

A Review on Polyherbal 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 is filled with a variety of synthetic cough syrups that serve a variety of purposes, but some of them have negative health effects. such as disorientation, delusions, and difficulties urinating. Because of the safe and conventionally used ingredients, cough syrup has developed as a substitute for synthetic cough syrup. Adhatoda vasica nees extracts were added to create the natural herbal syrup. The constituents of orang peel, sugar, alcohol, vasicine, vasicol, and vasinone are Syzygium aromaticum. It may also have expectorant and bronchodilator effects. An extract from the leaves of Adhatoda Vasica Nees is used as a traditional remedy for coughing. Antimicrobial, antibacterial, anti-inflammatory, anti-asthmatic, anticancer, antitubercular, and antioxidant qualities are possible for the vasaca plant. Vasaka leaves may yield substances with substantial antitussive properties and few adverse effects. enabling the administration of expectorants, namely dosage and the tracking of adverse effects. Thus, the current study's findings demonstrated vasaca leaves' cooperative effect in treating cough aversions.*

Keywords: Expectorants, Antitussive, Vasaka, Adulsa, Acanthaceae, Cough Syrup

I. 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 nerves fire in response to an irritation, which sends a signal to your brain. Usually a sugary beverage, vasaca cough syrup contains cough suppressant medicine. 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 afflict individuals of any age.[3, 4] It is caused by inflammation and tightness of the muscles around the airways, making it more difficult to exhale during coughing. [5]

The expectorant and antispasmodic qualities of thyme, a vasaca herb, aid in clearing the bronchi of mucus and relieving coughs. Because Adhatoda vasica leaves contain adhatodic acid, 6-hydroxy vasicine, vasicine, and vasicinone, they are used as expectorants and bronchodialators.[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 describe the function of Vasaca leaves in controlling cough aversions through analysis and study.

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 sucrose, maltodextrin, and glucose.

India's Fourrts Laboratories produced the cough medication.

TYPES OF COUGH SYRUP

- 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 omitted from the Cochrane Collaboration, we found one that did not meet the minimal systematic criteria, which we elected not to include[9,10,11]Instead, the CDSR provides a substantial, thorough, and morally sound body of information in the form of a "umbrella review," which is composed of up to 15 SRs and is updated frequently online.

However, it now lacks wide therapeutic value because there are generally few 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.

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. Although viruses are the primary cause of acute bronchitis, bacterial infections account for around 10% of cases.
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II. LITERATURE SURVEY

1. S. S. Singh and S. K. Mahdi (2017)

Title : Evaluation and Preparation of Polyherbal Syrup :

Summary:

This article reviews the preparation and evaluation of polyherbal syrups, highlighting their importance in traditional medicine. The authors discuss the selection of herbs, extraction methods, and formulation techniques. They also emphasize the need for quality control and standardization.

Key Points:

- Polyherbal syrups are widely used in traditional medicine due to their therapeutic benefits.
- Selection of herbs is crucial for synergistic effects and efficacy.
- Extraction methods and formulation techniques impact the final product's quality.
- Quality control and standardization are essential for ensuring safety and efficacy.

2. A. K. Singh and P. K. Singh (2018)

Title: Evaluation and Preparation of Polyherbal Syrup Summary:

This article provides an overview of polyherbal syrups, including their preparation, evaluation, and applications. The authors discuss the advantages of polyherbal syrups over single-herb extracts and highlight the importance of pharmacological and toxicological evaluations.

Key Points:

Polyherbal syrups offer advantages over single-herb extracts due to synergistic effects.

Preparation methods, including extraction and formulation, impact the final product's quality. Pharmacological and toxicological evaluations are crucial for ensuring safety and efficacy.

Polyherbal syrups have applications in various diseases, including diabetes and respiratory disorders.

3. R. K. Tiwari and A. K. Rai (2019)

Title: Evaluation and Preparation of Polyherbal Syrup Summary :

This article reviews the preparation, evaluation, and standardization of polyherbal syrups. The authors emphasize the importance of selecting appropriate herbs, optimizing extraction conditions, and ensuring quality control. They also discuss the role of polyherbal syrups in modern medicine.

