

Development and Assessment of Jaggery Based Herbal Cough Syrup Containing Clove

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ABSTRACT

One of the most widely used over-the-counter medications in the world is cough medicine. Recent research, however, indicates that there is little proof of the efficacy of many comparable treatments. For the treatment of colds and coughs, syrups are a popular and practical dose form. In this study, we created a herbal cough syrup using a foundation of peppermint oil, methyl paraben, and jaggery, as well as a decoction of medicinal herbs such ginger, tulsi, liquorice, black pepper, fennel, peppermint, and clove. The decoction process, which involves boiling the herbs to extract their active ingredients, was used to make the herbal cough syrup. In addition to thickening the syrup, combining this herbal infusion with a jaggery base prolongs its shelf life. Jaggery, a natural sweetener, improves the syrup's flavor and makes it more palatable, especially for people who might not like the taste of some herbs. The main goal of this study is to create a herbal cough syrup and evaluate its turbidity, color, odor, and taste. Accelerated stability testing will be used to track any changes. Color, odor, taste, pH, and viscosity were among the physical characteristics used to assess the final syrup's quality. Because of its expectorant qualities, clove oil is used to treat a variety of respiratory ailments, including bronchitis, asthma, colds, coughs, and other upper respiratory disorders.

Keywords: Jaggery, Cough Syrup, Clove

INTRODUCTION

A decoction of herbal components was combined with jaggery as a foundation to create the herbal cough syrup. The decoction procedure, which involves boiling herbal extracts to release their active ingredients, was used to create this syrup. The decoction's shelf life is increased by thickening it and preserving its qualities by combining it with jaggery. Furthermore, several herbal components that could normally have a disagreeable taste or odor are made more palatable by jaggery, a natural sweetener. [1] The taste and aroma of herbal ingredients can sometimes be off-putting. [2] It is crucial to analyze the solubility of active Compounds [3] In tropical Asia, spices are frequently added to teas to help with coughing [4]; clove oil, in particular, is an expectorant and is used to treat a variety of respiratory disorders, including bronchitis, colds, cough, asthma, and other upper respiratory conditions [5]. A cough is an abrupt, frequently recurring activity that aids in the removal of mucus, allergens, foreign objects, and microbes from the respiratory tract. The brain detects the presence of a foreign substance and instructs the body

to cough in order to eliminate it when the throat or upper airways become obstructed or irritated. Coughing is typically a natural reflex. It aids in clearing the throat of irritants like phlegm. On the other hand, chronic coughing may occasionally be a sign of an underlying illness. Three steps make up the cough reflex: inhaling, forcing out air against a closed glottis, and finally forcing air out of the lungs when the glottis opens, usually making a loud sound. Both voluntary and involuntary coughing are possible [6]. Chest pain, congestion, and an itchy throat are typical signs of a cough. Coughing repeatedly can irritate the body, which can lead to inflammation and more coughing. [7, 8] The creation of synthetic pharmaceuticals frequently involves the use of natural materials or molecules derived from them [9]. Manufacturers frequently choose insoluble forms of antibiotics, including suspensions or dry powders that may be reconstituted, for improved stability because many antibiotics become unstable in liquid form over time. [10] Numerous bacteria, viruses, and microbes frequently produce coughing, which can aid in the transfer of illnesses to new hosts. Although

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

respiratory tract infections are the most common cause of irregular coughing, other causes include choking, smoking, air pollution, asthma, GERD, post-nasal drip, chronic bronchitis, lung tumors, heart failure, and drugs like angiotensin-converting enzyme (ACE) inhibitors. [11] Asthma, persistent cough, idiopathic pulmonary fibrosis, chronic obstructive pulmonary disease (COPD), and cystic fibrosis are among the respiratory disorders that are associated with GERD. [12] Asthma, GERD, eosinophilic bronchitis, and post-nasal drip account for more than 90% of cases of persistent cough in people that continue longer than eight weeks. [13] To suppress cough, a variety of drugs are used, frequently in combination. Before talking about particular medications, it's critical to comprehend how coughing works, how it contributes to illnesses, and whether it's advantageous to suppress it [14].

