

DEVELOPMENT AND EVALUTION OF HERBAL LOZENGES

Parul Vyas^{1*}, Harshita Jain², Shipra Singh³, Nitin Nama⁴

^{1,3} UG Scholar, Career Point School of Pharmacy, Career Point University, Kota, India

² Associate Professor, Career Point School of Pharmacy, Career Point University, Kota, India

⁴ Assistant Professor, Career Point School of Pharmacy, Career Point University, Kota, India

Corresponding email Id:parulvyas770@gmail.com

Abstract-Herbal lozenges are a type of lozenge that is made with natural, plant-based ingredients rather than synthetic or chemical compounds. These lozenges are often marketed as a more natural alternative to traditional throat lozenges and may be used to soothe a sore throat, relieve coughing, or ease other symptoms of respiratory illness. Herbal lozenges can be made with a variety of different plant-based ingredients, depending on the intended use and desired effect. For example, lozenges made with Echinacea, elderberry, or zinc may be marketed as immune boosters, while those made with liquorice root, marshmallow root, or slippery elm may be used to soothe an irritated throat. In this review paper, the health benefits of herbal lozenges may also be preferred by individuals who are looking for a natural and chemical-free approach to managing their symptoms.

Keyword: - Herbal lozenges, ajwain, mint, throat infection, plant-based ingredients.

I. 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 (3). Lozenges come in a variety of flavors and formulations, including menthol, honey-lemon, cherry, and eucalyptus. Some lozenges are medicated with ingredients like benzocaine, which can provide temporary relief from pain and irritation in the throat and mouth (5). Others may contain vitamins, herbal extracts, or other natural ingredients.

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 (6). Overall, lozenges are a convenient and effective way to provide relief from minor throat and mouth symptoms, and they are widely available over-

the-counter at most pharmacies and grocery stores. Herbal lozenges are small tablets or pills that are typically made with a blend of herbs and other natural ingredients. The theory behind herbal lozenges is that they can be used to provide a variety of health benefits, depending on the specific herbs used (13). The herbs used in herbal lozenges are often chosen for their therapeutic properties. For example, peppermint and eucalyptus are often used in lozenges for their ability to soothe a sore throat and clear congestion. Ginger is another popular herb that is often used in lozenges for its anti-inflammatory properties, which can help to relieve nausea and other digestive symptom (8) In addition to herbs, many herbal lozenges also contain other natural ingredients such as honey, lemon, and vitamin C. These ingredients are often added for their immune-boosting properties, which can help to support overall health and wellbeing.

While there is some evidence to suggest that certain herbs and natural ingredients can provide health benefits, the effectiveness of herbal lozenges can vary depending on a number of factors, including the quality of the ingredients used and the specific health condition being treated(10). As with any natural remedy, it is always a good idea to talk to a healthcare provider before using herbal lozenges to treat a health condition.



Fig. no. 1 herbal lozenges

Advantages:

- Natural ingredients:** Herbal lozenges are made with natural ingredients, which mean they do not contain synthetic chemicals or artificial additives.
- Potentially effective:** Some herbs used in herbal lozenges have been shown to have medicinal properties that can help soothe sore throats, reduce coughing, and promote overall wellness.
- Fewer side effects:** Because they are made with natural ingredients, herbal lozenges may have fewer side effects compared to traditional medicines.
- Easy to use:** Herbal lozenges are easy to use, as they can be taken orally and do not require any special equipment or preparation.
- Available over-the-counter:** Many herbal lozenges are available over-the-counter, which makes them easily accessible.

Disadvantages:

- Limited scientific evidence:** While some herbs used in herbal lozenges have been studied for

their medicinal properties, more research is needed to fully understand their effectiveness and potential side effects.

- Not regulated:** Herbal lozenges are not regulated by the FDA in the same way that traditional medicines are, which means there may be inconsistencies in the quality and potency of the products.

- Allergic reactions:** Some people may be allergic to certain herbs used in herbal lozenges, which could lead to allergic reactions.

- Interactions with medications:** Some herbs used in herbal lozenges may interact with prescription medications, which could lead to adverse reactions.

