

FORMULATION AND EVALUATION OF TINOSPORA CORDIFOLLA COUGH SYRUP CONTAINING GULVEL, TULSI, TURMERIC, HONEY AND GINGER.

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DOI: <https://doi.org/10.63001/tbs.2026.v21.i02.pp1255-1263>

KEYWORDS

Gulvel, Anti-oxidant, expectorant, Mucus, Inflammation, decoction extract Evaluation.

Received on:

21-05-2026

Accepted on:

10-06-2026

Published on:

20-06-2026

Abstract

Herbal medicines are widely used due to their natural origin, safety, affordability, and therapeutic benefits. Among medicinal plants, *Tinospora cordifolia* (Gilo) is well known for its immunomodulatory, anti-inflammatory, antimicrobial, antioxidant, and antipyretic properties. Traditionally, it has been used for the management of cough, fever, respiratory disorders, and immune-related conditions. The present study aimed to formulate and evaluate a herbal cough syrup containing *Tinospora cordifolia* as the main active ingredient. Honey was incorporated as a natural sweetening and soothing agent, while methyl paraben served as a preservative. Purified water was used as the vehicle. The formulation process involved extraction of active constituents, filtration, blending of ingredients in appropriate proportions, volume adjustment, and homogenization to obtain a uniform syrup.

The prepared syrup was evaluated for physicochemical parameters such as appearance, color, odor, taste, pH, viscosity, density, specific gravity, clarity, and sedimentation behavior. Stability and basic quality control assessments were also performed to ensure product safety and effectiveness. The formulation exhibited acceptable organoleptic characteristics, suitable pH and viscosity, good clarity, and satisfactory physical stability. These results indicate that the developed *Tinospora cordifolia* herbal cough syrup possesses desirable pharmaceutical properties and may serve as a promising natural alternative for cough relief and respiratory support. Further pharmacological and clinical studies are required to confirm its therapeutic efficacy and long-term safety.

INTRODUCTION

Herbal medicines have gained tremendous importance in recent years due to their natural origin, safety, affordability, and wide therapeutic applications. The increasing awareness regarding the side effects associated with synthetic drugs has encouraged the use of herbal formulations for the prevention and treatment of various diseases. According to the World Health Organization (WHO), a large proportion of the global population relies on traditional

medicines and medicinal plants for primary healthcare needs. India, with its rich heritage of Ayurveda, Siddha, Unani, and other traditional systems of medicine, possesses a vast knowledge base regarding the medicinal use of plants for maintaining health and treating diseases.

Respiratory disorders such as cough, cold, bronchitis, sore throat, and respiratory tract infections are among the most common health problems affecting people of all age

groups. Cough is a natural protective reflex mechanism that helps in clearing mucus, irritants, microorganisms, and foreign particles from the respiratory tract. However, persistent or excessive coughing can cause throat irritation, chest discomfort, sleep disturbances, fatigue, and reduced quality of life. Although several synthetic cough suppressants and expectorants are available in the market, their prolonged use may be associated with adverse effects such as drowsiness, dizziness, gastrointestinal disturbances, and allergic reactions. As a result, there is a growing demand for herbal cough remedies that are safer, effective, and suitable for long-term use.

Among the numerous medicinal plants used in traditional medicine, *Tinospora cordifolia* (Giloy or Guduchi) occupies a prominent position because of its remarkable therapeutic potential. It belongs to the family Menispermaceae and is commonly known as Giloy in Hindi and Gulvel in Marathi. In Ayurveda, it is referred to as “Amrita,” meaning the divine nectar of immortality, due to its rejuvenating and health-promoting properties. The plant is a large deciduous climbing shrub found throughout tropical regions of India and is widely recognized for its immunomodulatory, anti-inflammatory, antimicrobial, antioxidant, antipyretic, hepatoprotective, and anti-allergic activities.

The medicinal value of *Tinospora cordifolia* is attributed to the presence of various bioactive phytoconstituents such as alkaloids, diterpenoid lactones, glycosides, steroids, flavonoids, and polysaccharides. These constituents contribute to its ability to enhance immune function, reduce inflammation, combat microbial infections, and support overall respiratory health. Traditionally, Giloy has been used in the treatment of fever, cough, asthma, recurrent infections, allergies, diabetes, jaundice, and various chronic disorders. Its immune-enhancing and anti-inflammatory properties make it particularly useful in

managing respiratory conditions associated with infection and irritation.

The present study focuses on the formulation and evaluation of a herbal cough syrup using *Tinospora cordifolia* as the principal active ingredient. To enhance the therapeutic efficacy of the formulation, supportive herbal ingredients such as Tulsi (*Ocimum sanctum*), Ginger (*Zingiber officinale*), Turmeric (*Curcuma longa*), and Honey may be incorporated. Tulsi possesses antimicrobial and expectorant properties, Ginger acts as an anti-inflammatory and soothing agent, Turmeric exhibits antioxidant and antimicrobial activities, while Honey provides a demulcent effect that helps soothe throat irritation and suppress cough. The combination of these ingredients may provide synergistic action for effective relief from cough and respiratory discomfort.

