



A CLOVE LOZENGES –A NATURAL APPROACH TO THROAT RELIEF

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ABSTRACT

Clove lozenges are herbal solid dosage forms designed to dissolve slowly in the mouth, providing direct relief for sore throat, cough, and oral irritation. Clove (*Syzygium aromaticum*), enriched with eugenol, exhibits analgesic, anti-inflammatory, and antimicrobial properties. Combined with natural sweeteners like jaggery and honey, and supportive herbs like ginger, the lozenges offer a safe, effective, and natural alternative to synthetic throat remedies. This report discusses the formulation, evaluation, and benefits of clove lozenges, highlighting their role as a natural remedy for throat relief and oral health. Clove lozenges are developed to offer a natural and effective solution for relieving cough and throat discomfort. The formulation typically includes clove due to its antifungal, antibacterial, and analgesic properties, often in combination with honey, ginger, and lime, which collectively provide anti-inflammatory and soothing effects on the throat. In evaluation studies, these lozenges exhibit good physical characteristics (e.g., hardness, uniformity, disintegration time) and favorable sensory attributes (taste and aroma). Clinical observations indicate their potential efficacy in alleviating symptoms of sore throat, cough, and respiratory irritation, making them an attractive and safer alternative to synthetic medications for throat and airway protection. The growing preference for herbal lozenges stems from their natural healing profile, minimal side effects, and pleasant taste, alongside multifunctional effects such as demulcency (soothing), antiseptic action, and immune support, all of which are attributed to such key herbal ingredients as clove. Herbal lozenges are solid pharmaceutical dosage forms intended to dissolve slowly in the mouth, providing local relief to the throat and oral cavity. Lozenges formulated with natural ingredients—such as clove, honey, ginger, and tulsi—aim to alleviate symptoms of sore throat and cough through a combination of demulcent, analgesic, anti-inflammatory, and antimicrobial effects. The formulation process involves blending the selected herbal ingredients, molding, and drying to achieve desired physical characteristics (uniformity, hardness, and disintegration time) and palatability. Clinical evaluation indicates that herbal lozenges are effective in reducing throat irritation and cough, with minimal side effects and a favorable safety profile, thus offering a natural and safe alternative to synthetic cough remedies.

KEYWORDS: Clove lozenges are developed to offer a natural and effective solution for relieving cough and throat discomfort.

1. INTRODUCTION

Lozenges are widely used pharmaceutical and herbal preparations meant to dissolve in the mouth, ensuring sustained release of active agents. Unlike tablets that are swallowed, lozenges act locally, soothing throat irritation and providing symptomatic relief. Throat infections such as pharyngitis, tonsillitis, and cough are common, often

caused by bacterial or viral pathogens. Herbal lozenges formulated with clove offer dual benefits—symptomatic relief and antimicrobial protection.



Clove, a dried flower bud of the tree *Syzygium aromaticum*, is known for its traditional and medicinal uses. Its major bioactive compound, eugenol, has been proven to provide significant pain relief, antimicrobial activity, and anti-inflammatory benefits. This makes it a strong candidate for use in throat lozenges, particularly for natural throat care solution.

Classification of Lozenges

1. Hard Candy Lozenges
2. Soft Lozenges
3. Compressed Tablet Lozenges
4. Chewable Lozenges

1. Hard Candy Lozenges

These are made by a special cooking process where sugar is dissolved to form the candy base.

The sugar solution is heated to 110°C, and if corn syrup is used, the temperature must be kept between 145–156°C.

They can hold about 2–4% of medicines.

Sweeteners used include sucrose, dextrose, maltose, and lactose.

Colors: Approved FD & C colors like orange, red, green, or yellow.

Flavors: Menthol, eucalyptus oil, spearmint, cherry, and others.

Weight: Each lozenge usually weighs 1.5–4.5 g.

Moisture content: 0.5%–1.5%.

Because of the high cooking temperatures, ingredients that are sensitive to heat cannot be added.

Hard candy lozenges are basically a solid syrup of sugar and carbohydrates in a glassy (non-crystalline) state.

