. Hence, its clinical usefulness is questionable

Antihistamines

Diphenhydramine, chlorpheniramine, and brompheniramine are the antihistamines found in children's cold and allergy formulas.[21,22] Antihistamines, also known as H1 receptor antagonists, compete for and block the action of histamine at the H1 receptor site on cells in the respiratory tract, gastrointestinal tract, and blood vessels. In the respiratory tract, antihistamines decrease congestion related to allergies.[40] Naclerio et al 1988 studied the response of inflammatory mediators to induced viral infections. All variables except histamine grew stronger in direct relationship with the symptoms as the cold increased in severity[41]. This finding indicates that antihistamines have no role in the treatment of the common cold; they will not shorten the period of symptoms. They are helpful, however, in the

treatment of the symptoms of allergic rhinitis. Lastly, in young infants, sympathomimetic-antihistamine mixtures are particularly dangerous because they may cause respiratory depression.[42,43,44]

Antipyretics

Some multi-symptom cold formulas contain acetaminophen or ibuprofen as an antipyretic and analgesic.[18,19] Acetaminophen acts centrally to inhibit the synthesis prostaglandins in the CNS and peripherally to block pain impulse generation. Antipyretic activity is due to its action against prostaglandin E2 in the CNS, which increases in fever.[38,39]

THE ACTIVE INGREDIENTS FOUND IN HERBAL REMEDIES THAT POSSESS AN ANTITUSSIVE EFFECT

Saponins

Among herbal remedies, saponins are one of the most well-understood mechanisms of action, with thethe capacity to modify cough characteristics and phlegm quality.Heterosides with both glycid and non-glycid components are called saponins. [44,45]The non-glycid component, referred to as the aglycone, is responsible for its pharmacological effects. When therapeutic doses are taken orally, the saponins reflexively irritate the vagal nerves. This leads to an increase in phlegm output in the airways.Moreover, expectoration is elevated due to inflammation in the cough and respiratory centres. Conversely, larger concentrations of saponins can irritate the stomach and intestinal mucous membranes, leading to emesis, diarrhoea, and bleeding.[46]

Flavonoids

Flavonol glycosides and their aglycones combine to form flavonoids. Activation can be decreased by flavonoids of xanthinoxidase and cholinesterase by preventing oxidative and reductive processes. The antitussive-expectorant activity of flavonoids, which are used to treat renal diseases, thromboembolic sequelae, and cardiovascular illnesses, is probably what makes their therapeutic benefits advantageous.

Essences

Essences are compounds that include fragrant terpenes. These are volatile substances that directly stimulate cells that secrete, irritating a range of bodily tissues, including the epithelium of the airways. They accelerate the ciliary epithelium's motility and have antibacterial and antiphlogistic qualities. The ingredients in the essence medications are Fructus anisi, Fructus foeniculi, Fructus melissae, H. seu, and Fructus thymi. and renal parenchyma damage are some of the side effects that might occur after using aetheric oils[47].

Mucilage

These days, upper respiratory infections are frequently treated with the so-called slime medications.connected to a dry, uncomfortable cough. The most well-known are Folium et Flos althaeae, Folium et Flos malvae, Radix, and Folium plantaginis. Slime medications create a protective layer on the surface of the airway mucous membrane that lessens irritation of the nerve endings of non-myelinated C-fibers as well as cough receptors (rapidly adapting cough receptors, or RARs) on myelinated vagal nerve fibres. This lessens the irritation of the injured mucous membrane brought on by inflammatory mediators or foreign objects, which results in coughing.[48]

Gums

Gums are transparent, amorphous hydrocolloids found naturally in plants, usually found in higher plants.as a post-injury protection agent. The herbal gums have a strong antitussive effect. The antitussive qualities of peach gum were studied.Mucilage's cough-suppressing properties are probably comparable.

Pectin

Pectin is said to as a mucous membrane protector for the stomach. The exact mode of action of pectins is unknown, but in experimental settings, the antitussive effect of pectins isolated from citrus fruits (30.2 percent) was comparable to that of antitussives that act peripherally, like prenoxdiazine (23.7 percent) and dropropizine (27.4 percent) (dose of 50 mg/kg b.w.).

RESEARCH METHODOLOGY [50]

To determine the primary studies, secondary sources, and guideline searches, the following sources were chosen: Medline (using the search engine PubMed) The Cochrane Library's Cochrane Database of Systematic Reviews, or EMBASE DARE stands for Database of Abstract of Reviews of Effects. The main Guideline Banks (LG) at Gruppo Italiano di Medicina Basata sulle Evidenze (GIMBE) have been identified. We used the following phrases to gather data from the PubMed (MeSH database) and Embase keyword registers: "Cough," "coughing," and "chronic," matched the terms "epidemiology," "prevalence," case-by-case in different search strings. "Incidence, cause, diagnosis, outcome, and treatment" We searched for specific clinical regions in PubMed using the clinical queries search engine and the pre-defined phrase "chronic cough children. The domains of aetiology, diagnosis, prognosis, and therapy, as well as any existing "clinical prediction guides," might all be independently investigated. We searched the literature for our findings without setting a deadline, and we finished on September 8, 2014. The selection was further limited to reports having human subjects between the ages of 0 and 18 that were written in either English or Italian. We restricted our search to randomised controlled trials (RCTs) while looking for literature about therapy. We did not include non-systematic reviews, editorials, letters, works of pure study, or grey literature in our investigation.

