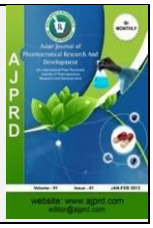
Available online on 15.08.2026 at http://ajprd.com

Asian Journal of Pharmaceutical Research and Development

Open Access to Pharmaceutical and Medical Research



Open Access

Research Article

Formulation and Evaluation of Polyherbal Lozenges

Dr.Rasika Bhalke, Harishchandre Swapnil, Ghotekar Tejaswini, Bhandare Siddhi, Jadhav Akankasha

Matoshri Institute of Pharmacy Dhanore, Yeola. Nashik

A B S T R A C T

Herbal medicines have gained considerable attention due to their therapeutic effectiveness, safety, and fewer side effects compared to synthetic drugs. Lozenges are a convenient dosage form commonly used for the relief of cough, sore throat, and other respiratory ailments. The present study aimed to formulate and evaluate polyherbal lozenges containing Vasaka (Justicia adhatoda), Mint Tulsi (Ocimum tenuiflorum), Clove (Syzygium aromaticum), Ginger (Zingiber officinale), Turmeric (Curcuma longa), Honey, Jaggery, Crystal Menthol, Fennel, and Black Pepper. The lozenges were prepared by the melting and molding method using natural sweetening and binding agents. The prepared formulations were evaluated for organoleptic characteristics, weight variation, hardness, friability, thickness, and phytochemical screening, Six lozenges had an average weight of 812 mg. Six lozenges had an average hardness of 18.07 ± 0.12 kg/cm²,Six lozenges had a friability of 0.35% to 0.56%. Five lozenges had an average thickness of 12.17 ± 0.10 mm. Phytochemical analysis confirmed the presence of alkaloids, flavonoids, tannins, phenols, and terpenoids. The evaluation results indicated satisfactory physicochemical properties and good mechanical strength. The study concluded that the formulated polyherbal lozenges may serve as a promising natural remedy for the symptomatic relief of cough and sore throat.

KEY WORDS: Polyherbal Lozenges, Vasaka, Tulsi, Ginger, Turmeric, Cough, Sore Throat.

A R T I C L E I N F O: Received 14 Jan 2026; Review Complete 15 April 2026; Accepted 24 June 2026; Available online 15 August 2026

Cite this article as:

Bhalke R, Swapnil H, Tejaswini G, Siddhi B, Akankasha J, Formulation and Evaluation of Polyherbal Lozenges, Asian Journal of Pharmaceutical Research and Development. 2026; 14(4): 116-121 DOI: http://dx.doi.org/10.22270/ajprd.v14i4.1838

*Address for Correspondence:

Ghotekar Tejaswini, Matoshri Institute of Pharmacy Dhanore, Yeola. Nashik

INTRODUCTION

In recent years, products made from plants have become more and more popular as cosmetics, nutraceuticals, and medicines. Because they are poorly absorbed when taken orally, herbal medicines—which are frequently used in both developed and developing countries' healthcare systems—are complex chemical mixes made from plants with limited efficacy. They can be bought over-the-counter in health food stores and pharmacies for self-medication or as prescription medications for non-allopathic medical systems [1]. The World Health Organization (WHO) estimates that 80% of people on Earth still rely on herbs and other traditional remedies for their basic medical needs. Herbal treatments are now widely recognized as effective treatment options for diabetes, rheumatoid arthritis, hepatic disorders, cough cures, memory boosters, and adaptogens[2].

The WHO divides herbal medicines into three categories: medical herbal products, processed plant material, and raw plant material. Herbal medicines are finished, labeled goods that contain active substances like aerial or subterranean plant parts, other plant preparations, or a combination of these[3].

was used Because of its purported advantages and safety, the use of plants in medicine is growing in popularity. Data and clinical significance served as the foundation for earlier developments in phytomedicine. Candy made from honey flavored with Twentieth citrus, herbs, and spices to treat sore throats about 1000 BC under Egypt's Dynasty. In the 19th century, doctors discovered morphine and heroin, which halt coughing at the brain's source. During that period, two popular formulas were Smith Brothers Cough Drops, which were first sold in 1852, and Luden's, which was created in 1879. Concerns about the potential for opiate addiction led to the development of alternative medications[4].

MATERIAL AND METHODS

1. **Vasaka :**

   Vasaka and Tulsi leaves were extracted using a hydrodistillation extraction method employing water. It is obtained from Vishal chemical industry.

