

A Review Article on Formulation And Evaluation of Herbal Cough Syrup

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Abstract: *The majority of oral Ayurvedic formulations are for liquid dose forms of drugs or medicinal combinations. Oral Ayurvedic formulations are mostly administered by mouth. Herbal goods must, nevertheless, meet all legal standards for quality, including stability testing. Since herbal syrup is easy for patients to take, it is a widely used and well-liked dosage form for treating fever, cough, and colds. The prepared herbal syrup in this study contains ginger macerated in a honey basis, along with other ingredients that are used as expectorants and antipyretics, such as tulsi, licorice, neem, amla, cinchona, fennel, peppermint, turmeric, brahmi, and clove. Density, specific gravity, pH, and other organoleptic properties were among the pre- and post-formulation criteria used to assess the final herbal syrup's quality. The final herbal syrup's stability research revealed that, over the course of 24 hours, no changes were seen in any of the physicochemical parameters that were studied, nor in the turbidity or homogeneity.*

Keywords: Cough, Herbal Syrup, Herbal formulation, Herbal treatment

Factors affecting quality of herbals :-

Atmospheric Factors:

1. Exogenous Factors:

Climate and Light: Plant should be cultivated in conditions which are similar to the plant's natural habitat. Hence climate that is temperature, rainfall and length of day, plays an important role in the growth of plants. Different crops require different climatic patterns. Most of the plants can grow well in sunny, dry conditions.

Latitude and Altitude: The effect of latitude is important in fat producing plants. Tropical plants (palm oil, cocoa butter) contain mainly saturated fatty acids, while the subtropical plants give a larger amount of unsaturated acids. The olive, almond and sesame oils are predominant in oleic acid. The plants of temperate zones (Cottonseed, sunflower) also contain more unsaturated acids. Peanut and olive trees grown in the subtropics have a higher unsaturated fat content.

Endogenous Factors :-

Genetic factors:

(1) Morphological markers, which themselves are phenotypic traits or characters.

(2) Biochemical markers, which include allelic variants of enzymes called isozymes.

(3) DNA markers, which reveal sites of variation in DNA. They are of three types: RFLP (Restriction Fragment Length Polymorphism), polymerase chain reaction based on RAPD (Random Amplified Polymorphic DNA) and DNA sequence based on SNP (Single Nucleotide Polymorphism).(4)

I. INTRODUCTION

Herbal medicine is also known as phyto-medicine or herbalism it is a medicine that use plants or their crude products for the treatment of diseases. It may include also animal fungi or bacteria product. Since ancient era, herbal or plant-based medicines has been used for the prevention, cure & mitigation of diseases and time to time more and more herbal constituents of these natural sources are get enhanced.

The history of herbal medicine dates back to ancient societies.

It entails using plants medicinally to treat illnesses and improve overall health and wellness. Certain plants should be taken with the same caution as pharmaceutical drugs due to their strong (powerful) components. In actuality, a large number of pharmaceutical drugs are manufactured clones of naturally occurring plant-based molecules. For example, the foxglove plant was the source of the cardiac medication digitalis. The goal of herbal medicine is to help the body find its natural equilibrium again so that it can cure itself. Various herbs affect the body's systems in different ways.

Herbal medicine system beneficial over Allopathy system:

Although allopathy has been the most acceptable system of medicine over the years, people are now shifting back to the utilization of herbal medicine. This is due to the setbacks of allopathic medicine like it is very expensive, it has serious and frustrating side effects, its relief from ailments is only symptomatic and fear of toxicity to allopathy drugs. Herbal medicine like Ayurveda and Homeopathy are preferred in the treatment of chronic diseases because of the characteristic features of Ayurveda like it is less costly and more sensible, exactly aligns with the patient's thoughts, more easily accessible, time tested, it's said to be more natural and safer and it is thought to have fewer or no negative effects.

Herbal cough syrup

A herbal syrup is prepared by combining a concentrated decoction with either honey or sugar, and sometimes alcohol. Herbal plants and formulations are utilized to treat a wide range of illnesses, including cough syrup and numerous other illnesses. Herbal cough syrup ingredients include tulsi, cinnamon, cloves, pudina, and adulsa.

