



Research Article

FORMULATION AND EVALUATION OF HERBAL LOZENGES CONTAINING GLYCYRRHIZA GLABRA, ZINGIBER OFFICINALE, AND OCIMUM SANCTUM FOR THROAT DISORDERS

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ABSTRACT

Herbal lozenges are medicated solid dosage forms designed to dissolve slowly in the mouth and provide local therapeutic effects in the oral cavity and throat. This review focuses on the formulation and preparation of herbal lozenges containing natural ingredients such as liquorice (*Glycyrrhiza glabra*), ginger (*Zingiber officinale*), and tulsi (*Ocimum sanctum*), which are well known for their anti-inflammatory, antimicrobial, expectorant, and soothing properties. Lozenges offer several advantages including ease of administration, prolonged drug contact with throat tissues, improved patient compliance, and the ability to mask unpleasant drug taste. The study also discusses the classification of lozenges, their advantages and limitations, and the role of different excipients such as sucrose, liquid glucose, acacia gum, honey, and citric acid in formulation. Herbal extracts were prepared using the decoction method to obtain active phytoconstituents, which were then incorporated into a sugar-based lozenge formulation through heating and molding techniques. The prepared herbal lozenges provide a natural and effective approach for relieving cough, sore throat, and mild respiratory discomfort while minimizing the side effects associated with synthetic medications. Thus, herbal lozenges represent a promising alternative dosage form for them management of throat and respiratory conditions.

INTRODUCTION

Lozenges are small, flavored tablets that are designed to dissolve slowly in the mouth. They are commonly used to relieve symptoms associated with sore throat, cough, and dry mouth. Lozenges can also be used to deliver medication directly to the throat or mouth, making them a popular choice for people who have difficulty swallowing pills or capsules.^[1]

Lozenges are typically taken by placing one tablet in the mouth and allowing it to dissolve slowly over several minutes. They should not be chewed or swallowed whole. It's important to follow the dosage instructions provided by the manufacturer or your healthcare provider to avoid overuse or potential side effects.^[1] Herbal lozenges are solid medications used to treat mouth and throat conditions, releasing active therapeutic ingredients gradually as they dissolve in the tongue. They are particularly effective for treating coughs, sore throats, and mild respiratory issues when used locally.^[2] Lozenges are used for patients who cannot swallow solid oral dosage forms as well as for medications designed to be released slowly to yield a constant level of drug in the oral cavity or to bathe the throat tissues in a solution of the drug. Drugs often incorporated into analgesics, lozenges anesthetics, include antimicrobials, antiseptics, antitussives, aromatics, astringents, corticosteroids, decongestants, and demulcents.^[3]

CLASSIFICATION OF LOZENGES:

Lozenges can be classified into various classes based on various methods like:

According to the site of action:

Local effect Ex. Antiseptics, Decongestants.

Systemic effect Ex. Vitamins, Nicotine.

According to texture and composition:

Chewy or caramel based medicated lozenges:

These are the dosage form in which medicament is incorporated into a caramel base which is chewed instead of being dissolved in mouth. Most formulations are based on the glycerinated gelatine suppository formula which consists of glycerine, gelatine, and water. These lozenges are often highly fruit flavoured and may have a slightly acidic taste to cover the acrid taste of the glycerine.^[3]

Compressed tablet lozenges:

When the active ingredient is heat sensitive, it may be prepared by compression. The granulation method is similar to that used for any compressed tablet. These tablets differ from conventional tablets in terms of organoleptic property, non-disintegrating characteristics and slower dissolution profiles.^[4]

Soft lozenges:

They are either meant for chewing or for slow drug release in mouth. They can be made from PEG 1000 or 1450, chocolate or sugar-acacia base while some soft candy formulations can also contain acacia and silica gel. Acacia is used to provide texture and smoothness and silica gel is used as a suspending agent to avoid settling of materials to the bottom of the Mold cavity during the cooling. The formulation requires heating process at about 50 °C, hence is only suitable to heat resistant ingredients.^[4]