HERBS USED IN COUGH SYRUP[14,15]

Figure No. 1

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

Figure No. 2

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 :-

Figure No.3

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

Figure No. 4

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

Figure No. 5

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

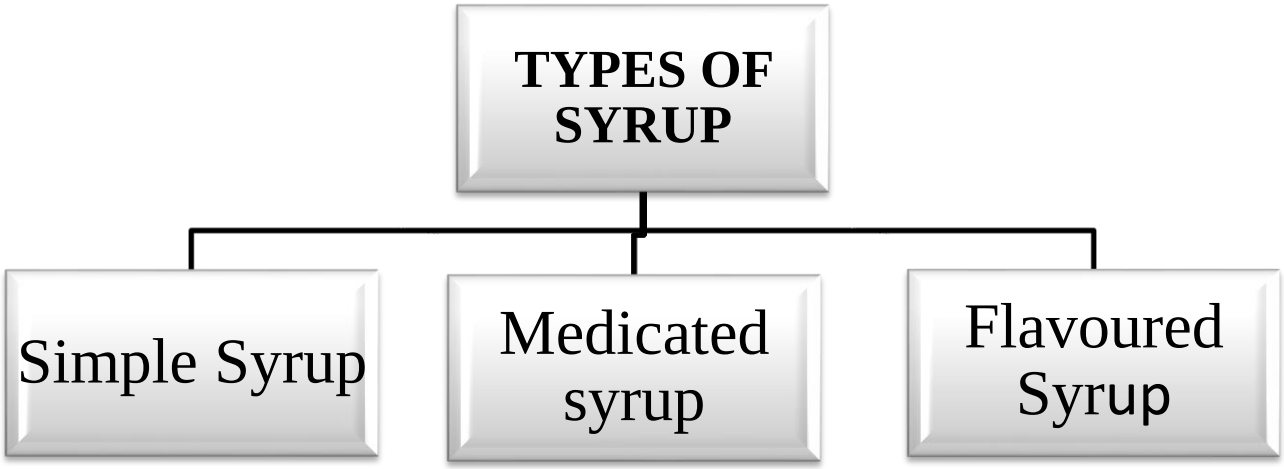
Family: Apidae

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

The leaves of Adhatoda vasica, Leaves of O.sanctum, , Orange peel were collected from adjoining area of Shrigonda (Ahemedngar) in the month of June- 2023. Fruits of Syzygium aromaticum and Rhizomes of Z. Officinale were purchased from the local market, Ahemednagar.

Preparation of extracts

1. Four Syzygium aromaticum were selected, their outer coats removed, and the resulting pieces were mixed to 100 millilitres of, which was thereafter slowly boiled to obtain extract. After filtering, the extract was allowed to cool. One millilitre of the entire extract is measured out.[52]
2. To make extract, about 20g of peel from two oranges was chopped into small pieces and added to 100ml of water. The mixture was then boiled slowly. After filtering, the extract was allowed to cool. A 5 ml solution is measured from the entire extract.
3. To make extract, about 20 gm of vasaka leaves and O.Sanctum leaves were added to 100 ml of water and boiled gradually. After filtering, the extract was allowed to cool. A 5 ml solution is measured from the entire extract. 4. Precisely weigh 33.3 millilitres of sugar. 5. After combining all the extracts, 50 millilitres of syrup were produced. 6. After this syrup was prepared, it was put into an amber bottle, sealed, and kept in a cool place. [15]

Preapration of herbal syrup

The simple syrup (66.7% w/v) was prepared as per Indian Pharmacopoeia. 200 mg of each extracts of Adhatodavasica, Zingiber Officinale.and 400 mg of each extracts of O.sanctum Syzygium aromaticum,Honeywere dissolved in simple syrup I.P. and the volume was made up to 100 ml and finally preservatives was added.[53]

Evaluation of herbal cough syrup

Physiochemical parameter likes specific gravity, density ,p^H, refractive index, alcohol contain, acid value were analysed as per the standard procedure mentioned in Indian pharmacopoeia. The colour, odour, test were also recorded.[2,23,24]

Table No.1

Colour	Greenish brown
Odour	Sweet aromatic
Test	Sweet
Specific gravity	1.25
Density	1.37
Refractive index	1.54
P^H	4.8
Alcohol contain	0.81
Acid value	0.118

Colour examination

Five ml final syrup was taken into watch glasses and placed against white back ground in white tube light. It was observed for its colour by naked eye.

Odour examination

Two ml of final syrup was smelled individually. The time interval among two smelling was kept 2 minutes to nullify the effect of previous smelling.

Taste examination

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

Determination of pH

Placed an accurately measured amount 10 ml of the final syrup in a 100 ml volumetric flask and made up the volume up to 100 ml with distilled water. The solution was sonicated for about 10 minutes. pH was measured with the help of digital pH meter.[54].

CONCLUSION

Drugs like vasaca have proven bronchodilator activity. Adhatoda vasaca Nees leaves extract as traditionally used to manage cough. In the presence study leaves, Flower achieved therapeutic effect to relive cough and reduced airway of inflammation. The pharmacological result also demonstrate that Adhatodic acid from Adhatoda vasaca Nees. They effective in reliving cough due to presence of polyphenolic compounds especially flavonoids .cough is common in the population, yet the true prevalence of these condition remains difficult to define. Those based on good evidence are more likely to improve the clinical outcomes. The clinical and basic research studies are still needed for better diagnosis, treatment, prevention of cough in children or adults.

IN FUTURE SCOPE

In the upcoming years, it is anticipated that the cough syrup sector would continue to rise. The future of the industry will be shaped by important variables such product innovation, growing customer desire for healthier and natural options, and expanding uses in the food and beverage sector. The market for polyherbal cough syrup is expected to grow in the future due to the growing popularity of herbal and natural treatments for respiratory ailments. The fact that polyherbal cough syrup is a natural product without artificial ingredients that might have unfavourable side effects is one of its key benefits.

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