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Original Article

Review on Formulation and Evaluation of Herbal Cough Syrup

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ABSTRACT

Most Ayurvedic medicines are taken by mouth, and many of them are in liquid form. However, herbal medicines also need to meet legal quality standards, including stability testing, to make sure they are safe and effective. Herbal syrup is a very common and popular form of medicine used to treat cough, cold, and fever because it is easy for patients to take. The natural herbal syrup was made by mixing extracts from Adhatoda vasica, Syzygium aromaticum (clove), and other ingredients like Vasicine, Vasicol, Vasinone, sugar, alcohol, and orange peel. This syrup may help open up the airways (bronchodilator) and remove mucus from the lungs (expectorant). The leaves of Adhatoda vasica have been used in traditional medicine to treat cough. The plant is known to have several useful properties such as antimicrobial, antibacterial, anti-inflammatory, anti-asthmatic, anticancer, antitubercular, and antioxidant effects. Cough is one of the most common health problems people have had for many years. It is the body's natural way of protecting the lungs and airways. Coughs can be divided into different types based on their signs, symptoms, duration, and nature. The most common and popular medicine used to treat cough and cold is syrup. Among these, herbal syrups are preferred because they have more benefits and fewer side effects compared to synthetic (chemical) syrupsThere are two main types of cough: dry cough and wet cough. A wet cough produces mucus, while a dry cough does not. Cough syrup is the most common and easy-to-use medicine for treating cough and antibacterial activity using extracts of Nagarmotha, Pippali, Liquorice, Ginger, Amla, and Honey. These extracts will be cold. The aim of this study is to make a herbal cough syrup and test its tested against different bacteria such as Staphylococcus aureus, E. coli, Salmonella, Pseudomonas aeruginosa, and Bacillus subtilis. The study will also check the physical and chemical properties of the herbal cough syrup. This study helped us understand what a cough is, the different types of coughs, and the factors that cause them. It also gave a brief overview of herbal treatments used for cough. Adhatoda Vasica (Vasaka) leaves act as a bronchodilator and expectorant. The leaf extract is a traditional medicine commonly used to treat cough. The plant is known to have several properties, such as antimicrobial, antibacterial, anti-inflammatory, antiasthmatic, anticancer, antitubercular, and antioxidant effects. Vasaka leaves may contain compounds that effectively reduce coughing with few side effects. They can also help in treating conditions that require expectorants when used in the right dose and with proper monitoring. Therefore, this study showed that Vasaka leaves can be effective in managing cough. his study aims to make a herbal cough syrup and test its turbidity, color, smell, and taste during stability testing. The quality of the final syrup was checked by measuring factors like viscosity, pH, color, appearance, and scent. Clove oil acts as an expectorant and helps treat respiratory problems such as colds, bronchitis, cough, asthma, and other upper respiratory infections. This study helped us understand what a cough is, the different types of coughs, and the factors that cause them. It also gave a short overview of herbal treatments used for cough.

Keywords: Herbal Cough Syrup, Ayurvedic medicines, Adhatoda vasica, Syzygium aromaticum (clove),

INTRODUCTION

Herbal syrup is a mixture made by combining a concentrated herbal decoction with honey, sugar, or sometimes alcohol. The base of the syrup is a strong herbal extract, and adding honey or sugar helps to thicken and preserve it. Herbal plants and such formulations are used to treat various diseases, including cough and other health problems. For thousands of years, nature has been a source of medicines. Many modern drugs have been developed from natural sources, especially plants, based on their traditional uses. In the future, medicinal chemistry and new technologies will be used to improve natural products and create effective medicines and other useful bioactive compounds. Another name for