Hard lozenges:

These are mixtures of sugar and other carbohydrates in an amorphous (non crystalline) or glassy state. They can also be regarded as solid syrups of sugars. The moisture content and weight of hard can lozenge should be in between, 0.5 - 1.5% and 1.5-4.5 g respectively. These should undergo also want uniform dissolution or erosion over 5-10 min., and they should not disintegrate. Disadvantage: The temperature required for their preparation is high hence heat labile materials cannot be prepared.^[3]

MATERIALS AND METHODS

Materials

Liquorice: It is the root of *Glycyrrhiza glabra* (**Family: Leguminosae**) from which a sweet flavour can be extracted. The liquorice plant is a herbaceous perennial legume native to southern Europe and parts of Asia, such as India. It is also known as mulethi in India and is widely used in Ayurvedic system of medicine for various ailments related to respiratory system. Used as Expectorant and Demulcent. These properties are due to the presence of Glycyrrhenic acid.^[11]



Figure.no.1 Liquorice

Ginger: Comprised of *Zingiber officinale* (**Family: Zinziberaceae**) rhizomes that have been scraped to remove the brown outer skin and sun-dried. Oleoresin, the primary compound in ginger, has expectorant,

carminative, and fragrant qualities. Fresh ginger contains an active ingredient called gingerol, which is typically found as yellow, strong oil with a spicy-sweet. Adrak is an additional name for ginger.^[14]



Figure.no.2 Ginger

Tulsi: Tulsi, also known as holy basil, is an herb that has been traditionally used in Ayurvedic medicine for its various health benefits. It is known for its anti-inflammatory, anti-bacterial, and anti-viral properties, which makes it a popular ingredient in herbal remedies for coughs, colds, and other respiratory ailments.^[1]



Figure.no.3 Tulsi

Table 1: Quantities For 100 Tablets:^[15]

S.NO.	INGREDIENTS	QUANTITY	PROPERTIES
1.	Sugar(sucrose)	66.7gm	Base
2.	Liquid Glucose	20gm	Texture Enhancer
3.	Acacia Gum	2gm	Binder
4.	Ginger Extract	2gm	Anti-inflammatory, Antitussive
5.	Liquorice Extract	2gm	Immune system booster
6.	Tulsi Extract	2gm	Anti-viral, Anti-bacterial
7.	Honey	5ml	Flavour
8.	Citric Acid	0.3gm	Flavour Enhancer
9.	Purified Water	q.s	

Table 2: Quantities For 20 Tablets:^[15]

S.NO.	INGREDIENTS	QUANTITY	PROPERTIES
1.	Sugar(sucrose)	13.34gm	Base
2.	Liquid Glucose	4gm	Texture Enhancer
3.	Acacia Gum	0.4gm	Binder
4.	Ginger Extract	0.4gm	Anti-inflammatory, Antitussive
5.	Liquorice Extract	0.4gm	Immune system booster
6.	Tulsi Extract	0.4gm	Anti-viral, Anti-bacterial
7.	Honey	1ml	Flavour
8.	Citric Acid	0.06gm	Flavour Enhancer
9.	Purified Water	q.s	

Procedure of extraction (decoction):

Tulsi:

The leaves are shade dried for 7 days at room temperature and were made into fine powder. After making Powder, the powdered sample was weighed and it was found to be 53.40g. Water used as a solvent by the decoction method (drug weight: 26g and water: 250 ml). After that it was filtered and the extract was collected in a china dish, then it was heated till the mass was cooled and form a powder mass.^[2]

Ginger:

In this process, Ginger is boiled in a specified volume of water for a defined time; it is then cooled and strained or filtered. This procedure is suitable for extracting water-soluble, heat-stable constituents. This process is typically used in preparation of Ayurvedic extracts. The starting ratio of crude drug to water is fixed, e.g. 1:4 or 1:16; the volume is then brought down to one-fourth its original volume by boiling during the extraction procedure. Then, the concentrated extract is filtered and used as such or processed further.^[16]

