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Original Article

A Review on Herbal Sore-Throat Candy: Formulation, Pharmacological Properties and Evalution

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ABSTRACT

Sore throat is a common complaint associated with throat pain, irritation, dryness, cough and difficulty in swallowing. Herbal medicines have traditionally been used for respiratory and throat-related complaints and contain diverse bioactive constituents. This review discusses the proposed development of a herbal sore-throat candy containing Vasaka leaves, guava leaves, pomegranate peel, rose petals, ginger, honey, Pippali and lemon. The review covers the causes and symptoms of sore throat, herbal ingredients, reported pharmacological properties, their possible role in sore-throat management, formulation and preparation, evaluation parameters, advantages, limitations, packaging, storage and future prospects. Individual ingredients have reported antimicrobial, antioxidant, anti-inflammatory, analgesic, antitussive or soothing properties in traditional, experimental or clinical literature. However, these findings should not be interpreted as proof of efficacy of the complete candy unless the finished formulation is specifically tested. Proper standardization, quality control, stability testing, microbiological evaluation and safety assessment are required for further development.

Keywords: Polyherbal candy Ginger, Vasaka, Pippali, Antimicrobial activity, Anti-inflammatory activity

INTRODUCTION:

Sore throat is a common health problem that may occur due to infections, inflammation, allergy, environmental irritation, or excessive use of the voice. It is generally associated with throat pain, irritation, difficulty in swallowing, dryness and cough. Most uncomplicated cases are self-limiting; however, symptomatic treatment is commonly used to provide relief from throat discomfort [1,2].

Interest in herbal medicines has increased because medicinal plants contain biologically active compounds that may show antimicrobial, antioxidant and anti-inflammatory properties. Traditional medicinal plants used for sore-throat conditions have demonstrated antimicrobial activity in experimental studies [3]. Honey is traditionally used for cough and throat discomfort, and a systematic review and meta-analysis reported improvement in upper respiratory tract symptoms and reductions in cough frequency and severity compared with usual care [4].

Ginger contains gingerols and related compounds that have been investigated for biological activities. A systematic review of meta-analyses reported effects on inflammatory and oxidative-stress markers, although these findings mainly concern systemic ginger supplementation rather than a specific throat-candy formulation [5]. A herbal sore-throat candy is a convenient dosage form in which selected herbal ingredients can be incorporated into a palatable, slowly dissolving preparation. The development of such a formulation requires suitable ingredient selection, standardization, preparation, quality evaluation, packaging and stability assessment.

1.NEED AND IMPORTANCE OF HERBAL SORE-THROAT CANDY:

Sore throat can cause pain, irritation, dryness, itching, difficulty in swallowing and cough. In uncomplicated cases, treatment is commonly aimed at reducing symptoms and providing comfort. A slowly dissolving candy or lozenge can provide a convenient dosage form for local oral and throat exposure.

Clinical research has investigated botanical lozenges for chronic pharyngitis, although evidence from one botanical product cannot be directly extrapolated to

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the proposed formulation [6]. Honey also has supportive clinical evidence for symptomatic relief of upper respiratory tract symptoms and cough [4].

A herbal sore-throat candy may offer convenience, palatability and ease of administration while allowing selected medicinal plants to be combined in one dosage form. However, herbal origin does not automatically establish safety or therapeutic effectiveness. The final product requires appropriate physical, chemical, microbiological, stability and safety studies.

1.CAUSES AND SYMPTOMS OF SORE THROAT:

Causes: Viral infections are common causes of acute sore throat and may occur with cough, runny nose or other respiratory symptoms [1,2]. Group A Streptococcus is an important bacterial cause of acute pharyngitis, particularly in children and adolescents [2,7]. Allergens, cigarette smoke, air pollution, dust, chemical fumes and dry air can contribute to throat irritation. Prolonged voice use can cause throat discomfort and hoarseness. Gastroesophageal reflux may contribute to chronic throat irritation in some individuals [8].

Symptoms: Common symptoms include throat pain or soreness, irritation and dryness, painful or difficult swallowing, throat redness or inflammation, cough, hoarseness, fever, swollen neck lymph nodes, runny or blocked nose and general tiredness. Symptoms alone do not always distinguish viral from bacterial infection; clinical assessment and appropriate testing may be needed in suspected streptococcal disease [2,7].

2.HERBAL INGREDIENTS USED IN THE FORMULATION:

The proposed formulation contains Vasaka leaves powder, guava leaves powder, pomegranate peel powder, rose petal powder, fresh ginger juice, honey, Pippali powder, sugar and lemon premix. Vasaka contains quinazoline alkaloids including vasicine and vasicinone [9]. Guava leaves contain phenolic and flavonoid constituents [10,11]. Pomegranate peel is rich in polyphenols, tannins, ellagitannins and punicalagin [12]. Rose contains flavonoids and other bioactive constituents [13]. Ginger contains gingerols and shogaols [5]. Honey contains sugars, organic acids and phenolic compounds and has clinical evidence for cough relief [4]. Pippali contains alkaloids including piperine and piperlongumine [14]. Lemon contains flavonoids and phenolic acids [15].