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"cough" is "tussis." It is an action, either voluntary or involuntary, that helps clear the throat and airways of dust, germs, irritants, fluids, or mucus. A cough is basically a quick release of air from the lungs. When the throat or airways are blocked or irritated, the brain senses something foreign and signals the body to cough to remove it. Liquid medicines are often given by mouth because they are easier for people who have trouble swallowing tablets or capsules. Cough syrup is one type of liquid medicine. It is made by mixing sugar and clean water to form a thick liquid. Syrups are different from other solutions because they contain a lot of sugar. Some syrups have medicine or flavoring added to them, while others only have flavor and no medicine. Flavored syrups are often used to make bitter medicines taste better, creating what is called a medicated syrup. Because syrups contain a lot of sugar, they can spoil easily, so preservatives are often added to keep them safe. Syrups can be different from each other based on their contents. Some syrups contain medicine, while others only have flavoring agents. When a syrup does not contain any medicine but only flavoring, it is called a flavored or non-medicated syrup. Cough is a very common problem that affects almost everyone. There are two main types of cough: dry cough and wet cough. In a dry cough, there is no mucus or phlegm, while in a wet cough, mucus or phlegm is present. Cough syrup is a popular and commonly used medicine to treat cough and cold because it is easy for patients to take.

Advantages and Disadvantages of Herbal Medicine:

Advantages:

1. Helps to improve the immune system.
2. More easily accepted by people in the community.
3. Better suited for the human body.
4. Low cost and has little to no side effects.
5. Natural and easily available.
6. Can help manage serious diseases like Alzheimer's and others.

Disadvantages:

1. Risk of poisoning from wild herbs.
2. Not properly regulated or controlled.
3. No clear guidelines for correct dosage.
4. Herbs can react with modern medicines.
5. Not suitable for all health conditions.

Classification of Cough:

1. Acute Cough – Lasts for less than 3 weeks**.**
2. Chronic Cough – Lasts for more than 3 weeks.
3. Dry Cough – No mucus is produced**.**
4. Wet Cough – Mucus is present.

Advantages:

- Protects against allergic cough.
- Easily available.
- Low cost.
- Helps improve the respiratory system.
- Has little or no side effects.
- Safe and harmless.
- Easy for patients to use.
- Herbs grow in common places.
- Does not require a prescription.

Disadvantages:

- Not properly regulated.
- Herbs may react with modern medicines.
- No clear dosage instructions.
- Takes longer to show effects.
- Not suitable for emergencies or unconscious patients.

Herbs Used in Cough Syrup:

1) Tulsi
2) Clove
3) Vasaka
4) Zinger
5) Honey
6) Thyme
7) Fennel
8) Cinnamon

1. Tulsi –

Tulsi has strong antimicrobial properties that work against many germs that affect humans and animals. Because of this, it can be used as a hand sanitizer, mouthwash, and water purifier. It can also help in animal care, wound healing, food preservation, storing herbal materials, and maintaining good health while traveling.

Fig. Tulsi Plant

Synonym**:** Tulas, Tulsi

Biological Source**:** Tulsi consists of the fresh and dried leaves of Ocimum species, such as *Ocimum sanctum* L. and *Ocimum basilicum* L.

Family: Labiatae

Chemical Constituents**:** Phytochemical studies show that Tulsi contains oleanolic acid, ursolic acid, rosmarinic acid, eugenol, carvacrol, linalool, and β-caryophyllene as its main chemical components.

Uses:

- Acts as an expectorant
- Helps in asthma treatment
- Used in cough syrups
- Works as a nasal decongestant

2. Clove –

Many research studies have explored the health benefits of clove and its main component, eugenol. These benefits include antioxidant, anti-inflammatory, antimicrobial, heart-protective, and brain-supporting effects.

Fig. Clove

Botanical Overview of Clove

- Scientific Name**:** *Syzygium aromaticum* (L.) Merr. & Perry
- Family: Myrtaceae
- Common Names**:** Clove, Laung (Hindi), Lavangam (Tamil/Telugu)
- Plant Part Used**:** Dried flower buds

Uses of Clove

1. Analgesic and Anaesthetic

- Eugenol works as a natural pain reliever and local anaesthetic.
- Clove oil is used on toothaches and mouth sores to reduce pain.

2. Respiratory Relief

- Acts as an expectorant, helping to remove phlegm in cases of cold, bronchitis, and asthma.