Liquorice:

In this process, Liquorice is boiled in a specified volume of water for a defined time; it is then cooled and strained or filtered. This procedure is suitable for extracting water-soluble, heat-stable constituents. This process is typically used in preparation of Ayurvedic extracts. The starting ratio of crude drug to water is fixed, e.g. 1:4 or 1:16; the volume is then brought down to one-fourth its original volume by boiling during the extraction procedure. Then, the concentrated extract is filtered and used as such or processed further.^[16]

Method of preparation:

1. Accurately weigh all the ingredients.
2. Dissolve sugar in a small quantity of purified water and heat gently with constant stirring until a clear syrup is obtained.
3. Add liquid glucose and continue heating the mixture to about 145–150°C (hard crack stage).
4. Add finely powdered acacia gum and mix thoroughly to form a uniform mass.
5. Remove the mixture from heat and allow it to cool slightly (around 120°C).
6. Add ginger extract, liquorice extract, honey, and mix well.
7. Add citric acid and stir thoroughly to obtain a homogeneous mixture.
8. Pour them often mass into greased lozenge moulds or on to a greased tray.
9. Allow the mixture to cool and solidify at room temperature.
10. Remove the lozenges from the moulds, wrap individually, and store in an airtight container.^[15]

EVALUATION PARAMETERS OF HERBAL LOZENGES TABLET

Appearance

The lozenges are examined visually for color, shape, uniformity, and absence of cracks or air bubbles. A good lozenge should have a smooth surface and uniform appearance.

Weight Variation

Twenty lozenges are individually weighed and the average weight is calculated. Each lozenge weight should be within the acceptable pharmacopoeia limits to ensure uniform drug distribution.

Hardness Test

Hardness determines the mechanical strength of lozenges. It is measured using a hardness tester to ensure that the lozenges are strong enough to withstand handling and packaging but still dissolve slowly in the mouth.

Thickness

The thickness of the lozenges is measured using a Vernier caliper or micrometer screw gauge to ensure uniformity in size.

Friability Test

Friability evaluates the ability of lozenges to resist abrasion during handling, transportation, and packaging. It is tested using a friabilator, and the weight loss should generally be less than 1%.

Disintegration/ Dissolution Time

Since lozenges are designed to dissolve slowly in the mouth, the dissolution time is evaluated in simulated saliva or water to determine the time required for complete dissolution.

Drug Content Uniformity

This test ensures that each lozenge contains the required amount of active herbal constituents. The content is analyzed using suitable analytical methods.

pH Determination

The pH of the dissolved lozenge solution is measured to ensure it is suitable for oral mucosa and does not cause irritation.

Moisture Content

Moisture content is determined to ensure stability and prevent microbial growth or stickiness of the lozenges.

Organoleptic Evaluation

The taste, flavor, mouth feel, and over all acceptability are evaluated by sensory analysis because palatability is important for lozenge dosage forms.

RESULT

The herbal lozenges were successfully prepared using extracts of liquorice (*Glycyrrhiza glabra*), ginger (*Zingiber officinale*), and tulsi (*Ocimum sanctum*) with sucrose as the base and liquid glucose as a texture enhancer. The prepared lozenges showed a uniform shape, smooth surface, and acceptable color and flavor. Evaluation parameters such as weight variation, hardness, and thickness were found to be within acceptable limits, indicating uniformity in the formulation. The lozenges exhibited good mechanical strength with minimal friability and dissolved slowly in the mouth, ensuring prolonged contact of the active ingredients with the throat tissues. Organoleptic evaluation indicated a pleasant taste due to the presence of honey and citric acid, which helped in masking the herbal taste. Overall, the formulation demonstrated satisfactory physicochemical properties and was suitable for use as a throat- soothing herbal preparation.

