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"Formulation and Evaluation of Herbal Cough Syrup"

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ABSTRACT: Ayurvedic formulations are mainly administered by oral route and most of the orally administered Ayurvedic formulations belong to liquid dosage forms of drug or drug combination. However, Herbal products have to fulfill legal requirements with regard to quality including stability testing. Herbal Syrup is a commonly used and popular dosage form that is used to cure cough, cold, and fever because it has ease of patient compliance. In the present study, Prepared Herbal Syrup contains Ginger macerated honey base and also Tulsi, licorice, neem, amla, cinchona, fennel, peppermint, turmeric, Brahmi, clove, and is used as expectorant and antipyretic.

KEYWORDS: Syrup, Herbal syrup, Formulation, Vasaka, Tulsi, Ginger, Honey, Cinnamon, Lemon.

I. INTRODUCTION

For thousands of years, nature has served as a source for therapeutic agents, and an Astounding number of contemporary medications have been separated from these sources, notably plants, with many of them based on their traditional medical applications. Novel natural product requirements will be optimised utilising medicinal chemistry and combinatorial chemical and biosynthetic technology based on their biological activities to produce efficient chemotherapeutic and other bioactive drugs.[1]

Public interest in natural remedies, particularly herbal therapy, has grown significantly over the past few decades, primarily in industrialized countries but also in developing nations.[2] Patients of all ages frequently experience coughs related to acute and chronic illnesses. Common causes of cough include bacterial or viral infections of the upper respiratory tract, air pollution, smoking, foreign bodies, asthma, and eosinophilic bronchitis. It's possible that treating the cough's etiology alone won't be enough; desensitizing the cough pathways is also crucial.[3] Treatment for a cough relies on the purpose it serves. When a cough points to an underlying sickness, treatment should also make an effort to control, prevent, or stop the condition. This tendency has developed substantially, not only in developing nations but also primarily in industrialized nations.[4,5]

The oral administration of liquid pharmaceuticals has typically been justified on the grounds of simplicity of administration to patients who have difficulty swallowing solid dosage forms. Cough Syrup is a liquid dosage form. Sugar and clean water are condensed together to create syrup. Syrups are distinguished from other types of solutions by their high sugar content. The presence of medication or other flavorings in syrups is debatable. Non-medicated or flavored syrups are ones that contain a flavoring component but no medication. Flavored syrups are frequently employed as delivery systems for unpleasant-tasting pharmaceuticals; the end product is medicated syrup. Syrups frequently have a preservative since the high sugar content makes them vulnerable to contamination. [2,3]

This research article discusses the formulation and evaluation of a multi-herbal anti-tussive syrup made from natural ingredients such as ginger, lemon, honey, vasaka, cinnamon, and tulsi. These herbal remedies, traditionally used as cough suppressants, have been transformed into a syrup form. This multi-herbal syrup is preferable to over-the-counter medications because it is non-toxic, safe, and free from negative side effects on the body. [5,6]

II. MATERIAL AND METHODS

A. Selected ingredientsformulation of herbal syrup :

1. Honey :

Synonym:

Madhu, Madh, Mel, Purified honey.

Biological source:

Honey is a viscid and sweet secretion stored in the honey comb by various species of bees, such as Apis mellifera, Apis dorsata, Apis

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florea, Apis indica and other species of Apis, belonging to the family Apideae (Order: Hymenoptera).

Fig 1 : Honey

Chemical constituents:

The average composition of honey is as follows: Moisture 14–24%, Dextrose 23–36%, Levulose (Fructose) 30–47%, Sucrose 0.4–6%, Dextrin and Gums 0–7% and Ash 0.1–0.8%. Besides, it is found to contain small amounts of essential oil, beeswax, pollen grains, formic acid, acetic acid, succinic acid, maltose, dextrin, colouring pigments, vitamins and an admixture of enzymes, for example, diastase, invertase and inulase.

Use :

Honey shows mild laxative, bactericidal, sedative, antiseptic and alkaline characters. It is used for cold, cough, fever, sore eye and throat, tongue and duodenal ulcers, liver disorders, constipation, diarrhoea, kidney and other urinary disorders, pulmonary tuberculosis, marasmus, rickets, scurvy and insomnia.

2. Ginger :

Synonym :

Rhizomazingiberis, Zingibere

Biological source :

Ginger consists of the dried rhizomes of the Zingiber officinale Roscoe, belonging to family Zingiberaceae.

Fig 2 : Ginger

Chemical constituents :

Ginger contains 1 to 2% volatile oil, 5 to 8% pungent resinous mass and starch. The volatile oil is responsible for the aromatic odour and the pungency of the drug is due to the yellowish oily body called gingerol which is odourless. Volatile oil is composed of sesquiterpene hydrocarbon like α-zingiberol; α-sesquiterpene alcohol α-bisabolene, α-farnesene, α-sesquiphellandrene.