- Used in steam inhalation to relieve respiratory congestion.

3. Antimicrobial Activity

- Has strong antibacterial, antifungal, and antiviral properties.
- Effective against germs in the mouth, such as *Streptococcus* and *Candida albicans.*

3. Vasaka –

Vasaka (Adhatoda vasica**)** is traditionally used for treating respiratory ailments such as asthma, bronchitis, and cough. It is also known for its benefits in managing skin problems, bleeding disorders, and microbial infections. The leaves contain active compounds—particularly *vasicine*—that help loosen phlegm, clear airways, and ease breathing.

Fig. Vasaka plant

Botanical Name**:** *Adhatoda vasica* (also known as *Justicia adhatoda*)

Famil**y:** Acanthaceae

Common Names**:** Vasaka, Malabar Nut, Adhatoda, Arusha

Uses of Vasaka (Adusa):

- Respiratory Problems**:** Commonly used in Ayurveda to treat asthma, bronchitis, cough, and cold. It helps open airways, loosen mucus, and make breathing easier.
- Antibacterial and Antifungal**:** Has natural properties that help fight bacteria and fungi, useful in treating infections.
- Anti-inflammatory and Pain Relief**:** Reduces swelling and pain because of the active compound *vasicine*.

4. Ginger –

Ginger is the underground stem (rhizome) of the Zingiber officinale plant. It is a **s**picy herb used in cooking and traditional medicine. Ginger is known to reduce nausea, ease pain and swelling, and help with menstrual cramps. It also has antioxidants and other helpful compounds that may support **joint health** and **control blood sugar**, though more studies are needed to confirm these benefits.

Fig. Ginger

Biological Source: Ginger comes from the rhizome (underground stem) of the flowering plant *Zingiber officinale*.

Family: Zingiberaceae

Chemical Constituents: Ginger contains many active compounds such as phenols, terpenes, and paradols. In fresh ginger, the main active compound is gingerol, which gives it its unique flavor and medicinal properties.

Uses:

• Acts as an expectorant (helps remove mucus)
• Used in cough syrups
• Helps clear a blocked nose (nasal decongestant)

5. Honey –

Honey is a sweet, thick liquid made by honeybees from the nectar of flowers. There are around 320 types of honey, differing in color, smell, and taste. It mainly contains natural sugars and also includes small amounts of amino acids, vitamins, minerals, iron, zinc, and antioxidants.

Fig. Honey

Botanical Characteristics:

- Scientific Name**:** *Apis mellifera* (the honeybee that produces honey)
- Family: Apidae
- Origin: Honey is made by honeybees from the nectar they collect from flowers.
- Soothes the throat**:** Honey forms a coating on the throat and gives relief from irritation and dry cough.
- Reduces cough: It may help control coughing and can sometimes work better than some cough medicines.
- Helps clear mucus**:** Honey can make mucus thinner, making it easier to cough out.
- Fights infection**:** Because of its antibacterial and antioxidant properties, honey helps prevent infections and reduce throat inflammation.

6. Thyme –

Thyme (*Thymus vulgaris*) is a fragrant herb. Its flowers, leaves, and oil are often used to add flavor to food and for medicinal purposes. Thyme has natural chemicals that can help fight bacterial and fungal infections.

Fig. Thyme

Botanical Overview of Thyme

Scientific Name**:** *Thymus vulgaris*

Family**:** Lamiaceae

Biological Source**:** The dried leaves and flowering tops of *Thymus vulgaris* plant.

Chemical Constituents**:**

Thyme contains important compounds such as thymol, p-cymene, alpha-carvacrol, terpinene, and beta-caryophyllene.

Uses:

- Helps in treating dry and wet cough.
- Acts as an anti-inflammatory and antimicrobial agent.
- Works as an expectorant (helps remove mucus).
- Shows antiviral properties.