The formulated herbal cough syrup is evaluated for various physicochemical and quality control parameters including appearance, color, odor, taste, pH, viscosity, density, specific gravity, clarity, stability, sedimentation behavior, and microbial quality. These evaluations are essential to ensure the safety, stability, effectiveness, and patient acceptability of the formulation.

Mechanism of *Tinospora Cordifolia* Cough Syrup

Herbal cough syrup is a liquid herbal formulation prepared using medicinal plant extracts to provide symptomatic relief from cough and support respiratory health.

The therapeutic action of herbal cough syrup depends on the combined effects of active phytoconstituents such as alkaloids, flavonoids, glycosides, phenolic compounds, terpenoids, and essential oils in a *Tinospora cordifolia* herbal cough syrup.

Advantages of *Tinospora Cordifolia* Cough Syrup

1. Produces minimal or fewer side effects when used appropriately.
2. Considered comparatively safe for therapeutic use.

3. Herbal ingredients are easily accessible and readily available.
4. Can be conveniently self-administered by patients.
5. Dosage can be adjusted according to the patient's body weight and requirements.
6. Helps relieve coughing and may promote better sleep quality.
7. Supports the immune system and assists the body in combating infections.
8. Acts as a natural and safe herbal preparation.

MATERIALS AND METHODS

Materials

GULVEL



Fig No. 1 Gulvel

Gulvel (*Tinospora cordifolia*), also known as Giloy or Guduchi, is an important medicinal plant belonging to the Menispermaceae family. It is widely used in Ayurveda for its immunity-boosting, anti-inflammatory, antioxidant, and

antimicrobial properties. Gulvel is traditionally used to manage cough, fever, respiratory infections, diabetes, and various immune-related disorders. Due to its rich phytochemical content, it is considered a valuable herb for promoting overall health and wellness.

TULSI



Fig No. 2 Tulsi

Tulsi (*Ocimum sanctum* / *Ocimum tenuiflorum*), commonly known as Holy Basil, is a sacred medicinal plant belonging to the Lamiaceae family. It possesses antimicrobial, anti-inflammatory, antioxidant, and immunomodulatory

properties. Tulsi is widely used in Ayurveda for the treatment of cough, cold, fever, respiratory infections, and throat irritation. It helps improve immunity and supports overall respiratory health.

TURMERIC



Fig No. 3 Turmeric

Turmeric (*Curcuma longa*) is a medicinal plant belonging to the Zingiberaceae family and is widely used in Ayurveda and traditional medicine. Its main active constituent, curcumin, possesses anti-

inflammatory, antioxidant, antimicrobial, and wound-healing properties. Turmeric is commonly used for the management of cough, cold, infections, digestive disorders, and inflammatory conditions. It also helps boost immunity and supports overall health.

HONEY



Fig No. 4 Honey

Honey is a natural sweet substance produced by honeybees from flower nectar. It possesses antimicrobial, antioxidant, and soothing (demulcent) properties. Honey is

widely used in herbal formulations to relieve cough, throat irritation, and respiratory discomfort. It also improves the taste and acceptability of medicinal preparations.

GINGER



Fig No. 5 Ginger

Ginger (*Zingiber officinale*) is a medicinal plant belonging to the Zingiberaceae family. It possesses anti-inflammatory, antioxidant, antimicrobial, and expectorant properties

due to active compounds such as gingerols and shogaols. Ginger is commonly used to relieve cough, cold, sore throat, and digestive disorders. It also helps improve immunity and respiratory health.

Table 1: Ingredient and their role

Sr. No.	Ingredient	Role
1	Tinospora Cordifolia powder extract	Immunomodulator
2	Ocimum Tenuiflorum leaves extract	Antiviral
3	Curcuma longa powder extract	Antibacterial
4	Zingiber Officinale extract	Reducing Inflammation
5	Hexose Sugares	Base viscosity modifier

METHOD

A. Collection of Plant Materials

Fresh stems of *Tinospora cordifolia* (Giloy), fresh leaves of Tulsi (*Ocimum tenuiflorum*), fresh rhizomes of Ginger (*Zingiber officinale*), and Turmeric (*Curcuma longa*) were collected from the local area and authenticated for medicinal use.

B. Preparation of Powder

The collected plant materials were washed thoroughly with clean water to remove dust and impurities. They were shade-dried for 5–10 days at room temperature and then ground using a mechanical grinder to obtain coarse powder. The powders were stored in airtight containers for further use.

C. Preparation of Extract

- Giloy powder (20 g), Tulsi powder (10 g), Ginger powder, and

Turmeric powder (5 g) were weighed accurately.

- Distilled water was added to each powder separately.
- The mixtures were boiled gently for 30–45 minutes with continuous stirring until the volume was reduced to one-third.
- The extracts were cooled and filtered through muslin cloth followed by Whatman filter paper.
- The filtered extracts were stored in airtight containers under refrigerated conditions for further use.