Uses :

Ginger is used as an antiemetic, positive inotropic, spasmolytic, aromatic stimulant, carminative, condiment, and flavouring agent. It is prescribed in dyspepsia, flatulent colic, vomiting spasms, as an adjunct to many tonic and stimulating remedies, for painful affections of the stomach, cold, cough, and asthma.

3. Tulsi:

Synonym: Sacred basil, Holy basil

Biological source:

Tulsi consists of fresh and dried leaves of Ocimum sanctum Linn., belonging to the family Labiatae.

Fig 3: Tulsi

Chemical constituents:

It contains approximately 70% eugenol, carvacrol (3%), and eugenol-methyl-ether (20%). It also contains caryophyl-lin. Seeds contain fixed oil with good drying properties. The plant is also reported to contain alkaloids, glycosides, saponin, tannins, an appreciable amount of vitamin C and traces of maleic, citric, and tartaric acid.

Uses :

The fresh leaves, its juice and volatile oil are used for various purposes. The oil is antibacterial and insecticidal. The leaves are used as stimulant, aromatic, spasmolytic, and diaphoretic. The juice is used as an antiperiodic and as a constituent of several preparations for skin diseases and also to cure earache. Infusion of the

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leaves is used as a stomachic. The drug is a good immunomodulatory agent.

4. Lemon:
Synonym:
Citrus limon

Biological source:
Lemon is the fruits obtained from citrus limon.

Fig 4: Lemon

Family :
Rutaceae

Chemical constituents:
It includes flavonoids and also other compounds such as phenolic acids , carboxylic acid , aminoacids , and vitamins.

Uses :
Lemon is primarily used for its vitamin C nutritional value and potassium content. Intake of citrus fruit reduces the risk of various diseases. They have antioxidant, antimicrobial, antibacterial, antifungal, anti-inflammatory, anticancer, hepatoregenerating and cardioprotective activities.

5.Vasaka:
Synonym**:** adulsa, Malabar nut, adhatoda, and va

Biological Source:
Also known as Adhatoda vasica or Malabarnut. It belongs to the Acanthaceae Family The biological source of vasaca is dried and fresh leaves of this plant.

Fig 5: Vasaka

Use:
Respiratory ailments: Vasaka is used to treat colds, coughs, asthma, and bronchitis. It can also help with sinusitis and sore throats.

B. Formula table:

Srno.	Ingredient	Quantity taken
1.	Vasaka	8 ml
2.	Tulsi	5 ml
3.	Ginger	5 ml
4.	Honey	25 ml
5.	Cinnamon	5 ml
6.	Lemon	2 ml

C. Method of preparation for herbal syrup:
Herbal syrup is prepared by using the following steps
Step 1: Method of preparation of decoction
The initial stage in studying medicinal plant is the preparation of plant samples to preserve thebiomolecules in the plants prior to extraction. Plants samples such as leaves,barks,roots,fruitsandflowerscan beextractedfrom freshordriedplant materialssuchasgrindinganddryingalsoinfluencesthe preservationof phytochemicals in the final extracts.

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A. ExtractionofGinger:

Soxhlation method:

Fresh ginger

⇩

Cleaned ginger

⇩

Chopping

⇩

Ginger slice

⇩

Soxh let extraction Heating temperature: 80c

⇩

Heating time 2 hours

⇩

Ratio: 50gm of ginger and2 00ml of solvent(ethanol)

⇩

Sample

⇩

Distillation

⇩

Gingeroil collected

B. ExtractionofVasaka:

- 100 gm of fresh leaves were crushed using motor and pestal and 100 ml of distilled water added to it and it was subjected to heat at 121 degrees of the (15ib pressure) for 30 min. The steamed material was taken in a 4 layered muslin cloth and squeezed in order to obtain juice out of it. The juice obtained was measured and this sample was coded as vasaka juice.

C. **Extraction of Tulsi:**

50gm of dried tulsi leaves

⇩

Placed into the extraction tumble

⇩

Boiling chips were added in RBF

⇩

350 ml of ethanol poured in round bottom flask

⇩

Soxhlet heated at 700C for 6 hours.