Key Points:

- Selection of appropriate herbs is crucial for efficacy and safety.
- Optimization of extraction conditions impacts the final product's quality.
- Quality control measures, including standardization and stability testing, are essential.
- Polyherbal syrups have potential applications in modern medicine, including adjunct therapy.

AIM :

To develop a safe, effective, and palatable polyherbal cough syrup that provides Cough and relief from its associated symptoms, while also promoting overall respiratory health.

OBJECTIVE :

1. To formulate a polyherbal cough syrup: Combine multiple herbs with established anti-tussive, expectorant, and anti-inflammatory properties to create a synergistic effect.
2. To evaluate the efficacy and safety: Conduct clinical trials to assess the syrup's effectiveness in relieving cough and its associated symptoms, as well as its safety profile.
3. To standardize the herbal extracts: Ensure the quality and consistency of the herbal extracts used in the formulation, using standardized extraction methods and
4. To optimize the dosage form: Develop a dosage form that is easy to administer, palatable and suitable for various age groups.
5. To compare with existing cough syrup: Evaluate the polyherbal cough syrups efficacy and safety in comparison to existing conventional cough syrup
6. To ensure regulatory compliance: Comply with relevant regulatory requirements, such as good manufacturing practices and labelling regulation.
7. To investigate the phytochemical profile: Analyze the phytochemical constituents of the individual herbs and the final formulation to understand their potential interaction and contribution to the syrups efficacy.

SCOPES OF POLYHERBAL COUGH SYRUP :

Therapeutic Scope:

1. Symptom alleviation from colds and coughs: Polyherbal cough syrup can help with congestion, coughing, and other upper respiratory tract infection symptoms.
2. Bronchitis and asthma management: The syrup's anti-inflammatory and bronchodilatory properties can help manage bronchitis and asthma symptoms.
3. Allergic cough relief: Polyherbal cough syrup can provide relief from allergic coughs caused by seasonal allergies or environmental factors.

Preventive Scope

1. Immune system support: Certain herbs in the polyherbal cough syrup can help boost the immune system, reducing the risk of respiratory infections.

2. Antioxidant properties: The syrup's antioxidant properties can help protect against oxidative stress and inflammation, reducing the risk of chronic disease.

Commercial scope

1. Growing demand for natural product: The increasing demand for natural and herbal product creates a significant market opportunity for polyherbal cough syrup.
2. Competitive advantages : A well formulated polyherbal cough syrup can offer a competitive

Advantages over conventional cough syrup.

3. Export potential : polyherbal cough syrup can be exported to countries with a high demand for Natural and herbal product.

Research and Development Scope :

1. Standardization of herbal extract : Research can focus on standardizing herbal extract to ensure Consistency and quality.
2. Clinical trials and efficacy studies: Conducting clinical trials and efficacy studies can help establish the syrups safety and effectiveness.
3. New herbal combination and formulation: Research can herbal explore new herbal combination and formulation to enhance the syrups safety and efficacy.

PHARMACOLOGICAL 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.

ANTI-HISTAMINES :

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 of 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]

ACTIVE INGREDIENTS WITH ANTITUSSIVE EFFECTS FOUND IN HERBAL REMEDIES :

The ability to alter cough symptoms and phlegm quality makes saponins one of the most well-understood mechanisms of action among herbal medicines. Saponins are heterosides that include both glycid and non-glycid components. [44, 45] Its pharmacological actions are caused by the aglycone, which is the non-glycid component. The vagal nerves are reflexively irritated by the saponins when therapeutic dosages are administered orally. The airways produce more phlegm as a result of this. Additionally, inflammation in the cough and respiratory centers causes an increase in expectoration. On the other hand, higher saponin concentrations have the potential to irritate the mucous membranes of the stomach and intestines, resulting in bleeding, diarrhea, and vomiting.[46] Flavonoids are made up of flavonol glycosides and their aglycones.

Flavonoids :

Flavonoids are made up of flavonol glycosides and their aglycones. By blocking oxidative and reductive processes, flavonoids of xanthinoxidase and cholinesterase can reduce activation. The therapeutic effects of flavonoids are likely due to their antitussive-expectorant activity, which is utilized to treat cardiovascular diseases, thromboembolic sequelae, and renal ailments.