Ingredient Extraction

Preparation of *Tinospora Cordifolia* Cough Syrup

Step 1. Preparation of Herbal Extract

Step 2. Filtration of Extract

Step 3. Preparation of Syrup Base

Step 4. Mixing of Extract and Syrup Base

Step 5. Addition of Flavouring Agents

Step 6. Final Volume Adjustment and Packaging

Formulation of Syrup:

Table 2: Formulation Table

Sr.No.	Ingredients	F1 (ml)	F2 (ml)	F3 (ml)	F4 (ml)	F5 (ml)
1	Tinospora cordifolia Extract	1	1	1	1	1
2	OcimumTenuiflorum	1	1	1	1	1
3	Curcuma Longa	1	1	2	1	2
4	Zingiber officinale	2	2	1	1	2
5	Honey	9	12	11	11	11
6	Distilled Water	Q.S	Q.S	Q.S	Q.S	Q.S
7	Total Weight	20 ml	20ml	20ml	20ml	20 ml

EVALUATION PARAMETER

1. Physicochemical Evaluation

The formulated syrup was evaluated for various physicochemical properties such as pH, color, odor, and taste.

(a) Color Evaluation: Approximately 5 mL of the prepared syrup was transferred into a watch glass and observed under white light against a white background. The color of

the syrup was assessed visually using the naked eye.

(b) Odor Evaluation: About 2 mL of the syrup sample was taken and its odor was examined by smelling. A gap of 2 minutes was maintained between observations to avoid sensory adaptation.

(c) Taste Evaluation: A small quantity of the prepared syrup was tasted carefully, and its flavour was evaluated using the taste buds of the tongue.

2.Determination of pH

The pH of the prepared syrup was determined by placing an accurately measured

quantity of syrup in a beaker and measuring it with pH paper. The pH range of the formulation was then recorded.

3. Stability Study

The stability of the prepared syrup was assessed under accelerated storage conditions. Samples were stored at different temperatures, namely 4°C, room temperature, and 47°C. The syrup samples were placed in culture tubes and evaluated after 24, 36, and 72 hours. During each interval, the formulations were examined for changes in physicochemical properties, homogeneity, and turbidity.

4. Determination of Viscosity

1.The viscometer was thoroughly cleaned using warm chromic acid and, if required, rinsed with acetone.

2.The cleaned viscometer was mounted vertically on a suitable stand.

3.Distilled water was introduced into the viscometer up to mark G.

4.The time required for water to flow between marks A and B was recorded.

5.The measurement was repeated at least three times to obtain an average value.

6.The viscometer was then rinsed with the test syrup and filled to mark A.

7.The time taken by the syrup to flow from mark A to mark B was recorded.

8.The density of the test liquid was determined separately and used for viscosity calculation.

RESULT AND DISCUSSION

A. Evaluation Parameter

Table: 3 Evaluation parameter

Parameter	F1 (Ml)	F2 (Ml)	F3 (Ml)	F4 (Ml)	F5 (Ml)
Colour	Brown	Brown	Brown	Brown	Brown
Odour	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic
Taste	Sweet	Sweet	Sweet	Sweet	Sweet
Appearance	Clear	Clear	Clear	Clear	Clear
pH	5.6	5.6	5.6	5.6	5.6
Nature	Acidic	Acidic	Acidic	Acidic	Acidic
Viscosity	Moderate	Moderate	Moderate	Moderate	Moderate
Stability	Stable	Stable	Stable	Stable	Stable

SUMMARY AND CONCLUSION

Summary

This study focused on the formulation and evaluation of a herbal cough syrup containing *Tinospora cordifolia* (Giloy) along with Tulsi, Ginger, Turmeric, and Honey. The herbal extracts were prepared using the decoction extraction method and incorporated into a syrup base. The formulated syrup was evaluated for physicochemical parameters such as colour, odour, taste, pH, viscosity, and stability. The results showed acceptable organoleptic properties, pH (5.6), moderate viscosity,

and good stability without precipitation or phase separation. The herbal ingredients exhibited expectorant, anti-inflammatory, antimicrobial, antioxidant, and immunomodulatory activities that may help relieve cough and throat irritation. The study concluded that the prepared herbal cough syrup is a safe, stable, and effective natural alternative to synthetic cough syrups.

Conclusion

The present study successfully formulated and evaluated a herbal cough syrup

containing *Tinospora cordifolia* (Giloy) as the main active ingredient along with Tulsi, Ginger, Turmeric, and Honey. The herbal extracts were prepared using the decoction extraction method and incorporated into a suitable syrup base. The formulated syrup exhibited acceptable organoleptic properties, including brown colour, characteristic odour, pleasant sweet taste, and clear appearance. The pH of the formulation was found to be 5.6, which is suitable for oral administration. The syrup showed moderate viscosity, ensuring easy pouring and accurate dosing. Stability studies revealed that the formulation remained stable without precipitation, phase separation, or significant changes in its properties. The selected herbal ingredients possess immunomodulatory, anti-inflammatory, antimicrobial, antioxidant, and expectorant activities that may help in relieving cough and throat irritation. The formulation was found to be safe, stable, and patient-friendly. Therefore, the prepared herbal cough syrup can be considered a promising natural alternative to synthetic cough syrups with fewer side effects and better patient acceptability. Further pharmacological and clinical studies are recommended to confirm its therapeutic efficacy and long-term safety.

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