Types of herbal syrup

- Flavored syrup
- Medicated syrup
- Artificial syrup

Advantages of cough syrup

- No side effect
- Low cost
- Easily available
- No harmless
- Herbs grow in common place

Disadvantages of cough syrup

- Not suitable in emergency and for unconscious patients.
- Suspension must be packed in unit dosage forms in order to achieve dose precision.
- The same microbiological contamination occurs when preservation is not applied in the proper ratio.
- Fluctuation in storage temperature may cause crystallization of sucrose from saturated syrup.(12)

Types of the cough

Cough is classified depending upon duration, character and type.

A. Depending upon type

There are two forms of cough: dry cough and wet cough, depending on the type. Symptoms and indicators are used to identify this.

1. Dry cough

- A productive and powerful cough
- Symptoms related to dry cough

- i. delicate throat
- ii. Not discharged mucus
- iii. Cough that is brief, dry, and frequent comes on often
- iv. Constant or persistent tickling
- Medicine: Cough suppressant and antitussive.

2. Wet cough

- An infectious cough that is ineffective
- Signs associated with wet cough
 - i. Coughs up phlegm
 - ii. Wheezing
 - iii. Chest tightness
 - iv. Difficulty in breathing .
- Medicine: Expectorant.

Herbal treatment for cough

The most preferred treatment for cough is herbal treatment. Herbal remedies are significantly contributing to the advancement of the medical field. 2. Herbal remedies are used to treat a variety of minor to severe illnesses, such as viral infections, renal diseases, lung cancer, diabetes, allergies, asthma, TB, cough, pneumonia, and kidney problems. As previously said, according to WHO estimates, 80% of the population even uses herbal medications for basic medical needs. Traditionally, medicinal herbs have been employed as primary healthcare agents, particularly in Asian nations. 31 Herbal medications are primarily used to treat chronic illnesses rather than life-threatening ones and to promote wellness.

2. Many adverse effects, including nausea, vomiting, sedation, allergies, respiratory tract infections, changes in appetite, irritability, sleepiness, and addiction can result from using synthetic medication treatments, which account for the majority of cases.(3)

II. MATERIAL

1. FENNEL



Figure .1 Fennel

Synonyms:-

Large Fennel, Sweet Fennel, Fennel fruit, Saunf (Hindi); Fructus Foeniculi.

Biological source:-

Fennel is the dried, ripe fruits of *Foeniculum vulgare* Mill. (Family: Apiaceae).

Geographical source:-

Fennel is indigenous to Mediterranean region of Asia and Europe. It is widely cultivated in Russia, India, Japan, southern Europe, China and Egypt.

Chemical constituents:-

Fennel contains volatile oil (2-6.5%) and fixed oil (12%). The main constituent of The fruit's unique flavor and aroma are provided by the phenolic ether, anethole (50–60%), and the ketone, fenchone (18–20%), which also include anisic aldehyde, anisic acid, apinene, dipentene, and phellandrene.

Uses:

Fennel is used as stimulant, aromatic, stomachic, carminative, and expectorant. Anethole is used in mouth and dental preparations. Fennel is used in diseases of the chest, spleen and kidney.

2. CLOVE



Figure 2. Clove Buds

Synonyms:-

Caryophyllus, Clove buds, Caryophyllum; Caryophylli; Laung (Hindi).

Biological source:

Cloves are the dried flower buds of *Eugenia caryophyllata* Thumb (Syn. *Syzygium aromaticum*). (Family: Myrtaceae).

Geographical source:-

The clove tree is a Moluccan native. It is cultivated in Zanzibar, Sumatra, South America, West Indies, Brazil, Pemba, Ambon, Madagascar, Mauritius, Tanzania, Sri Lanka and South India.

Chemical Constituents: -

Clove oil has a volatile content of 14–21%. Eugenol, acetyl eugenol, gallotannic acid, two crystalline principles (α - and β -caryophyllenes), methyl furfural, gum, resin, and fiber are the other ingredients. Eugenol is a white liquid, while caryophylline is an odorless component that looks to be a phytosterol as well. Clove oil's analgesic and antibacterial qualities stem from its 60–90% eugenol content.

Uses:

Used for upset stomach and as an expectorant clove is used for diarrhea hernia and bad breath.

3. TULSI



Figure 3 Tulsi Leaves

Synonyms:-

Sacred basil, Holy basil

Biological Source:-

Tulsi consists of fresh and dried leaves of *Ocimum sanctum* Linn. (Syn. *Ocimum tenuiflorum*) family Lamiaceae, and contains not less than 0.40 per cent eugenol on dried basis.