- May not be suitable for everyone:** Herbal lozenges may not be suitable for everyone, such as pregnant or breastfeeding women, or people with certain medical conditions. It is important to talk to a healthcare provider before using herbal lozenges.

Herbal lozenges are a type of lozenge that contains natural ingredients that are believed to have medicinal properties. Here are some common types of herbal lozenges:

Echinacea lozenges: Echinacea is an herb that is believed to support the immune system and reduce the severity of colds and flu. Echinacea lozenges may be formulated with other herbs or vitamins to boost their effectiveness (3).

Ginger lozenges: Ginger is a natural anti-inflammatory and is believed to be effective for reducing nausea and promoting digestion. Ginger lozenges may be used to soothe sore throats and promote overall wellness.

Slippery elm lozenges: Slippery elm is a tree that is native to North America and has been used for centuries for its soothing and healing properties. Slippery elm lozenges are often used to soothe sore throats and reduce coughing.

Liquorice lozenges: Liquorice root is a natural anti-inflammatory and is believed to have antibacterial properties. Liquorice lozenges may be used to soothe sore throats and promote overall wellness.

Marshmallow lozenges: Marshmallow root is a natural anti-inflammatory and is believed to be effective for soothing irritated mucous membranes. Marshmallow lozenges may be used to soothe sore throats and reduce coughing.

Sage lozenges: Sage is a natural antiseptic and is believed to be effective for reducing inflammation and soothing sore throats (13). Sage lozenges may be used to promote overall wellness.

Thyme lozenges: Thyme is a natural antiseptic and is believed to be effective for reducing coughing and promoting respiratory health. Thyme lozenges may be used to soothe sore throats and reduce coughing.

When choosing an herbal lozenge, it is important to consider the specific health benefits you are looking for and the texture that you prefer (4). It is also important to read the label carefully to make sure that you are getting a high-quality product that contains the herbs and active ingredients you are looking for.

Lozenges are a type of medicine or candy that are designed to dissolve slowly in the mouth. They come in a variety of flavours, shapes, and sizes. Here are some common types of lozenges:

Throat lozenges: These lozenges are formulated to soothe sore throats and reduce coughing. They often contain ingredients like menthol, eucalyptus, honey, or lemon.

Zinc lozenges: These lozenges are believed to boost the immune system and shorten the duration of colds. They typically contain zinc gluconate or zinc acetate.

Vitamin C lozenges: These lozenges are designed to provide a high dose of vitamin C, which is thought to support immune function and reduce the severity of colds.

Herbal lozenges: These lozenges contain natural ingredients like chamomile, Echinacea, or ginger, which are believed to have soothing or healing properties.

Nicotine lozenges: These lozenges are used as a smoking cessation aid. They deliver a small dose of nicotine to help reduce cravings and withdrawal symptoms.

CBD lozenges: These lozenges contain cannabidiol (CBD), a non-psychoactive compound found in the cannabis plant. They are used to provide pain relief, reduce anxiety, or promote relaxation.

Breath freshener lozenges: These lozenges are designed to freshen breath and mask unpleasant odours. They often contain mint, cinnamon, or other flavourings.

There are three main types of herbal lozenges: hard, soft, and chewable.

Hard lozenges are typically made from a combination of sugar, honey, and herbs and they are designed to dissolve slowly in the mouth (6). They are often used to soothe sore throats, reduce coughing, or freshen breath.

Soft lozenges are similar to hard lozenges, but they have a softer, chewier texture. They are often made from a combination of sugar, honey, herbs, and gelatine, and they are used to soothe sore throats and provide other health benefits (10).

Chewable lozenges are designed to be chewed, rather than slowly dissolved. They are typically made from a combination of sugar, honey, herbs, and gum Arabic, and they are used to soothe sore throats, freshen breath, and provide other health benefits. When choosing an herbal lozenge, it is important to consider the specific health benefits you are looking for and the texture that you prefer. It is also important to read the label carefully to make sure that you are getting a high-quality product that contains the herbs and active ingredients you are looking for.