2. **Tulsi:**

   Also referred to as holy basil, tulsi is a herb that has long been utilized in ayurvedic medicine due to its numerous health advantages[8]. Mint Tulsi was obtained from the Matoshri Institute of pharmacy college of dhanore, yeola. botanical garden.

3. **Clove:**

   Cloves are the fragrant blossom of the Syzygium aromaticum (Fugenia Caryophylus) tree (Mortacede). It is obtained from vishal chem industry

4. **Ginger :**

   Ginger is made from the rhizomes of Zinziber officinale. The main component of ginger is oleo-resin, which has expectorant, carminative, and aromatic properties. Ginger was obtained from the Matoshri Institute of pharmacy college of dhanore, yeola. botanical garden.

5. **Turmeric** :

   They are derived from Curcuma longa rhizomes (Zinziberaceae). Turmeric is a common spice in Indian cooking because of its vivid yellow hue.

6. **Honey:**

   This saccharine fluid, which is made from flower nectar, is deposited in the honeycomb by the hive bee, Apismallifera, Apisdorsata, and other Apis species. It is obtained from Dabur Honey.

7. **Jaggery** :

   Unrefined cane sugar is called Saccharum officinarum jaggery, or "Gul" in Hindi. Jaggery can be utilized as a natural sweetener and binding agent in herbal lozenges[10]. It is obtained from grossery shop.

8. **Crystal Menthol:**

   Crystal menthol is a naturally occurring substance that is extracted from mint plants, especially peppermint and spearmint [11]. Because of its calming and cooling qualities, which can help relieve coughs and sore throats, it is frequently used in herbal lozenges along with other ingredients like honey. It is obtained from Vishal Chemical.

9. **Fennel:**

   Fennel is a flowering plant native to the Mediterranean region but is also cultivated in other parts of the world. It is grown for its aromatic seeds and flavorful bulb-like stem. It is obtained from Vishal Chemical industry.

10. **Black pepper: (Piper nigrum)**

    Black pepper is a dried unripe fruit (peppercorn) of a climbing vine used as a common spice. It has a pungent taste due to piperine and is widely used to enhance flavor in food. It is obtained from Vishal Chemical industry.

Priliminary Phytochemical Screening:

The existence of several secondary metabolites was ascertained using a variety of qualitative tests. Dragendorff11 and Mayer's reagents were used to find alkaloids.

Alkaline reagent tests and Shinoda's test were used to identify flavonoids.

Lead acetate and ferric chloride tests were used to identify phenolics. The Salkowski method was used to identify the terpenoids[11].

Table 1: Phytochemical Test

Sr. No.	Test	Procedure	Observation
1	Test for Alkaloid (Dragendorff's test)	A test tube was filled with a small quantity of the extract. A few drops of Dragendorff's reagent were added	The presence of alkaloids was indicated by the formation of an orange-red precipitate
2	Test for Flavonoid (Shinoda test)	A test tube was filled with a small quantity of the extract. Next, a small quantity of magnesium oxide and a few drops of dilute hydrochloric acid (HCl) were added.	The presence of flavonoids was indicated by the development of a red color or a change in coloration
3	Test for Phenol (Ferric Chloride test)	A test tube was filled with a small quantity of the extract. A few drops of 5% ferric chloride solution were added	The presence of phenols was indicated by the appearance of a blue or green coloration
4	Test for Tannin (Lead acetate test)	A test tube was filled with a small quantity of the extract. A few drops of 10% lead acetate solution were added. The presence of tannins was indicated by the formation of a white or cream-colored precipitate.	The presence of tannins was indicated by the formation of a white or cream-colored precipitate
5	Terpenoids screening (Salkowski test)	A test tube was filled with a small quantity of the extract. A few drops of concentrated sulfuric acid (H_2SO_4) were added	The presence of terpenoids was indicated by a color change or the development of a red coloration.

Hydrodistillation Extraction Method

Fresh Vasaka (Justicia adhatoda) and Tulsi (Ocimum tenuiflorum) leaves were collected, washed thoroughly with distilled water, and shade dried. The dried leaves were crushed into small pieces. About 100 g of the plant material was mixed with 1000 mL of distilled water and subjected to hydrodistillation using a Clevenger-type

apparatus for 3 hours. The obtained distillate was filtered through Whatman filter paper and stored in an airtight amber-colored container at 4°C until further use. The extract was then used in the preparation of polyherbal lozenges.

PREPARATION OF HERBAL LOZENGES [7]

Vasaka and tulsi leaves were extracted using the hydro-distillation method, with water serving as the solvent. Turmeric powder, menthol crystals, clove powder, ginger powder, and black pepper powder were mixed thoroughly to prepare the powder blend.