Geographical Source:-

It is herbaceous, multi branched annual plant found throughout India. It is considered as sacred by Hindus. The plant is typically grown in gardens and in close proximity to temples. Tulsi is currently farmed commercially for its volatile oil, and it is propagated by seeds.

Chemical constituents:-

About 70% of it is made up of eugenol, 3% is carvacrol, and 20% is eugenol methyl ether. It has caryophyllin as well. Fixed oil with strong drying qualities is found in seeds.

Uses:

It is an insecticidal and antibacterial oil. The leaves have diaphoretic, antitarrhal, fragrant, stimulating, and spasmolytic properties. The juice has antiperiodic properties.

Tulsi possesses anti-inflammatory and expectorant qualities.

4. TURMERIC



Figure 4. Turmeric rhizomes

Synonyms: Curcuma

Biological source:-

Turmeric is prepared rhizome of *Curcuma longa* Linn. (Zingiberaceae). It is perennial herb of ginger family, having thick rhizome; origins in Southern Asia; widely grown in China and India Indonesia and other tropical countries.

Chemical Constituents:-

Turmeric contains 3-7% orange-yellow colored volatile oil which is mainly composed of turmerone (60%), α , β -atlantone and zingiberene (25%) with minor amounts of 1,8 cineole, aphellandrene, d sabinene and borneol. Others than above it contains yellow coloring matter including 0.3-5.4%.

Uses:

It is used as an antioxidant in capsules tablets and flavouring tea. It is advised. as a food supplement to treat liver problems menstrual difficulties hi marej test pain etc.

5. ADULSA



Figure 5. Adulsa Leaves

Synonyms:- Malabar nut, Adhatodavasica

Biological source:-

The fresh and dried leaves of this plant are the biological source of vasaka.

It is a member of the Acanthaceae family.

Chemical constituents:-

Vasaka's chemical components are flavonoids and alkalis tannins. Serpent glucoside and sugar. Osaka leaves have a high concentration of vitamin C. These plants have peganine, basil, and vasicinolone in their roots(4).

Uses:-

utilized as an expectorant. It is used to alleviate vomiting and thirst in leprosy blood disorders. It's applied to infertility treatment. It has anti-ulcer properties as well.(12)

6.GINGER



Figure 6. Ginger

Synonyms: Zingibere, Rhizomazingiberis, Ginger Officinale, and Gingerin

Biological source:-

The rhizomes of *Zingiberofficinale*, Roscose, and sun-dried are what make up ginger.

Chemical constituents:-

It has a variety of ingredients, including fiber, resinous matter, starch, moisture, fat, and volatile oil. The oil comprises phenyl propanoids, oxygenated terpene derivatives, and hydrocarbons (monoterpene and sesquiterpene). In addition to these chemicals, the medicine also contains α -zingiberene, β -sesquiphellandrene, α -curcumene, β -bisabolene, α -farnesene, geranial, and citral.

Uses:-

It has flavoring, carminative, aromatic, stimulating, and stomachic properties. Its oil is used to make liquor, drinks, and mouthwashes. Ginger inhibits parasite diseases and has molluscicidal properties. Additionally, it inhibits nausea and gastrointestinal symptoms. It raises stomach motility and leads to the adsorption of poisons. Additionally, it works well to manage postoperative nausea and vomiting as well as the symptoms of hyperemesis gravidarum. In addition, ginger has antibacterial, anthelmintic, fungicidal, analgesic, antipyretic, antitussive, cardiovascular, and antiulcer properties. It also inhibits platelet aggregation. Ginger that has been coated in lime to enhance its color and quality is known as limes ginger. It is primarily done to store ginger for a long time.(12)

7. Honey



Figure 7.Honey

Synonyms:- Madhu, Clarified Honey, Strained Honey, mel

Biological source:-

Honey is a saccharine secretion produced from the nectar of flowers and accumulated in the honeycomb by the Honeybee, *Apis mellifica* Linn. (Family Apidae).

Chemical constituents:-

35 to 40 percent sucrose, 35 to 40 percent levulose, 15 to 20 percent water, and 35 to 40 percent dextrose are all present in honey. Pollen grains, volatile oil, dextrin, and wax are also present in trace amounts.