Essentials: Fragrant terpenes are among the components that make up essences. These are volatile compounds that irritate a variety of body tissues, including the airway epithelium, by directly stimulating cells that produce. They have antibacterial and antiphlogistic properties and speed up the mobility of the ciliary epithelium. Fructus anisi, Fructus foeniculi, Fructus melissae,

H. seu, and Fructus thymi are the constituents of the essence drugs. and damage to the renal parenchyma are among the adverse effects that could happen after using aetheric oils.

Mucilage :

These days, the so-called slime medicines are commonly used to treat upper respiratory infections. linked to an unpleasant, dry cough. Radix, Folium plantaginis, Folium et Flos althaeae, and Folium et Flos malvae are the most well-known. Slime drugs reduce irritation of the fibers and cough receptors (also known as rapidly adapting cough receptors, or RARs) on myelinated vagal nerve fibers by forming a protective layer on the surface of the mucous membrane of the airway. This reduces the irritation of the damaged mucous membrane caused by foreign substances or inflammatory mediators, which causes coughing.[48]

GUMS :

Usually found in higher plants, gums are translucent, amorphous hydrocolloids that occur naturally in plants as a protective measure after an injury. The antitussive properties of the herbal gums are potent. Peach gum's antitussive properties were studied. Mucilages cough suppressing properties are probably comparable.

Pectin :

The ability of mucilage to reduce coughing is most likely similar. Pectin: Pectin is thought to protect the stomach's mucous membrane. In experimental settings, the antitussive effect of pectins isolated from citrus fruits (30.2 percent) was comparable to that of peripherally acting antitussives such as prenoxidiazine (23.7 percent) and dropropizine (27.4 percent) (dose of 50 mg/kg b.w.). However, the precise mechanism of action of pectins is unknown.

III. 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). To collect information from the PubMed (MeSH database) and Embase keyword registries, we employed the following phrases: 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 keyword "chronic cough children," we looked for particular clinical regions in PubMed. The fields of diagnosis, prognosis, treatment, and aetiology, in addition to as well as any current "clinical prediction guides," could all be looked into separately. Without a deadline, we conducted a literature search and completed our work on September 8, 2014. The selection was further limited to papers having

human participants between the ages of 0 and 18 that were written in either English or Italian. When searching for therapeutic literature, we limited our search to randomized controlled trials (RCTs). In our investigation, we excluded non-systematic reviews, editorials, letters, works of pure study, and grey literature.

HERBS USED IN COUGH SYRUP [14,15] :



Figure No. 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

Use :

- Expectorant
- In asthmatic patient
- Cough syrup.

1) Tulsi :



Figure No. 2

Synonym : Tulasi

Biological source: Tulsi consist of the fresh and dried leaves of *Ocimum* species like *Ocimum sanctum* L. and *Ocimum basilicum*

Family : Labiateae.

Chemical Constituent: Phytochemical studies have shown that oleanolic acid, ursolic acid, rosmarinic acid, eugenol, carvacrol, linalool, and β -caryophyllene

Uses :

- Expectorant
- In asthmatic patient
- Cough syrup
- Nasal decongestant

2) Clove :-



Fig no. 3

Synonym : Lavang, Clove bud, *Caryophyllum*

Biological Source: Clove 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 patient
 - Cough syrup
 - Nasal decongestant.

3. Zinger :



Fig no.4

Synonym : Zingiber and Zingiberis .

Biological source : Ginger is a flowering plant whose rhizome of Zingiber officinale.

Family : Zingiberaceae.

Chemical constituents: Ginger is abundant in active constituent such as phenolic and terpene compound and paradols.

In fresh ginger,gingerols are the major polyphenols.

Uses :

- Expectorant
- Cough syrup
- Nasal decongestant.

4. Honey



Figure No. 5

Synonym : Madhu, Purified honey.