2. Soft Lozenges

Popular because they are easy to make and can carry many different medicines.

Base ingredients: usually a mix of polyethylene glycol (PEG), acacia, or similar materials.

A special type called Pastille:

Soft, jelly-like, and see-through.

Contains medicine in a sugar base made of gelatin, glycerol-gelatin, or acacia.

Advantages

Pleasant taste.

Easy to use, carry, and store at room temperature.

Limitations

Lozenges with PEG absorb moisture easily.

They lose strength if exposed to high heat.

3. Compressed Tablet Lozenges

Made by wet granulation or direct compression methods.

These methods are useful for medicines that are thermolabile (easily destroyed by heat).

They are similar to tablets but are designed to dissolve slowly in the mouth rather than being swallowed quickly.

3. Chewable Lozenges

These are soft, candy-like lozenges that have been available for a long time.

They usually have a strong fruity flavor, sometimes slightly acidic, which helps hide the taste of medicine.

Easy to prepare, though making the gelatin base is the most difficult step.

Very useful for giving gastrointestinal (GI) drugs, especially for children.

Can be used for local (oral) or systemic (whole-body) effects.

Also called candy lozenges or “gummy-type” lozenges.

Their pleasant taste and candy-like form make them especially popular among kids.

OBJECTIVE

- To formulate clove-based herbal lozenges for throat relief.
- To evaluate the analgesic, antimicrobial, and anti-inflammatory properties of clove in lozenge form.
- To use natural sweeteners like jaggery and honey for improved palatability and therapeutic value.
- To assess the hardness, friability, disintegration, and organoleptic properties of clove lozenges.
- To promote herbal alternatives as safer and cost-effective remedies for throat problems.

4. Ingredients and Their Role

Ingredient	Scientific Name	Key Components	Role in Lozenges
Clove	<i>Syzygium aromaticum</i>	Eugenol, flavonoids	Analgesic, antimicrobial, anti-inflammatory, freshens breath
Ginger	<i>Zingiber officinale</i>	Gingerols, shogaols	Anti-inflammatory, expectorant, flavoring agent
Jaggery	<i>Saccharum officinarum</i>	Sucrose, minerals	Natural sweetener, binder, throat soothing
Honey	<i>Apis mellifera</i>	Sugars, enzymes	Demulcent, antibacterial, improves taste
Garlic	<i>Allium sativum</i>	allicin	Flavor enhancer, antioxidant support

Clove

Scientific Name: *Syzygium aromaticum*.

Key Components: Eugenol, flavonoids.

Role in Lozenges: Acts as an analgesic, antimicrobial, and anti-inflammatory; also helps freshen breath.

Traditional & Modern Uses: Traditionally used in Ayurveda and Unani medicine for toothache, sore throat, and digestive problems. Modern uses include flavoring agent, oral care, and respiratory relief.

Clove (*Syzygium aromaticum*)

Clove is a dried flower bud of the tree *Syzygium aromaticum*. It has been used for centuries in traditional medicine and is valued for its strong aroma, spicy flavor, and therapeutic properties.

Active Components

Eugenol (main compound): Provides pain-relieving, anti-inflammatory, and antiseptic effects.

Flavonoids, tannins, and essential oils: Contribute to antimicrobial and antioxidant activities.

Role in Lozenges for Throat Relief

1. Pain Relief (Analgesic): Eugenol helps numb throat pain and irritation.
2. Anti-inflammatory: Reduces swelling and discomfort in sore throat.
3. Antimicrobial: Fights bacteria, fungi, and viruses that may cause throat infections.
4. Expectorant Action: Helps loosen mucus, making it easier to clear the throat.
5. Freshening Effect: Leaves a pleasant, warm, and refreshing taste in the mouth.

Health Benefits of Clove in Lozenges

Soothes sore throat, cough, and throat irritation.

Prevents growth of harmful microbes in the mouth and throat.

Provides natural pain relief without synthetic chemicals.

Boosts oral health by reducing bad breath and infections.

Acts as a natural antioxidant, supporting immune defense.