Uses:-

Honey has long been used to cure conditions affecting the eyes, bronchial asthma, throat infections, tuberculosis, lethargy, dizziness, hepatitis, constipation, worm infestation, piles, eczema, and wounds. used as a nutritious supplement.

8. Cinnamon

Synonyms: Ceylon cinnamon

Biological source:-

The source of cinnamon bark and leaf oils, is an indigenous tree of Sri Lanka, although most oil now comes from cultivated areas. *C. zeylanicum* is a significant spice and aromatic crop with a variety of uses in medicine, flavoring, drinks, and perfumery.



Figure 8. Cinnamon

Chemical Constituents:-

Cinnamon bark contains polycyclic diterpenes and proanthocyanidin oligomers. It has 0.5 to 1 percent volatile oils, 1.2 percent phlobatannins, starch, mannitol (which gives it a sweetish taste), mucilage, and calcium oxalate.

The light yellow-colored cinnamon oil produced by the distillation process turns reddish-brown when stored.

Uses:-

The medication has the following uses: carminative, stomachic, astringent, aromatic stimulant, antibacterial, antifungal, and antiseptic. It is also used commercially as a spice, condiment, in the making of candies, dentrifices, and perfumes. Food technology and urinary infections both employ cinnamon oil. Skin and mucous membranes are irritated by cinnamon oil and cinnamaldehyde. They result in allergic reactions such as lip and facial edema or urticaria. (4)

9. Mentha:-

Synonyms:-

Peppermint, *Oleum mentha Piperita*, Mint,

Biological source:-

Mentha oil is obtained by steam distillation of flowering tops of *Mentha piperita* Linn.



Figure 9. Mentha

Chemical Constituents:-

The primary ingredient is l-menthol, either in an ester or free form. Three types of peppermint exist: the American variety, which has an 80% menthol content, the Japanese variation, which has a 70–90% menthol content, and the Indian variety, which has a 70% menthol content. Menthofuran, menthone, jasmone, menthyl acetate, menthylisovalerate, and other derivatives such as cineole, limonene, isopulegone, camphene, pinene, jasmine, and esters (which have a nice smell) are additional significant ingredients.

Because of resinification, methylfuran is the cause of the unpleasant odor.

Uses:-

The oil has antibacterial, stimulating, flavoring, and carminative properties. It is utilized in the making of toothpaste, tooth powder, shaving cream, chewing gum, candies, jellies, perfumes, and essences in addition to the pharmaceutical and cosmetic industries.

Mentha oil also has numerous medicinal benefits, including those as an antitussive, smooth muscle relaxant, digestant, anti-inflammatory, and anti-ulcer. It is utilized in the production of lozenges and topical preparations.(3)

III. METHOD OF PREPRATION

As indicated in Table 1 and Figure 1, herbal components are used to formulate a herbal syrup for the treatment of cough.

Table 1: List of ingredients used for herbal cough syrup

Sr. No.	Ingredient	Botanical Name
1	Ginger	Zingiberofficinale
2	Tulsi	Ocimumtenuiflorum
3	Cinnamon	Cinnamomumverum
4	Turmeric	Curcuma longa
5	Honey	Apismellifera
6	Peppermint	Menthe piperita L.
7	Adulsa	Justiciaadhatoda
8	Clove	Syzygiumaromaticum
9	Fennel	Foeniculumvulgare

(1)

Formulation Table:

As indicated in Table 2, three formulations of herbal cough syrup were created.

Table 2: List of herbal ingredients with quantity and use.

Sr. No	Ingredients	Quantity	Use
1.	Ginger	2-3 gm	Antitussive, Expectorant
2.	Tulsi	15-20 leaves	Antitussive, Expectorant
3.	Cinnamon	2 gm	Aromatic, Expectorant
4.	Turmeric	1-2 gm	Antitussive
5.	Honey	35%	Base, Viscosity modifiers, sweetener
6.	Peppermint	2 gm	Pain reliever
7.	Adulsa	3 gm	Antitussive
8.	Clove	2 gm	Expectorant
9.	Fennel	2 gm	Digestive , stimulant



Figure 1: Herbal ingredients used for preparation for herbal cough syrup.

PROCEDURE:

The decoction method was used to prepare the herbal cough syrup.

The steps involved in making herbal cough syrup are illustrated in Chart 1.