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

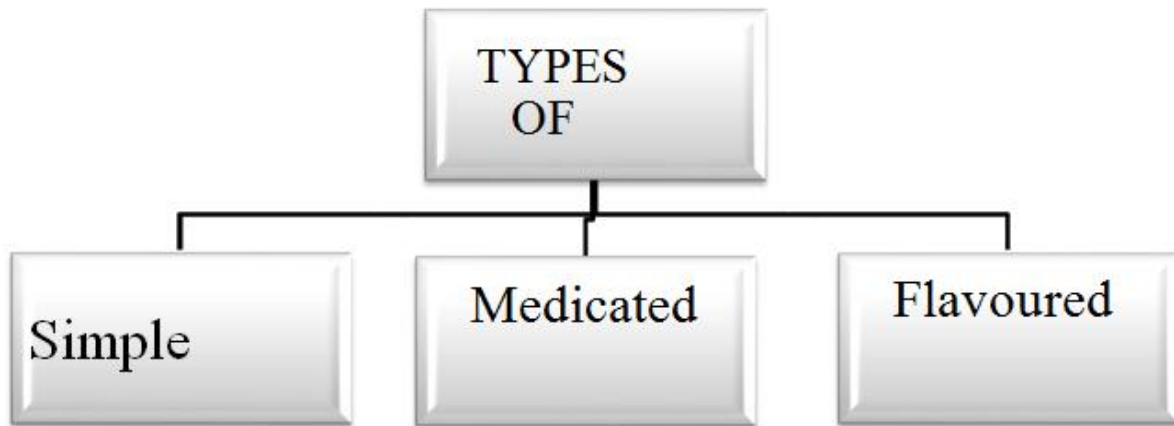
Family : Apidae

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 mineral calcium,iron ,zinc,potassium,phosphrous, magnesium,selemium, chromirm and manganese.

Uses :

- a. Expectorants
- b. In asthmatic patients
- c. Cough syrup
- d. 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 and purified water.

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

Medicated Syrup :

When syrup contains medicinal substances is know as medicated cough syrup

Example :- Ginger syrup Strong Ginger tincture 5 mL Syrup q.s. 100 mL.

Flavoured Syrup :

Syrup containing flavouring agents but not medicinal substance are called as flavoured vehicles. containing aromatic/ flavoured – flavoured syrup.

Example: Cherry & Raspberry syrup.

IV. MATERIAL AND METHOD

Collection of plant material :

The leaves of Adhatoda vasica, Leaves of O santum , Orange peel were collected from adjoining area of Shrigonda (Ahemedngar) in the month of June- 2024 Fruit of Syzygium aromaticum and Rhizomes of the Z. Officinale were purchased from the local market, Ahemednagar.

Preparation of extracts :

1. After choosing four Syzygium aromaticum and removing their outer coats, the pieces were combined with 100 milliliters of water, which was then slowly heated to produce extract. The extract was filtered and then let to cool. The entire extract is metered out into one milliliter.[15]
2. About 20g of finely chopped orange peel from two oranges was 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..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]

Preparation of herbal syrup :

The Indian Pharmacopoeia was followed in the preparation of the simple syrup (66.7% w/v). 200 mg of each extracts of Adhatodavastica, Zingiber Officinale and 400 mg of each extracts of O.sanctum Syzygium aromaticum, Honey were dissolved in simple syrup I.P. and the volume was brought up to 100 ml and finally preservatives was added.[53].

EVALUATION OF HERBAL COUGH SYRUP

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

Colour Analysis :

Five milliliters of the finished syrup were put in watch glasses and exposed to a white background and white tube light. The color of it was visible to the unaided eye.

Odour Analysis :

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

Taste test:

A small amount of the finished syrup was taken, and its flavor was assessed using the tongue's taste buds.

Ph Determination:

10 ml of the finished syrup, precisely measured, was added to a 100ml using distilled water to fill the volumetric flask to the full 100 ml. Ten minutes or so were spent sonicating the solution. The pH was measured using a digital pH meter.[51].

V. CONCLUSION

Vasaca is one medication that has been shown to have bronchodilator effects. The leaves of Adhatoda vasaca Nees are traditionally used to treat coughs. When research leaves were present, the flower had a therapeutic effect that relieved coughing and decreased inflammation in the airways.

The pharmacological results also show that Adhatoda vasaca Nees contains adhatodic acid. Because they contain polyphenolic components, particularly flavonoids, they are good at relieving cough. Although coughing is frequent in the general population, it is still challenging to determine how widespread certain conditions actually are. Clinical outcomes are more likely to be improved by those that are supported by solid evidence. 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.

Future growth in the polyherbal cough syrup market is anticipated as a result of the Increasing use of natural and herbal remedies for respiratory conditions. 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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