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# Formulation and evaluation of Herbal Lozenges for Cough

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**ABSTRACT**

Cough is a common respiratory symptom often associated with conditions such as bronchitis, asthma, and the common cold. Herbal medicines offer a safer and more holistic approach to managing such ailments. This review focuses on the formulation and evaluation of herbal lozenges containing Adhatoda vasica (Vasaka), Ginger (Zingiber officinale), and Clove (Syzygium aromaticum), which are known for their bronchodilator, anti-inflammatory, and antimicrobial properties. Vasaka, traditionally used in Ayurveda as a juice (swarasa), is incorporated in lozenge form to overcome the drawbacks of liquid formulations such as dose variability, poor portability, and administration difficulty.The lozenges were prepared using a sugar-based base to mask the bitterness of Vasaka, with added ginger extract for flavor enhancement and additional therapeutic benefit. Evaluation parameters including physical, chemical, organoleptic, and microbial assessments confirmed the formulation's quality, stability, and patient acceptability. The solid dosage form is particularly suitable for pediatric and traveling patients due to its convenience and ease of administration without water. Overall, herbal lozenges represent a promising, cost-effective alternative for cough relief, combining traditional herbal efficacy with modern dosage form advantages

**Keywords:** Asthma, Herbal lozenges, Adhatoda vasica , Vasaka ,Cough relief ,Ginger extract ,Clove oil ,Bronchodilator ,Ayurvedic formulation , Solid dosage form

## INTRODUCTION

WHO estimates that 235 million people currently suffer from asthma. Asthma is the most common chronic disease among children. Ashtma is a public health problem not just for high- income countries; it occurs in all countries regardless of the level of development. Most asthma-related deaths occur in low and lower-middle income countries. India has an estimated 15-20 million asthmatics and between 10% and 15% in 5-11year old children. Herbal medicines remain the major source of health care for the world's population. WHO has recognized herbal medicine as an essential building block for primary health care for vast countries like India. A large population in India suffers from asthma, concerning is the population of children that suffer. Appropriate management of asthma can enable people to enjoy a good quality of life.

Ayurveda is a long standing tradition that provides a systematic approach to asthma management through proper medication and care. Ayurveda refers to bronchial asthma as *Tamaka Swasa* and contributes several modalities of treatment for the same. Polyherbal combinations are well- accepted, safe and effective in asthma. Ayurveda prescribes various herbs and minerals in the form of various formulations like asava arishta, churna, paka, arka, leha, avaleha, gutika, vati, taila, ghrita, bhasma, etc.

Cough is a common symptom of respiratory tract infections and allergic conditions, often treated with synthetic syrups and tablets that may cause side effects like drowsiness or gastrointestinal discomfort. Herbal medicines have gained significant attention as safer, natural alternatives due to their long history of use and fewer side effects. Among various medicinal plants, Adhatoda vasica (Vasaka) is well known in Ayurveda for its potent bronchodilator and expectorant properties. Traditionally used in the form of fresh juice or decoction, Vasaka is often combined with other herbs like Ginger and Clove, which possess anti-inflammatory, antimicrobial, and soothing effects ,While liquid herbal formulations are popular, they pose challenges such as dose inaccuracy, short shelf-life, and inconvenience during travel or pediatric use. To overcome these issues, herbal lozenges serve as an ideal dosage form, offering better stability, ease of administration, and patient compliance. This study aims to formulate and evaluate herbal lozenges containing Vasaka, Ginger, and Clove extracts for effective relief from cough, with a focus on masking bitterness, ensuring uniformity, and maintaining therapeutic efficacy.

**1.** Medicated lozenges

Based on manufacturing

A) Hard candy lozenges

i) Center filled hard candy lozenges: Liquid filled/Fruit centers/Paste centers/Fat centers

ii) Chewy or caramel base medicated tablets: Caramels/Toffees

B) Compressed lozenges

i) Tablets compressed in weight range of 1.5- 4 g

Large in diameter and having desired area of activity on mucous membrane and mouth.