II. OBJECTIVES

Herbal lozenges are designed to provide various health benefits in the form of a small tablet that slowly dissolves in the mouth. The aim of herbal lozenges is to deliver the active herbal ingredients directly to the throat, mouth, and respiratory system to provide relief from various conditions(15) .Herbal lozenges can be formulated with a variety of herbs and natural ingredients, each of which may have different therapeutic properties. For example, some herbal lozenges may contain herbs that help to soothe a sore throat or alleviate coughing, while others may be designed to boost the immune system or promote relaxation (6, 4).

The specific aims of herbal lozenges can vary depending on the herbs and ingredients used in their formulation. However, some common aims of herbal lozenges may include:

1. Relieving cough and sore throat symptoms
2. Promoting respiratory health
3. Boosting the immune system
4. Supporting digestion and gut health
5. Providing relaxation and stress relief
6. Alleviating allergy symptoms
7. Supporting oral health and hygiene.

It is important to note that herbal lozenges are not intended to replace medical treatment or diagnosis, and individuals should consult with a healthcare professional before using them to treat any health conditions.

III ETIOLOGY OF COUGH:

Cough is a natural reflex of the body that helps to clear the airways of irritants, mucus, and foreign particles. However, when coughing becomes frequent or persistent, it can be a sign of an underlying condition (12). The etiology (cause) of cough can be divided into several categories:

Respiratory infections: Cough is a common symptom of respiratory infections such as the common cold, flu, bronchitis, pneumonia, and tuberculosis. These infections cause inflammation and irritation of the airways, leading to coughing.

Allergies: Allergies to environmental factors such as pollen, dust, mould, and animal dander can cause coughing as the body tries to expel the irritants.

Asthma: Asthma is a chronic condition that causes inflammation and narrowing of the airways, leading to coughing, wheezing, and difficulty breathing.

Gastroesophageal reflux disease (GERD): GERD is a condition where stomach acid backs up into the oesophagus, causing irritation and coughing.

Smoking: Smoking and exposure to second hand smoke can cause chronic coughing as well as chronic obstructive pulmonary disease (COPD).

Medications: Certain medications such as ACE inhibitors used for high blood pressure can cause coughing as a side effect.

Occupational exposures: Exposure to dust, chemicals, and other irritants in the workplace can cause coughing and other respiratory symptoms.

Heart failure: Coughing can be a symptom of heart failure as fluid builds up in the lungs, leading to coughing and difficulty breathing.

In summary, coughing can be caused by a variety of factors, including respiratory infections, allergies, asthma, GERD, smoking, medications, occupational exposures, and heart failure (15). If coughing persists or is accompanied by other symptoms, it is important to seek medical attention to determine the underlying cause and receive appropriate treatment (5).

IV. MATERIALS AND METHODOLOGY

1. Jaggery: *Saccharum officinarum* Jaggery, also known as "Gur" in Hindi, is a type of unrefined cane sugar. In herbal lozenges, jaggery can be used as a natural sweetener and binding agent.



Fig. no. 2 Jaggery

2.Sugar: Sugar can also be used in herbal lozenges as a natural sweetener and binder. It helps in caramel formation and hardens the lozenges.



Fig. no. 3 Sugars

3. Tulsi: Tulsi, also known as *holy basil*, is an herb that has been traditionally used in Ayurvedic medicine for its various health benefits (5). 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.



Fig. no. 4 Tulsi

4. Liquorice root: Liquorice is an extract from the *Glycyrrhizaglabra* plant which contains glycyrrhizic acid (GZA). It is known for its sweet taste and medicinal properties, which include soothing coughs and sore throats, reducing inflammation, and boosting the immune system. In herbal lozenges, liquorice root can be used as a key ingredient to help soothe and relieve coughs and sore throats (9).



Fig. no. 5 Liquorice root

5. Eucalyptus oil: In herbal lozenges, eucalyptus oil can be used as a key ingredient to help clear the respiratory system and relieve coughing and congestion (1). It can also help to soothe sore throats and provide a cooling sensation that can help to reduce inflammation.