Clove lozenges are a natural remedy for throat problems. With clove's pain-relieving, anti-inflammatory, and antimicrobial properties, these lozenges provide quick and soothing relief from sore throat, cough, and irritation while also supporting oral and respiratory health.

**Ginger**

Scientific Name: *Zingiber officinale*

Key Components: Gingerols, shogaols

Role in Lozenges: Provides anti-inflammatory action, works as an expectorant, and adds flavor.

Traditional & Modern Uses: Used in herbal remedies for cough, cold, indigestion, and nausea. Modern uses include flavoring in foods and therapeutic teas for respiratory relief.

Introduction

Ginger is a widely used spice and medicinal root, valued for its strong aroma and therapeutic properties. It has been traditionally used in Ayurveda, Chinese, and Unani medicine for treating digestive, respiratory, and inflammatory conditions.

Pharmacological Properties

Anti-inflammatory: Reduces throat swelling and irritation.

Analgesic: Provides natural pain relief for sore throat and cough.

Antioxidant: Protects tissues from oxidative stress and supports immunity.

Antimicrobial: Inhibits the growth of bacteria and viruses responsible for respiratory infections.

Role in Herbal Lozenges

1. Soothes Cough and Cold: Helps relieve throat irritation and persistent coughing.
2. Respiratory Support: Acts as an expectorant, aiding in the expulsion of mucus.
3. Flavoring Agent: Adds a warm, spicy taste that complements other herbal ingredients.
4. Immune Booster: Strengthens the body's defense against infections.

Ginger (*Zingiber officinale*) is a powerful herbal ingredient in lozenges, providing anti-inflammatory, analgesic, antioxidant, and antimicrobial benefits. It helps relieve coughs, sore throat, and respiratory discomfort, while also enhancing flavor and immunity.

**Jaggery**

Scientific Name: *Saccharum officinarum*

Key Components: Sucrose, minerals

Role in Lozenges: Serves as a natural sweetener, binder, and soothes the throat.

Traditional & Modern Uses: Traditionally used as an energy booster and detoxifier. Modern applications include its use in confectionary, sweets, and natural throat-soothing remedies.

Introduction

Jaggery, commonly called Gur in India, is a traditional, unrefined sweetener obtained from sugarcane juice. Unlike refined sugar, it is produced without chemical processing, so it retains many natural minerals and nutrients.

Physical Properties

Appearance: Golden brown to dark brown solid blocks or granules.

Taste: Sweet with a slight earthy flavor.

Nature: Hygroscopic (absorbs moisture), slightly sticky.

Nutritional Composition

Carbohydrates (mainly sucrose, glucose, fructose).

Minerals: Iron, magnesium, calcium, potassium, phosphorus.

Vitamins: Small amounts of B-complex vitamins.

Other components: Natural antioxidants and phenolic compounds.

Uses in Herbal Lozenges

1. **Sweetener:** Enhances taste naturally without the side effects of refined sugar.
2. **Binding Agent:** Helps in shaping and holding the lozenge together.
3. **Vehicle/Base:** Serves as a medium to carry herbal extracts and essential oils.
4. **Color & Flavor:** Gives a natural golden-brown color and characteristic taste.

Medicinal & Health Benefits

Respiratory Relief: Traditionally used to relieve cough, sore throat, and mild respiratory congestion.

Energy Booster: Provides quick energy due to simple sugars.

Immunity Support: Contains antioxidants and micronutrients that support the immune system.

Digestive Aid: Helps stimulate digestive enzymes and may prevent constipation.

Detoxifying Action: Believed to help cleanse the respiratory tract and blood.

Warming Effect: Keeps the body warm, especially in cold weather, making it useful in throat remedies.

In herbal lozenges, jaggery not only acts as a sweetener and binder but also enhances the therapeutic value by offering minerals, throat-soothing properties, and immunity-boosting effects. It is preferred over refined sugar because it is more nutritious and supports the overall medicinal purpose of the formulation.



Honey

Scientific Name: *Apis mellifera*

Key Components: Sugars, enzymes

Role in Lozenges: Functions as a demulcent, has antibacterial properties, and improves taste.