The lozenges were prepared using the melting and molding method. Water, honey, the prepared powder blend, and the leaf extracts were added to a beaker and mixed thoroughly. The mixture was heated over medium heat with continuous stirring until the jaggery completely dissolved. After dissolution of the jaggery, the temperature was increased to medium-high, and the mixture was boiled for 5–10 minutes until it reached 300°F (150°C) [8].

The mixture was then removed from the heat source and allowed to cool for a few minutes. When molds were used, the liquid mixture was poured into the molds and allowed to cool and solidify for 30–45 minutes. In the absence of molds, the mixture was poured onto a sheet of butter paper and allowed to cool until it became firm enough to handle. The prepared lozenges were stored in an airtight container at room temperature for up to two weeks[9]

Table 2: Formulation Table

Sr. No.	Ingredients	Quantity						Properties
		F1	F2	F3	F4	F5	F6	
1	Vasaka extract	10ml	12ml	11ml	13ml	12ml	12ml	Anti-inflammatory
2	Mint tulsi extract	4ml	3ml	3.5ml	2ml	2.5ml	3ml	Antimicrobial
3	Clove	3 gm	2gm	2.5gm	2gm	3gm	4gm	Anti inflammatory
4	Ginger	2gm	4gm	3gm	3.5gm	2.5gm	3gm	Antioxidant
5	Turmeric	5gm	4gm	4.5gm	5.5gm	4.5gm	6gm	Relief from Cough
6	Honey	8ml	9ml	8.5ml	7ml	9ml	10ml	Immunity Booster
7	Jaggery	13gm	14g,	13.5gm	12gm	13gm	12gm	Antibacterial
8	Crystal Menthol	5gm	3gm	4gm	4gm	4.5gm	6gm	Cooling and Soothing Effect
9	Fennel	7gm	5gm	6gm	6gm	5.5gm	3gm	Carminative
10	Black Pepper	3gm	4gm	3.5gm	4gm	3.5gm	2gm	Carminative

EVALUATION PARAMETERS:

1. Organoleptic Evaluation

Based on visual observation. The organoleptic properties of the formulations were identified [11].

Appearance: It is important to evaluate the lozenges' color, size, and shape. Additionally, the consistency of shape, surface texture, and any speckles should be examined.

Taste: The lozenges' sweetness, sourness, bitterness, and saltiness should all be assessed. It's also important to evaluate the mouthfeel and aftertaste.

Odor: The intensity, quality, and pleasantness of the lozenges' herbal scent should be evaluated.

Texture: The lozenges' stickiness, chewiness, and hardness should be evaluated. Additionally, it is important to verify whether the lozenges dissolve readily in the mouth.

2. Weight Uniformity test

The average weight of the herbal lozenges was 812 mg, with weight variation within acceptable limits, indicating good uniformity..

3. Hardness test

The hardness test was performed on randomly selected herbal lozenges using a Monsanto hardness tester to evaluate their mechanical strength. The results showed that the lozenges possessed adequate hardness to withstand handling, storage, and transportation without breaking.[12].

4. Friability Test

The friability of the herbal lozenges was found to be 0.48%, indicating good mechanical strength and resistance to handling, packaging, and transportation.

5. Thickness test

The average thickness of the herbal lozenges was determined using a Vernier caliper and was found to be uniform, indicating consistent manufacturing quality.

RESULT

Phytochemical Screening Result

Table 3: Phytochemicals Screening Result

Sr. No.	Test	Observation	Result
1	Test for Alkaloid (Dragendorff's test)	formation of orange-red precipitate.	Presence of alkaloids was indicated.
2	Test for Flavonoid (Shinoda test)	Indicated by development of a red color.	Presence of flavonoids.
3	Test for Phenol (Ferric Chloride test)	Indicated by the appearance of a blue or green coloration	Presence of phenols
4	Test for Tannin (Lead acetate test)	Indicated by the formation of a white or cream-colored precipitate	Presence of tannins
5	Terpenoids screening (Salkowski test)	Indicated by a color change or the development of a red coloration	Presence of terpenoids

Evaluation Parameter Result:

1. Organoleptic Evaluation

Table 4: Organoleptic evaluation of Herbal Lozenge

Sr. No.	Batch	color	odour	Taste	Appearance	Texture
1	I.	Light Brown	Characteristic Herbal	Sweet, Slightly pungent	Uniform, glossy.	Smooth
2	II.	Brown	Characteristic Herbal	Sweet, pungent	Uniform	Smooth
3	III.	Dark Brown	Herbal and Spicy	Sweet, Moderately pumgent	Uniform	Slightly Hard
4	IV.	Brown	Characteristic Herbal	Sweet, Slightly pungent	Uniform,glossy	Smooth
5	V.	Brown	Herbal	Sweet, pungent	Uniform	Smooth
6	VI.	Dark Brown	Herbal and Spicy	Sweet, Moderately pumgent	Uniform	Smooth and Hard

The formulated herbal lozenges were dark brown in color with a hard texture, honey-like odor, oval shape, and sweet-bitter taste.