Fig. no.6 Eucalyptus

6. Ginger: *Zingiberofficinale*. It is known for its anti-inflammatory, analgesic, and antioxidant properties, which make it a popular ingredient in herbal remedies for various health issues, including respiratory ailments such as coughs and colds. It is important to note that ginger can have blood-thinning effects and should be used with caution by individuals taking blood-thinning medications or with bleeding disorders (3).



Fig. no. 7 dried ginger

Fig. no. 8 decoction of ginger

7. Ajwain: *Trachyspermumammii*n herbal lozenges, ajwain can be used as a key ingredient to help soothe and relieve coughs and sore throats. It can also help to break up mucus in the respiratory system, which can help to reduce congestion and promote easier breathing. (6)



Fig. no. 9 dried ajwain

Fig. no. 10 decoction of ajwain

8. Clove: Clove, also known as *Syzygiumaromaticum*, in herbal lozenges, clove can be used as a key ingredient to help to reduce inflammation in the respiratory system and promote healing. The essential oil of clove contains eugenol, which is a powerful antimicrobial agent that can help to fight infections in the respiratory system (14).



S.NO.	INGREDIENTS	QUANTITY	100%
-------	-------------	----------	------



Fig. no. 11 dried clove

Fig. no. 12 decoction of clove

9. Crystal menthol: Crystal menthol is a natural compound extracted from mint plants, particularly from peppermint and spearmint (12). It is a popular ingredient in herbal lozenges and cough drops due to its cooling and soothing properties, which can help to relieve sore throats and coughs. In herbal lozenges, crystal menthol is often combined with other ingredients such as honey, lemon, and ginger to create a powerful remedy for respiratory ailments.



Fig. no. 13 crystal menthol

Fig. no. 14 powdered menthol

10. Lemon: lemon can be used as a key ingredient to help soothe and relieve sore throats and coughs. Its acidic properties can help to break up mucus and phlegm in the respiratory system, making it easier to expel. The high vitamin C content of lemon can also boost the immune system and help to fight off infections (11).



Fig. no. 15 lemon

Formulation Table:

TABLE NO. 1 FORMULATION OF SOFT LOZENGES

1.	jaggery	40gm	40%
2.	sugar	42gm	42%
3.	tulsi	2ml	2%
4.	liquorice	0.5gm	0.5%
5.	lemon	4-5 drops	Qs
6.	ginger	4gm	4%
7.	ajwain	10ml	10%
8.	eucalyptus	2 drops	Qs
9.	clove	1ml	1%
10.	Crystal menthol	0.5gm	0.55
		TOTAL: - 100gm	TOTAL: -100%

Hard Lozenges:

TABLE NO. 2 FORMULATION OF HARD LOZENGES

S.NO.	INGREDIENTS	QUANTITY	100%
1	jaggery	90gm	90%
2	liquorice	1gm	1%
3	lemon	4-5 drop	2.5%
4	ginger	3gm	3%
5	ajwain	6.5gm	6.5%
6	eucalyptus	1 drops	Qs
7	clove	0.4gm	0.4%
8	Tulsi	2gm	2%
9	Crystal menthol	0.5gm	0.5%
		TOTAL: - 100gm	TOTAL: -100%

METHODOLOGY:

Soft lozenges:

1. Prepare a decoction of tulsi, liquorice, ginger, ajwain, and clove.
2. Rinse the raw material and prepare a decoction (in 100ml distilled water).
3. After prepare a decoction extract the juice with the help of mesh
4. Marc and menstrum is obtained.
5. Menstrum containing tulsi, liquorice, ginger, ajwain, clove extract and mix thoroughly.
6. Extract the eucalyptus oil through Clevenger apparatus.
7. Then liquefy jaggery and sugar in different beaker at medium flame and after melting mix both of them together.
8. Then according to given quantity add menstrum into beaker containing base of lozenges.
9. Continue and mix thoroughly.
10. Add drops of eucalyptus oil.
11. Transfer the solution into mould for its perfect shaping.
12. Then keep it in a refrigerator for 1 to 2 days until it gets harder.
13. Soft lozenges are ready.