7. Fennel –

Fennel (Foeniculum vulgare) Fennel is a plant that belongs to the carrot family. All parts of the plant—bulb, stalks, leaves, and seeds—are edible and have a sweet, licorice-like taste. It originally comes from the Mediterranean region but is now grown all over the world. Fennel is used in many dishes, both raw and cooked, and its dried seeds are used as a spice. It is rich in vitamins, minerals, and fiber and is traditionally used to help with indigestion and stomach pain (colic).

Fig. Fennel

Botanical Overview of Fennel

Scientific Name**:** *Foeniculum vulgare*

Family: Apiaceae (Umbelliferae)

Common Names**:** Fennel, Sweet Fennel, Saunf (Hindi), Florence Fennel

Uses of Fennel:

- Expectorant: Helps loosen and clear mucus from the respiratory tract, making it easier to cough up—useful for colds and bronchitis.
- Anti-inflammatory**:** Contains natural compounds that reduce inflammation in the airways and soothe a sore throat.

8. Cinnamon –

Cinnamon is a spice rich in antioxidants that help protect the body from diseases, inflammation, and early ageing. It may also support good digestion, improve dental health, and help reduce cholesterol and blood pressure levels.

Fig: Cinammon

METHOD OF PREPARATION OF HERBAL COUGH SYRUP:-

- **Preparation of Extract By Decoction method:-**

Weigh accurately each ingredients except honey

⇩

Ingredients are mixed using 500ml water in round bottom flask

⇩

flask attach to the reflex condenser and mixed material was boil under carefully by using water bath for 3 hrs.

⇩

Boil untill total volume become one forth part of solution

⇩

Then liquid extract was cooled and filtered.

➢ **Preparation final cough syrup:-**

To prepared final cough syrup 45% of honey was mixed slowly side by side continous stirring in decoction solution.

⇩

Herbal cough syrup was prepared and use for cough.

EVALUATION OF HERBAL COUGH SYRUP:-

Test	Procedure
Colour	• 5 ml of prepared syrup was taken on a watch glass • Watch glass placed against white background in white tube light. • Colour was observed by naked eyes
Odour	• 2ml of prepared syrup was taken & smelled by individually. • Time interval between 2 smelling was 2 minutes to nullify effect of previous smelling.
Taste	• A pinch of final syrup was taken and examined on taste buds of the tongue.
pH	• 10 ml of prepared syrup taken in 100 ml of volumetric flask. • Make up volume to 100 ml with dist. water. • Sonicated for 10 minutes. • pH was measured by using digital pH meter.
Viscosity	• The viscosity of formulation was determined by using Ostwald's U-tube viscometer.
Density	• Density of formulation was determined by using density bottle.

DISCUSSION:

Herbs have played an important role in improving human health for thousands of years. About 25% of all modern medicines are made from plant substances or their synthetic forms. According to the World Health Organization (WHO), nearly 80% of the world's population—especially in developing countries—still depends on traditional and herbal medicines. Even in developed countries, around half of the population uses herbal remedies. This particular herbal syrup contains Fennel, Honey, Ginger, Vasaka**,** Cinnamon, and Tulsi leaf.

- Vasaka helps in treating chronic bronchitis, asthma, and cough.
- Thyme and Cinnamon help to thin mucus, making it easier to clear.
- Fennel soothes the throat and reduces irritation.
- Tulsi acts as an antiviral agent.

CONCLUSION:

Vasaka and Its Role in Treating Cough Drugs like Vasaka (*Adhatoda vasica* Nees) have shown proven bronchodilator activity, meaning they help widen the airways and make breathing easier. The leaf extract of *Adhatoda vasica* has been traditionally used to manage cough. In recent studies, the leaves and flowers have shown therapeutic effects in relieving cough and reducing airway inflammation. The pharmacological studies also show that Adhatodic acid, a key compound found in *Adhatoda vasica*, helps relieve cough due to the presence of polyphenolic compounds, especially flavonoids. Although cough is a common condition in the general population, its exact prevalence is difficult to determine. Continued clinical and basic research is important to improve the diagnosis, treatment, and prevention of cough in both children and adults.

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