Chart1: Method of preparation decoction.

Take some quantity of each herbal ingredients



Herbs are mixed in 500 ml of water



Attach reflux condenser and boil material carefully by using water bath for 3 hours



Boil until the entire volume equals one-fourth of the preceding



After cooling, the liquid was filtered away.

(13)



(1)

Figure 2 (1,2) : Extraction process(decoction)



(2)

Figure 2 (1,2) : Extraction process(decoction)



<p>Composition: Each 120 ml contains: Ginger 2-3 gm Tulsi 10-15 leaves Cinnamon 2 gm Turmeric 1-2 gm Honey 35% Peppermint 2gm Adulsa 3 gm Clove 2 gm Fennel 2 gm Shake well before use. Keep all medicines out of reach of children. Storage: Store in a cool, dry & dark Place at below 25° C</p>	 <p>HERBAL COUGH SYRUP 120 ml NATURAL HEALTH SUPPORT NUTRACEUTICAL PRODUCT</p>	 <p>FssaiLic. No.: 2026203823049 Net Volume: 120 ml Batch No.: BP2026S MRP : 90.56 Rs (Inc. Of All Taxes) Mfg Date : 01 / 2024 Exp Date : 3 Years From MfgDt Dose: Children: 1 Teaspoonful Three Time a day Adult: 2 Teaspoonful Three Time a day Mfg.by Tushar Pawar Rashtriya College Of Pharmacy, Hatnoor, Kannad ,Chh. Sambhajinagar, India-431103,</p>
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Figure 3: Well, labeled herbal cough syrup formulation.

IV. RESULT AND DISCUSSION

Evaluation Parameters

Table 3: Evaluation parameters of drug

Sr. No.	Test	Procedure
1	Colour Examination	2ml of I poured syrup into a watch glass. The watch glass was repositioned. white backdrop illuminated by a white tube light iii. The color was noted.
2	Odour Examination	2ml of prepared syrup was taken and smelled by an individual. The Two minutes passed between each scent in order to offset the effects of the preceding scent.
3	Taste Examination	A small amount of the finished syrup was obtained and tested on the tongue's test buds.
4	pH Determination	i. A 100 ml volumetric flask was filled with 10 ml of the prepared syrup. ii. Use distilled water to make up to 100ml of makeup. 3. Sonicate for ten minutes. iv. A digital pH meter was used to measure the pH.

(13)

Pre formulation studies:

Table 4: Physicochemical constituents of crude drug

Sr. No	Test	Result (%)
1	Moisture content	1.4
2	Ethanol soluble extractive	11.9
3	Water soluble extractive	13.1

Following post Formulation Studies:

Table 5: Formulated herbal cough syrup's physicochemical properties

Formulations	Colour	Odour	Taste	PH	Viscosity
Harbal Syrup	Yellowish brown	Aromatic	Sweet	6.1	0.0132

1. Color:

It was discovered that the herbal cough syrup formulation had a yellowish-brown color. The color findings of the syrup formulation batches are displayed in Table 5.

2. Odour:

The results for the odour of the cough syrup formulation batches are displayed in Table 5. For formed batches, the formulation odor was fragrant.

3. Taste:

The outcomes of the cough syrup formulation batches' tastes are displayed in Table 5. For formed batches, the formulation tasted sweet.

4. pH:

The results of the formulation batches of cough syrup are displayed in Table 5. The formulation's pH is 6.1 for each batch of formulation.

5. Viscosity:

The results of the formulation batches of cough syrup are displayed in Table 5. The formulation's viscosity is (13)

V. CONCLUSION

The aim of this project was to formulate and evaluate herbal cough syrup. The current study has improved our understanding of what a cough actually is, the various sorts of coughs, and the factors that contribute to coughing. A brief analysis of herbal cough remedies was conducted. According to the study, allopathic treatment, which employs traditional medications for treatment, is less effective than herbal treatment since herbal medications have fewer or no adverse effects. Treatments with herbs are more commonly chosen. 11 Prescription medications are more difficult to obtain than herbal remedies. This work contributes to our understanding of cough and preventative actions. All three formulations' pre-formulation investigations met specifications. Three formulations were made, and tests for pH, color, odor, and taste were conducted. The present study will help us to understand effectiveness of herbal cough syrup compared to chemical- based syrups.

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