Fig.no. 17 soft lozenges

Hard lozenges:

1. Measure the raw material
2. Take ajwain, clove, tulsi, ginger, liquorice and dry the ingredients through hot air oven to remove moisture content.
3. Arrange the Clevenger apparatus for eucalyptus oil.
4. After drying the ingredients powder them through mixer jar and then pass the powder through sieve to get finer particles to get dissolved easily.
5. The on a medium flame liquefy jaggery until it gets melt.
6. During its melting time add accordingly ajwain, clove ginger and tulsi powder together.
7. Continue agitating the mixture and add required quantity of crystal menthol and drops of eucalyptus oil.
8. Keep the mould ready.
9. After mixing the entire ingredient transfer the mixture into mould for shaping then keep

10. It at room temperature until it gets harder. Sprinkle the cinnamon powder on lozenges to avoid getting sticky in humidity, and then the hard lozenges are stored for one to two days in a refrigerator (8).



Fig. no. 18 hard lozenges

V. RESULT & IMPLEMENTATION

1. **Macroscopic evaluation:** refers to the assessment of sensory properties such as taste, odour, and appearance of a product. Herbal lozenges can be evaluated using the following organoleptic parameters (7).
 - **Appearance:** The colour, size, and shape of the lozenges should be assessed. The surface texture, presence of any speckles, and uniformity of shape should also be checked.
 - **Taste:** The taste of the lozenges should be evaluated for sweetness, sourness, bitterness, and saltiness. The aftertaste and mouth feel should also be assessed.
 - **Odour:** The herbal aroma of the lozenges should be assessed for intensity, quality, and pleasantness.
 - **Texture:** The texture of the lozenges should be assessed for hardness, chewiness, and stickiness. It should also be checked if the lozenges dissolve easily in the mouth. (11)

S.NO.	PARAMETER	OBSERVATION

		SOFT LOZENGES	HARD LOZENGES
1.	colour	Dark brown	Brown
2.	taste	Sweet	Sweet
3.	texture	Smooth	Smooth
4.	shape	Oval	Oval

2. Weight variation:

Weight variation refers to the difference in weight between individual units of a product, such as herbal lozenges. It is important to evaluate weight variation in herbal lozenges to ensure that each lozenge contains the correct amount of active ingredient and to ensure consistency in product quality. To evaluate weight variation in herbal lozenges, a sample of lozenges is selected from a batch and individually weighed using a precise electronic balance. (15)

Average weight = (weight of 5 lozenges)/5

Weight variation = (Individual Weight-average weight ×100%)/ (average weight)

	AVERAGE WEIGHT	%VARIATION
F1 HARD LOZENGES	6.8	±2.94
F2 SOFT LOZENGES	7.5	±3.46

3.

Determination of moisture:

Moisture content is an important parameter to evaluate in herbal lozenges as it can affect the stability, quality, and shelf life of the product(3). Moisture can also influence the physical and chemical properties of the lozenges, such as their texture and solubility.

S.NO.	DOSAGE FORM	MOISTURE CONTENT
1.	F1 HARD LOZENGES	0.6%
2.	F2 SOFT LOZENGES	0.8%

4. Stability:

Stability testing is an important part of product development for herbal lozenges. Stability testing is used to evaluate the chemical, physical, and microbiological characteristics of the product over time and under various storage conditions. The stability of herbal lozenges can be affected by factors such as temperature, humidity, light, and oxygen exposure. (6) A formulation is kept for someday approx. 20 days and the testing is carried out up to required time period.

5. Measurement of PH:

PH is an important parameter to evaluate in herbal lozenges. PH is a measure of the acidity or alkalinity of a solution and can have an impact on the stability, efficacy, and sensory properties of the product. The pH of herbal lozenges can be determined using a pH meter or pH paper. A small amount of the lozenge is dissolved in water, and the pH of the resulting solution is measured. (2) The acceptable pH range for herbal lozenges depends on the specific product and its intended use. Typically, a pH range of 5.5 to 7.5 is acceptable for most herbal lozenges.