Table 3: Result of Evaluation Parameter

S.no	Evaluation Parameters	Method/Instrument Used	Observation
1	Appearance	Visual inspection	Smooth surface, uniform color & no cracks
2	Weight variation	Weighing 20 lozenges using digital balance	With acceptable pharmacopoeia limits
3	Hardness test	Monsanto hardness tester	Adequate hardness ensuring mechanical strength
4	Thickness	Vernier caliper	Uniform thickness observed

5	Friability test	Roche friabilator	Weight loss less than 1%
6	Disintegration/ Dissolution time	Dissolution in stimulated saliva and water	Slowly dissolved within 5-10 minutes
7	Drug content uniformity	Suitable analytical method	Uniform distribution of herbal constituents
8	pH determination	pH meter	pH suitable for oral cavity (around 5-7)
9	Moisture Content	Drying method	With unacceptable limits ensuring stability
10	Organoleptic evaluation	Sensory evaluation	Pleasant taste, acceptable flavor and mouth feel

CONCLUSION

From the present study, it can be concluded that herbal lozenges containing liquorice, ginger, and tulsi can be successfully formulated using a sugar-based candy method. These herbal ingredients possess natural anti-inflammatory, antimicrobial, and expectorant properties that help in relieving cough, sore throat, and minor respiratory discomfort. The prepared lozenges showed acceptable physical characteristics, stability, and patient-friendly organoleptic properties. Herbal lozenges offer several advantages such as ease of administration, prolonged drug action in the oral cavity, and improved patient compliance. Therefore, herbal lozenges can be considered a safe, effective, and natural alternative to conventional throat medications and may be useful in the management of throat irritation and cough.

REFERENCES

1. Allen, L. V., Popovich, N. G., & Ansel, H. C. (2014). Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems (10th ed.). Lippincott Williams & Wilkins.
2. Aulton, M. E., & Taylor, K. (2018). Aulton's Pharmaceutics: The Design and Manufacture of Medicines (5th ed.). Elsevier.
3. Lachman, L., Lieberman, H. A., & Kanig, J. L. (2009). The Theory and Practice of Industrial Pharmacy (3rd ed.). CBS Publishers & Distributors.

4. Banker, G. S., & Rhodes, C. T. (2002). *Modern Pharmaceutics* (4th ed.). Marcel Dekker Inc.
5. Kokate, C. K., Purohit, A. P., & Gokhale, S. B. (2017). *Pharmacognosy* (56th ed.). Nirali Prakashan.
6. Trease, G. E., & Evans, W. C. (2009). *Trease and Evans Pharmacognosy* (16th ed.). Saunders Elsevier.
7. Harborne, J. B. (2007). *Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis* (3rd ed.). Springer.
8. World Health Organization. (2013). *WHO Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants*. WHO Press.
9. Prakash, P., & Gupta, N. (2005). Therapeutic uses of *Ocimum sanctum* (Tulsi) with a note on eugenol and its pharmacological actions. *Indian Journal of Physiology and Pharmacology*, 49(2), 125–131.
10. Ali, B. H., Blunden, G., Tanira, M. O., & Nemmar, A. (2008). Some phytochemical, pharmacological and toxicological properties of ginger (*Zingiber officinale*). *Food and Chemical Toxicology*, 46(2), 409–420.
11. Fiore, C., Eisenhut, M., Krausse, R., et al. (2008). Antiviral effects of *Glycyrrhizaglabra* (Licorice) and its active component glycyrrhizin. *Journal of Ethnopharmacology*, 113(2), 218–228.
12. Cowan, M.M. (1999). Plant products as antimicrobial agents. *Clinical Microbiology Reviews*, 12(4), 564–582.
13. Singh, N., Hoette, Y., & Miller. (2010). *Tulsi: The Mother Medicine of Nature*. Lotus Press.
14. Tyler, V. E., Brady, L. R., & Robbers, J. E. (2006). *Pharmacognosy* (9th ed.). Lea & Febiger.
15. Khandelwal, K.R. (2008). *Practical Pharmacognosy: Techniques and Experiments* (19th ed.). Nirali Prakashan