Type of cough:

1. Dry cough
2. Wet cough

Cough classification:

1. **An acute cough:** that goes away after three weeks
2. **Chronic cough:** Lasts longer than three weeks.
3. **Dry cough:** No secretions or mucus are present.
4. **Wet cough:** accompanied by discharge or mucus.
5. **A cough that originates:** in the chest and throat may or may not be productive.
6. **Paroxysmal cough:** abrupt, frequent episodes of coughing.
7. **Bovine cough:** a quiet cough brought on by laryngeal paralysis.
8. **A habitual cough:** that is utilized to get attention is known as psychogenic cough.

Benefits of herbal remedies:

1. Safe for Use
2. Reasonably priced

3. No negative consequences.
4. Herbs discovered in public spaces
5. Easily accessible
6. No Need for a Prescription

Herbal remedies include the following drawbacks:

1. Unfavorable interactions with prescription drugs
2. Infrequent Risk of Herbal Self-Dosage
3. The effectiveness of herbal medicines is not thoroughly investigated in laboratories, which causes results to be delayed.

Method of preparing Jaggery Syrup:

The process of making jaggery syrup involved dissolving 40 grams of jaggery in 100 milliliters of water. After that, the mixture was filtered. Additionally, the resultant jaggery syrup served as a medium.

Procedure for making herbal cough syrup:

1. The necessary amount of crude herbs was measured.
2. After adding enough water to the water bath, the herbs were cooked until only one-third of the liquid was left.
3. Different conc. (40 percent w/v) syrup solutions were made.
4. The jaggery solution was made after the herbal extract was filtered.
5. With constant stirring, the filtered herbal extract was progressively mixed with the jaggery solution.
6. After adjusting the final volume to 100 ml and adding taste and preservatives, the mixture was assessed. [15]

Equipments and Materials:

Table: 1 Material

Sr.No.	Material No	Material Uses
•	Clove [API]	Expectorant
•	Jaggery	Base
•	Tulasi	Anti-tussive
•	Fennel	Flavouring agent
•	Black Pepper	Preservative



Figure: 1

Table: 2 Equipment

Sr.No.	Ingredients	Q.T (50ml)	Q.G. (30ml)	Uses
1.	Ginger	8.2 ml	4.6 ml	Anti-inflammatory
2.	Tulsi	3.1ml	1.6 ml	Antitussive
3.	Black pepper	4.2ml	2.1 ml	Preservative
4.	Fennel	6.5ml	3.2 ml	Flavoring agent
5.	Peppermint	6.7 ml	3.1 ml	Cooling agent
6.	Clove	4.2 ml	3.0 ml	Expectorant
7.	Liquorice	5.8 ml	3.6 ml	Anti - inflammatory
8.	Jaggery	9.2 ml	7.1 ml	Base

Table 3: Formula

Sr.No.	Equipment
1	UV-Spectrometer
2	pH meter
3	Colorimeter
4	Centrifuge
5	IR
6	Chromatography



Figure: 2

Making a cough syrup with herbs:

1. Every herb was consumed separately.
2. 500 milliliters of water were mixed with the herbs.

3. After cooling and filtering, the mixture was heated until the overall volume dropped to $\frac{1}{4}$.
4. The final syrup was made using the filter.

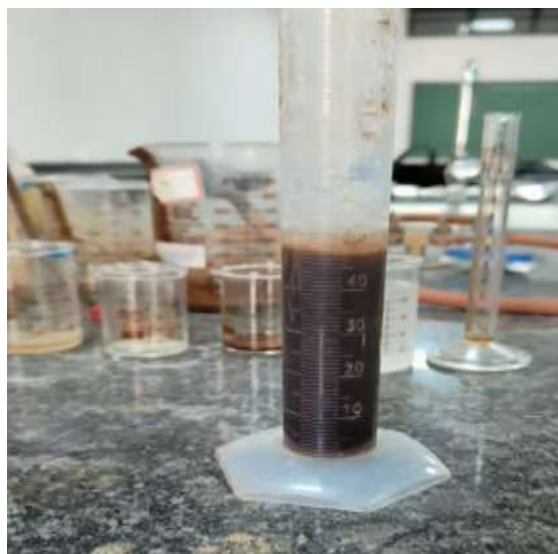


Figure 3:



Figure 4:

Formulation Evaluation parameters -

Color examination:

1. Two milliliters of the syrup that had been made were taken for analysis.
2. A close examination of the syrup's color was conducted.