2. Weight Uniformity Test Result

Table 5: Weight Uniformity Test of Herbal Lozenges

Sr. No.	Batch	Weight Uniformity Test (mg)					
		F1	F2	F3	F4	F5	F6
1	I.	860	865	862	864	861	866
2	II.	752	756	754	753	755	754
3	III.	855	858	865	859	857	857
4	IV.	774	777	775	778	776	776
5	V.	762	765	763	766	764	764
6	VI.	857	860	858	861	859	859
Average		810	813.5	812.83	813.5	812	812.6

The average weight of the herbal lozenges was found to be 812 mg. The weight variation of all lozenges was within acceptable limits, indicating good uniformity.

3. Hardness Test

Table 6: Hardness Test of Herbal Lozenges

Sr. No.	Batch	Hardness test kg/cm^2					
		F1	F2	F3	F4	F5	F6
1	I.	17.8	18.1	17.9	18.0	17.7	18.02
2	II.	16.9	17.1	17.0	17.2	16.8	17.1
3	III.	17.0	17.2	17.1	17.0	16.9	17.3
4	IV.	17.9	18.0	18.1	18.2	17.8	18.1
5	V.	16.8	17.0	17.1	17.2	16.9	17.1
6	VI.	18.0	18.2	18.1	18.0	17.9	18.2
Average		17.4	21.12	17.55	17.6	17.33	17.6

The average hardness of the herbal lozenges was found to be 18.07 ± 0.12 kg/cm², indicating good mechanical strength and suitability for handling, packaging, and storage.

4. Friability Test

Table 7: Friability Test of Herbal Lozenges

Sr. No.	Batch	Friability Test (g)					
		F1	F2	F3	F4	F5	F6
1	I.	0.52	0.50	0.49	0.51	0.48	0.50
2	II.	0.58	0.56	0.55	0.57	0.54	0.56
3	III.	0.46	0.45	0.47	0.44	0.46	0.45
4	IV.	0.41	0.42	0.40	0.43	0.41	0.42
5	V.	0.35	0.36	0.34	0.35	0.33	0.34
6	VI.	0.48	0.47	0.49	0.46	0.48	0.47
Average		0.46	0.46	0.44	0.45	0.45	0.45

The friability of the herbal lozenges ranged from 0.35% to 0.56% and was found to be within the acceptable limit (<1%), indicating good resistance to abrasion and breakage during handling and transportation.

5. Thickness Test

Table 8: Thickness test of Herbal Lozenges

Sr. No.	Batch	Thickness Test					
		F1	F2	F3	F4	F5	F6
1	I.	11.2	11.4	11.3	11.5	11.4	11.2
2	II.	11.5	11.7	11.8	11.6	11.7	11.8
3	III.	12.3	12.4	12.5	12.6	12.4	12.4
4	IV.	12.0	12.2	12.1	12.3	12.2	12.2
5	V.	12.6	12.8	12.7	12.9	12.8	12.7
6	VI.	12.5	12.7	12.8	12.6	12.7	12.7
Average		12	12.2	12.2	12.25	12.2	12.16

The average thickness of the herbal lozenges was found to be 12.17 ± 0.10 mm, indicating uniform thickness and good batch-to-batch consistency.

DISCUSSION

To manufacture the lozenges, a range of drugs were mixed with jaggery as the base. The monograph analysis was conducted in accordance with WHO guidelines. Alkaloids, flavonoids, tannins, phenols, and terpenoids were detected using various phytochemical screening methods. The lozenges were evaluated macroscopically and were found to have a dark brown hue, firm texture, honey-like odor, oval shape, and a sweet and slightly bitter taste. The quality control measures included weight uniformity, thickness, hardness, and friability tests.

Six lozenges had an average weight of 812 mg. Six lozenges had an average hardness of 18.07 ± 0.12 kg/cm², Six lozenges had a friability of 0.35% to 0.56%. Five lozenges had an average thickness of 12.17 ± 0.10 mm.