⇩

Sample Distillation

⇩

Tulsi oil collected

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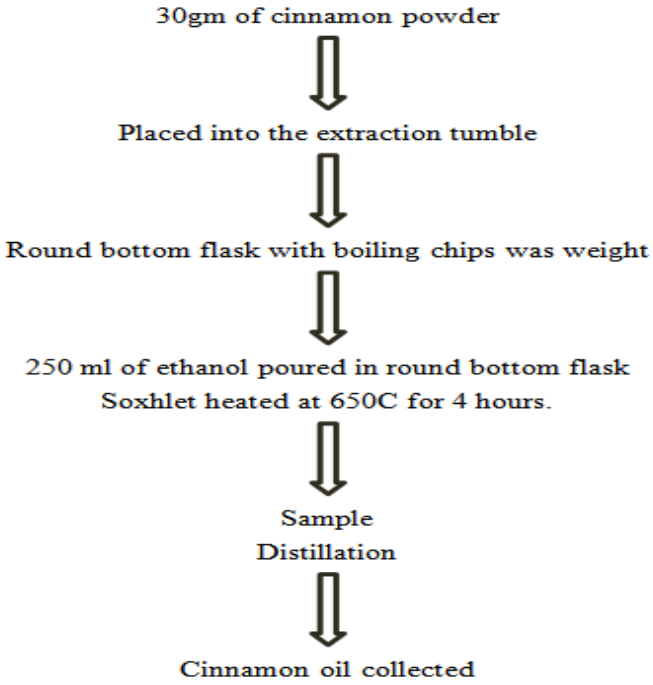
D. Extraction of Cinnamon:



Step 2: Method of preparation of herbal syrup :

- To prepared final herbal syrup 16ml of Pudina decoction and 17ml of Tulsi or 17ml of cinnamon decoction was added ad 50% of honey preservative was mixed slowly by side by side continually stirring .The final herbal syrup was prepared and then subjected for evaluation. The herbal syrup was prepared and solubility was checking by observing clarity of Solution visually.

Table 1: Formulation No.1 (F1) – For 50ml

Sr no.	Ingredient	% of Extract added
1.	Vasaka	18 %
2.	Tulsi	8 %
3.	Ginger	7 %
4.	Honey	50 %
5.	Cinnamon	12 %
6.	Lemon	5 %

Table 2: Formulation No.2 (F2) – For 50ml

Sr no.	Ingredient	% of Extract added
1.	Vasaka	17 %
2.	Tulsi	7 %
3.	Ginger	9 %
4.	Honey	50 %
5.	Cinnamon	13 %
6.	Lemon	4 %

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Table 3: Formulation No.3 (F3) – For 50ml

Sr no.	Ingredient	% of Extract added
1.	Vasaka	15 %
2.	Tulsi	9 %
3.	Ginger	9 %
4.	Honey	50 %
5.	Cinnamon	12 %
6.	Lemon	5 %

III. EVALUATION :

Physical evaluation:

Colour examination:

Five ml final syrup was taken into watch Glass 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.

Test examination:

A pinch of final syrup was taken and examined for its taste on taste buds of the tongue. Or simply a pinch of syrup was put on tip off tongue for determining test.

Physicochemical parameter:

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.

Determining of viscosity of syrup:

The viscosity of the syrup was determined by using viscometer mainly capillary viscometer, the average viscosity of any syrup at 21-30°c temperature is 700-1300 centipoise or cp, the determined viscosity of syrup was 880cp.

Determination of density:

The density of syrup can be determined by using the specific gravity of bottle. Clean the specific gravity bottle thoroughly with chromic acid or nitric acid. With the distilled water rinse the bottle for two to three times. Note the weight of the empty dry bottle with the capillary tube stopper (w1). Now fill the bottle with an unknown liquid and place the stopper and wipe of the excess liquid outside the bottle with the unknown liquid in analytical balance (w2). Finally, calculate the weight in grams of unknown liquid.

Visual inspection:

With the visual inspection, the ingredient & the final product are carefully examined for purity &for appearance Physical appearance of the product for patient adherence compliance is critical so that it should be good looking & elegance in appearance.

IV. RESULT :

Srno.	Parameter	Batch F1	Batch F2	Batch F3
1.	Color	Yellowish Brown	Pale Brown	Yellowish Brown
2.	Odour	Aromatic	Aromatic	Aromatic
3.	Test	Slightly Pungent	Pungent	Slightly Pungent
4.	pH	6.2	6.0	6.2
5.	Viscosity	0.9963 cp	0.9746 cp	1.04
6.	Density	1.30	1.29	1.30
7.	Stability	Stable at Room Temperature	Stable at Room Temperature	Stable at Room Temperature

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V. CONCLUSION :

The present study concludes that a comprehensive view of herbal remedies for treating cough—both as crude drugs and as polyherbal formulations—serves as an effective alternative to modern cough medicines, which often have numerous side effects. In this research, a polyherbal anti-tussive syrup was formulated and prepared using medicinal plants such as ginger, cinnamon, Vasaka, tulsi, lemon, and honey, and it was successfully evaluated.

The syrup's characteristics—including color, odor, taste, pH, and viscosity—were found to be satisfactory across all formulations. Notably, the formulation containing 50% w/v honey not only met pharmacopoeial standards but also had an appropriate concentration of honey, which is recognized for its therapeutic benefits. Additionally, the inclusion of an effective preservative ensured the syrup's stability and safety over time.

This study significantly advances the development of an effective and safe herbal cough syrup that utilizes honey as a primary ingredient. The incorporation of honey not only improves the syrup's taste but also enhances its soothing properties, making it a preferred choice for cough relief. Overall, the findings suggest that this formulation could be a more valuable option among herbal medicinal products.

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