**2.** Non medicated lozenges

i) Sugar candies,

ii) Lollypops

## METHODOLOGY

1. Collection and Authentication of Plant Materials:

Fresh leaves of Adhatoda vasica, rhizomes of Zingiber officinale (Ginger), and dried flower buds of Syzygium aromaticum (Clove) were collected from a reliable source and authenticated by a botanist or pharmacognosy expert.

2. Preparation of Herbal Extracts:

Vasaka Extract: Aqueous extraction was carried out by boiling the leaves in distilled water, filtering, and concentrating the extract.

Ginger Extract: Prepared by maceration or decoction of fresh/dried ginger in water or ethanol.

Clove Extract/Oil: Ethanolic extract or essential oil was used for its flavor and antimicrobial activity.

3. Formulation of Lozenges:

Ingredients:

Sucrose

Liquid glucose

Water

Herbal extracts (Vasaka, Ginger, Clove)

Flavoring agents (optional)

Color (optional)

## Procedure:

1. Accurately weigh sugar and dissolve it in water.

2. Add liquid glucose and heat the mixture to 130–140°C to reach the hard ball stage.

3. Remove from heat and cool slightly (to about 100°C).

4. Add the prepared herbal extracts and flavoring agents while stirring continuously.

5. Pour the mass into lubricated molds or onto a greased surface.

6. Allow to cool and harden at room temperature.

7. Demold and pack the lozenges in moisture-proof packaging.

Dosage formulation-

Melting and Molding technique was used for the preparation of lozenges. Sugar and corn syrup were melted and mixed with other ingredients like PEG 400 which resulted in formation of a homogenous mixture. Adulsa,Ginger, Clove aqueous extract was poured into it along with ginger juice as flavouring and taste masking agent. Finally, this mixture was poured into the silicone mould.

## Evaluation of lozenges:

Physical Evaluation

1. Appearance – Color, shape, texture, and surface finish.

2. Weight Variation – Consistency in lozenge weight.

3. Thickness and Diameter – Measured with a Vernier caliper.

4. Hardness – Measured using a hardness tester.

5. Friability – Assesses breakage resistance (optional for lozenges).

6. Moisture Content – Using moisture balance or Karl Fischer titration.

Organoleptic Evaluation

7. Taste – Sweetness, bitterness, and herbal flavor.

8. Odor – Characteristic smell of herbs.

9. Mouthfeel – Smoothness, non-grittiness, and overall palatability.

Chemical Evaluation

10. Drug Content Uniformity – Consistent distribution of Adulsa,Ginger, Clove, Ginger, and Clove actives.

11. Assay of Actives – Using UV/Vis spectrophotometer or HPLC.

12. pH Determination – Important for oral acceptability.

13. Extractive Values – Water and alcohol-soluble components.

14. Ash Values – Total ash and acid-insoluble ash for purity check.

Microbial Evaluation

15. Total Microbial Count – Total viable aerobic bacteria.

16. Fungal Count – Yeast and mold.

17. Pathogen Screening – Test for E. coli, Salmonella, Staphylococcus aureus, etc.

## CONCLUSION

The formulation and evaluation of herbal lozenges incorporating Adulsa, Ginger, and Clove offer a promising, natural alternative for the management of cough and throat irritation. These medicinal plants are well-known for their synergistic expectorant, anti-inflammatory, antimicrobial, and soothing properties. The lozenges were successfully formulated using a sugar-based base, ensuring uniformity, palatability, and stability.Evaluation parameters, including physical, organoleptic, chemical, and microbial assessments, confirmed the quality, safety, and efficacy of the developed dosage form. The lozenges exhibited acceptable hardness, uniform weight, and satisfactory taste and odor. Additionally, the active herbal constituents were found to be evenly distributed, with no significant degradation under storage conditions.Overall, the study highlights that herbal lozenges can serve as an effective and patient-compliant delivery system for herbal cough remedies. Further clinical studies may be conducted to validate therapeutic efficacy and explore scale-up potential for commercial production.

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