CONCLUSION

The study suggested that, for addressing the symptoms of sore throat and cough, herbal lozenges might be a safe and effective alternative to traditional cough drops. Herbal remedies such as vasaka, tulsi, turmeric, ginger powder, and black pepper powder offered anti-inflammatory and antioxidant properties in addition to symptom relief. Further research was needed to determine the ideal dosage for herbal lozenges, their mechanism of action, and their effectiveness in comparison with other treatments. Overall, herbal lozenges presented a practical option for complementary and natural approaches to respiratory health. Among the six batches, Batch V was identified as the optimized batch because it had the best physicochemical properties of all the formulations. It was selected as the optimized formulation. Compared with Batch I, Batch II and Batch III, Batch IV and Batch VI demonstrated a superior overall balance of hardness, thickness uniformity, friability, moisture content, and disintegration properties. As a result, Batch V was considered the best herbal lozenge formulation."

REFERENCES:

1. A, Chauhan V, Nautiyal A. A Review: Health Benefits of Herbal Plants in Nutraceuticals. Asian Journal of Pharmacy and Technology. 2022; 277–81. 10.52711/2231-5713.2022.00045
2. Sharma, V., Singh, S., Dixit, A. and Saxena, A. Formulation and evaluation of herbal cough syrup from seeds extract of hedge

mustard. International Journal of Research in Pharmacy and Chemistry. 2020; 1-10. https://dx.doi.org/ 10.33289/IJRPC.10.1.2020.10(3)

3. Choudhary, N. and Sekhon, B. S. An overview of advances in the standardization of herbal drugs. Journal of Pharmacy Education and Research. 2011; 55-70. Corpus ID: 55924669
4. Valecha SG, Dongaonkar CC, Dhole SN. Formulation and Evaluation of Herbal Emulgel: A Review Article. Asian Journal of Pharmacy and Technology. 2023; 297–303. 10.52711/2231-5713.2023.00053
5. Wink, M. Modes of Action of Herbal Medicines and Plant Secondary Metabolites. Medicines. 2015; 251–286. 10.3390/medicines2030251
6. Pourova J, Dias P, Pour M, Bittner Fialová S, Czigle S, Nagy M, et al. Proposed mechanisms of action of herbal drugs and their biologically active constituents in the treatment of coughs: an overview. PeerJ. 2023; Oct 24;11:e16096. 10.7717/peerj.16096
7. Vishvnath G, U.k J. Development of Quality Control Parameters for Herbal Formulation, Pippali churna. Asian Journal of Research in Chemistry. 2010; 3(4): 932–4.
8. Yogesh U, Tiwari K. Design, Development and Evaluation of Anisomeles indica Herbal Cough Syrup Introduction. Research Journal of Pharmaceutical Dosage Forms and Technology. 2021; 292–296. 10.52711/0975-4377.2021.00048
9. Patil SJ, Patil SD, Patil PB, Patil PS, Vambhurkar GB, Raut ID. Evaluation of Standardization Parameters of Ayurvedic Marketed Polyherbal Formulation. Asian Journal of Pharmaceutical Analysis. 2018; 220–76.
6. 10.5958/2231-5675.2018.00040.6 10. Waghmare R, Khan K, Patel M, More H, Mehendale P, Pharma I. Preparation and Evaluation of Herbal Cough Lozenges: CoridCough Pearls International Journal of PharmaO2. 2020; 140-146.
10. Sharma R, Kumari N, Ashawat MS, Verma CPS. Standardization and Phytochemical Screening analysis for Herbal Extracts: Zingiber officinalis, Rosc., Curcuma longa Linn., Cinnamonum zeylanicum Nees., Piper longum, Linn., Boerhaavia diffussa Linn. Indian Journals. 2020; 127–133. 10.5958/2231-5713.2020.00022.7
11. Maharjan S, Tiwari R, Regmi K, Neupane S. Formulation and Evaluation of Domperidone Lozenges. Asian Journal of Pharmacy and Technology. 2024; 1–4. 10.52711/2231-5713.2024.00001
12. Shaikh JS, Barhate SD. Formulation and Assessment of Polyherbal Candies for Soothing Cough and Sore Throat. Asian Journal of Pharmacy and Technology. 2024; 108–112. 10.52711/2231-5713.2024.00019
13. Kotta S, Bijumol C, Anitha Y, Dileep KJ, Valsala K. Design, development and in vitro-in vivo study of tramadol-paracetamol inlay tablets. Pharmaceutical Development and Technology. 2012; 1–9. 10.3109/10837450.2012.746365.