Odor examination:

1. A sample of syrup (about 2 ml) was obtained and smelled.
2. After that the smell was observed.

Taste examination:

A tiny sample of the finished syrup was obtained and its flavor was evaluated [16]

pH analysis:

- 1) The glass electrode was washed and rinsed with deionized water
- 2) The meter was calibrated to a value of 7 using the calibration knob after the electrode was submerged in PH 7 buffer solution.
- 3) Following calibration the electrode was taken out cleaned and rinsed with distilled water.
- 4) The value was then corrected after the electrode was submerged in the PH 4 buffer solution.
- 5) The Ph was finally recorded when the electrode was made with syrup [17]

Density analysis:

- 1) A thorough cleaning was performed on the specific gravity bottle.
- 2) To guarantee cleanliness, it was rinsed at least twice with distilled water.
- 3) Weighing was done on the dry, empty bottle and its cork (W1).

4) After adding the prepared syrup to the bottle, the stopper was put on, and any extra syrup on the outside was cleaned off.

5) The syrup-containing bottle's weight (W2) was noted.

6) The syrup's net weight (W3) was calculated.

7) The following formula was used to determine the syrup's density: $\text{Density} = (W3)/(V)$

where V is the syrup's volume and W3 is its weight.

Viscosity test:

Table 5: Determination of Rf value by TLC

Sample	Distance travelled by sample	Distance travelled by solvent	Rf value
Powder	3.6 cm	6.2 cm	0.58

1) Warm chromic acid and an appropriate organic solvent, such as acetone, were used to clean the Ostwald viscometer.

2) After that, it was placed upright on an appropriate stand.

3) In its dry state, water was added to the viscometer until mark G was reached.

4) The amount of time it took for water to go from mark A to mark B was noted in seconds.

5) To guarantee accurate measurements, this procedure was carried out at least three times.

6) After cleaning with the test liquid, the viscometer was filled to mark A and the time it took for the liquid to flow to mark B was recorded.

The formula for viscosity is as follows: $\text{viscosity} = (\text{test liquid density} \times \text{test liquid flow time}) / (\text{water density} \times \text{water flow time}) \times 100$

Testing for Stability:

1) Samples were stored at elevated temperatures in order to assess the stability of the herbal syrup formulation.

2) Culture tubes were filled with the finished syrup.

3) The temperatures at which these tubes were kept were 4°C, room temperature, and 47°C.

4) In order to identify any changes, the samples were examined for a variety of physicochemical characteristics at 24-, 48-, and 72-hour intervals, including color, odor, taste, and turbidity.

RESULT:

Table 4: Preformulation study

Sr.no.	Test	Percentage
1)	Moisture content	16.8
2)	Water extractive value	28.1
3)	Ethanollic extract value	40.5
4)	Total ash value	7.8

Table 6: Determination of solubility of sample

Sr. No.	Solvent	Solubility
1)	Water	Insoluble
2)	Ethanol	Soluble
3)	Methanol	Soluble
4)	Chloroform	Soluble
5)	Acetone	Insoluble

CONCLUSION:

The purpose of this study is to use established standard data to evaluate the physical and chemical

properties required for crude drug identification. The following physicochemical characteristics of the finished herbal cough syrup were noted: Physical

characteristics such as pH (5.45), viscosity (0.03), color (brownish), odor (aromatic), and taste (sweet) were all deemed excellent. Herbal formulations are generally preferred due to their minimal risk of negative effects. With a 40% w/v jaggery basis, this research helps create a herbal cough syrup that is both safe and effective

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HOW TO CITE: Sakshi Patil, Şanika Padawale*, Samruddhi Patil, Rutuja Pawar, Prafull Patil, Development and Assessment of Jaggery Based Herbal Cough Syrup Containing Clove, Int. J. Sci. R. Tech., 2025, 2 (4), 164-169. <https://doi.org/10.5281/zenodo.15183441>