Traditional & Modern Uses: Widely used in traditional medicine for wound healing, cough relief, and immunity boosting. Modern applications include natural sweetener and ingredient in throat lozenges.

Honey is widely recognized as an effective natural ingredient for oral health lozenges, due to its potent antimicrobial, antioxidant, and anti-inflammatory properties, making it valuable for reducing oral infections, inflammation, and promoting wound healing in the mouth.

Mechanisms and Benefits

Honey, particularly Manuka honey, directly inhibits harmful oral bacteria such as *Streptococcus mutans*, *Porphyromonas gingivalis*, and *Aggregatibacter actinomycetemcomitans*, helping to prevent dental plaque, gingivitis, and tooth decay.

The key bioactive components—such as methylglyoxal, hydrogen peroxide, phenolic acids, and bee defensin-1—contribute to its antimicrobial and antifungal effects, disrupting bacterial adhesion and biofilm formation in the oral cavity. Honey can also soothe sore throats, reduce cough, and support recovery from oral ulcerations and mucositis, making it well-suited to inclusion in lozenges for oral comfort and healing.

Honey is a natural sweetener that has soothing and healing properties. It forms a protective coating on the throat, which helps reduce irritation and coughing. Honey also has mild antibacterial and antioxidant effects, making it useful for fighting infections and supporting the immune system. Because of its sweet taste, honey is often added to lozenges to make them pleasant to take.



Garlic

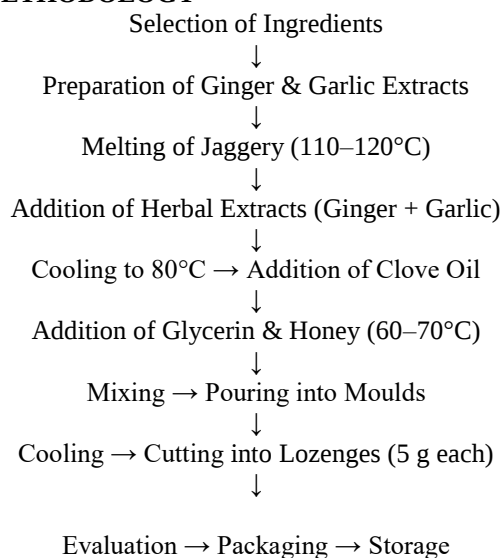
Scientific name: *Allium sativum*

Key component: allicin

Garlic is a well-studied herbal agent with significant antimicrobial, anti-inflammatory, and immunomodulatory activity relevant to oral health and is increasingly considered for inclusion in dental products such as lozenges, mouthwashes, and local delivery systems for periodontal disease management. Garlic extract and its derivatives have shown inhibitory activity comparable to standard oral antimicrobials (e.g., chlorhexidine) in laboratory tests and can effectively reduce oral bacterial load. Garlic is a well-known natural remedy used for many health problems. It has strong antibacterial, antiviral, and antifungal properties. This means it can help fight germs that cause throat infections. Garlic also boosts the immune system and reduces inflammation. Because of these benefits, it is sometimes used in natural throat remedies along with other herbs like clove.



5. METHODOLOGY



6. Evaluation Parameters

Sr.No.	Parameter	Standard Value or Limit
1.	Appearance	Uniform colour, odour, surface; free from cracks
2.	Weight Variation	5% (for >1.5 g lozenges)
3.	Thickness and Diameter	0.1 mm variation acceptable
4.	Hardness	4.0–4.5 kg/cm ²
5.	Dissolution Time	5–10 minutes
6.	Uniformity of Drug Content	90–110% of label claim
7.	Taste and Flavor Evaluation	Palatable and acceptable

8. CONCLUSION

Clove lozenges represent a natural, safe, and effective solution for throat irritation, sore throat, and mild infections. By combining clove with honey, jaggery, and ginger, the formulation provides analgesic, antimicrobial, and soothing benefits. Herbal lozenges are cost-effective, consumer- friendly, and sustainable alternatives to synthetic throat medications. Future research can explore large-scale production, flavor variations, and comparative clinical studies.

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