S.NO.	DOSAGE FORM	PH
1.	F1 HARD LOZENGES	5-6
2.	F2 SOFT LOZENGES	3-5

6.Dissolution time:

Dissolution time is an important parameter to evaluate in herbal lozenges as it can affect the release of active ingredients and the efficacy of the product. The dissolution time of herbal lozenges can be influenced by factors such as the size and shape of the lozenge, the type and number of excipients used, and the environmental conditions during storage (5).The dissolution time of herbal lozenges can be determined by placing a lozenge in a beaker of water at a specified temperature and measuring the time it takes for the lozenge to completely dissolve. The acceptable dissolution time for herbal lozenges depends on the specific product and its intended use. (9,4)



S.NO.	DOSAGE FORM	DISSOLUTION TIME
1.	F1HARD LOZENGES	8MIN.
2.	F2 SOFT LOZENGES	10MIN.

VI. CONCLUSION:

In conclusion, herbal lozenges are natural remedies that offer several benefits for a variety of ailments such as sore throat, cough, cold, and allergies. With an increasing demand for natural and organic products, growing interest in traditional medicine, increased research and development, and diverse applications, the future of herbal lozenges is promising. As consumers become more health-conscious, the market for herbal lozenges is likely to grow significantly, providing a natural and effective alternative to conventional medications. Additionally, with on-going research, it is expected that more innovative and effective herbal lozenges will be developed to meet the growing demand for natural remedies. Herbal lozenges are a safe and effective option for those seeking natural relief from common ailments.

VII. REFERENCES:

1. Panati C. Panati's extraordinary origins of everyday things. New York: Harper and Row. ISBN 0060964197. 1989;258 and 8211;260
2. Aulton ME. *Pharmaceutics: the science of dosage form design*. Churchill Livingstone. 2000.
3. Bhowmik D, Pankaj C, Tripathi KK, Chandira MR, Kumar KPS. Zingiberoffcinale the herbal and traditional medicine and it's therapeutically importance. *Res J Pharmacognosy Phytochemical*. 2010; 2(2):102-10.
4. Dahiya J, Jalwal P, Arora S, Singh B. Formulation and evaluation of polyherbal lozenge *Pharma Innov*, 2015; 4: 97.
5. Sastry SV, Nyshadham JR, Fix JA. Recent technological advances in oral drug delivery- a review. *Pharm Sci Tech Today*, 2000; 3: 138-45.
6. McElhiney LF. Education, training, and evaluation of hospital compounding personnel. *Int J Pharm Compd*, 2006; 10: 361.
7. Jagadeesh P, Ahammad DA, Devi GG, Mohiddin YK, Naveen R, Lakshmi BP, et al. Review on medicated lozenges. *Int J Innov Pharm Sci Res.*, 2019; 7: 11-25.
8. Controller of Publication. *Pharmacopoeia*. New Delhi, Indian: Controller of Publication, 2007; 1: 1576.
9. Ghosh PK, Sharma HK, Boruah N. Different methods used in solid dispersion. *J Pharm.*, 2018; 8: 28-38.
10. Chaudhari PD, Chaudhari SP, Lanka SD, Nakul P. Formulation and in vitro evaluation of taste masked or dispersible dosage form of lozenge. *Indian J Pharm Educ*, 2007; 41: 319-28.
11. Rao KP, Kumar CA, Afshanlaheji AK, Manjunath P, Baburao NC. Formulation and evaluation lozenges. *Int J Pharm Sci.*, 2011; 3: 125-8.
12. Phaechamud T, Tuntarawongsa S. Clotrimazole soft lozenges fabricated with melting and mold technique. *Res J Pharm Bio Chem Sci.*, 2010; 1: 579: 86.
13. Maheshwari R, Jain V, Ansari R, Mahajan SC, Joshi G, A review on lozenges, *BBB*, 2013, 1-9.
14. Shinde SG, Kadam V, Kapse GR, Jadhav SB, Zameeruddin, Bharkad VB, A review on lozenges, *IAJPR*, 2014, 4, 567-570.
15. Pothu R &Yamsani MR, Lozenges formulation and evaluation: A review, *IJAPR*, 2014, 1, 290-294.