Types Of Coughs:

- **Dry (nonproductive):** Doesn't bring up mucus.
- **Wet (productive):** Brings up mucus or phlegm.
- **Acute:** Lasts less than 3 weeks.
- **Subacute:** Lasts 3–8 weeks.
- **Chronic:** Lasts more than 8 weeks in adult.
- **Barking or "whooping":** Distinctive sounds that can occur with certain infections or airway conditions.

Ingredients:

Table 1: Ingredients

Ingredient Category	Specific Ingredient	Weight (gm)	Weight (gm)	Percentage (%)	Role of formulation
Candy Base (88%)	Sugar	6.00 g	6,000mg	60.0 %	Sweetener
	Honey	2.00g	2,000mg	20.0%	Natural demulcent
	Fresh Ginger Juice	0.50 g	500mg	5.0%	Anti-inflammatory
	Lemon Premix	0.30 g	300 mg	3.0 %	Preservative
Herbal Active Blend (12%)	Vasaka Leaves Powder	0.30 g	300 mg	3.0 %	Cough relief Agent
	Guava Leaves Powder	0.25 g	250 mg	2.5 %	Anti-microbial
	Pomegranate Peel Powder	0.25 g	250 mg	2.5 %	High Anti- oxidant

Ingredient Category	Specific Ingredient	Weight (gm)	Weight (gm)	Percentage (%)	Role of formulation
	Rose Petal Powder	0.25 g	250 mg	2.5 %	Natural cooling
	Pippali Powder	0.15 g	150 mg	1.5 %	Bio-enhancer
Total		**10.00 g**	**10,000 mg**	**100 %**	



4.PHARMACOLOGICAL PROPERTIES OF THE INGREDIENTS:

4.1 Vasaka Leaves Powder:[9]

- **Botanical Name**: Justicia Adhatoda (formerly known as Adhatoda vasica).
- **Family:** Acanthaceae (the Acanthus family).
- **Common Names:** Adulsa, Malabar Nut, Vasa. Fig.1:Vasaka Powder

• Description:

- The Powder: The powder is made by thoroughly washing, shade-drying and finely grinding the mature green leaves.It has a characteristic pale to olive green color a distinct herbaceous aroma, and a highly bitter, astringent.



4.2 Guava Leaves Powder: [10,11]

- **Botanical Name:** *Psidium guajava L*
- **Family:** Myrtaceae (the myrtle family, which also includes eucalyptus, cloves.
- **Common Names**: Amrood Patta (Hindi)
- **Description:** Fig.2:Guava Powder

The Powder: Prepared by shade-drying and crushing mature leaves, the final powder features a greenish-brown to olive-green color a mild earthy aroma, and a slightly astringent.

4.3 Pomegranate Peel Powder: [12]

- **Botanical Name:** *Punica granatum* L



- **Family:** Lythraceae (Historically classified under its own family, Punicaceae).
- **Common Names**: Anar Chilka (Hindi)
- **Description:** Prepared by thoroughly scrubbing the peels, separating them from the white bitter inner membranes, sun-drying or dehydrating them, and crushing them into a fine powder. The resulting powder ranges from a yellowish-tan to reddish-brown color, carries a faintly fruity but earthy aroma, and has a very astringent, better.



Figure 3: Pomegrante Powder

4.4 Rose Petal Powder: [13]

- **Botanical Name:** Dried Petals of Rose damascena Mill
- **Family:** *Rosaceae*
- **Common Names:** Damask Rose
- **Description:** Rose petals are soft, delicate, fragrant and usually pink to reddish in colour. The dried petals are powdered to obtain a fine, aromatic rose petals powder.



Figure 4: RosePetal Powder

4.5 Fresh Ginger Juice: [5]

- **Botanical Name:** Zingiber officinale Roscoe
- **Family***:* Zingiberaceae
- **Common Names**: Ginger / Adrak
- **Description:** Ginger is a branched, aromatic rhizome with a pale

yellowish-brown outer surface and yellowish-white inner portion. It has a characteristic strong aroma and pungent, warm taste.



Figure 5: Fresh Ginger Juice

4.6 Honey: [4]

- **Botanical Name:** Apis mellifera
- **Family**: Apidae
- **Common Names**: Madhu Honey
- **Description**: Honey is a thick, viscous, sweet liquid ranging from nearly colourless to dark brown, with a characteristic floral aroma and flavour.



4.7 Pippali Powder:[14]

- **Botanical Name:** Piper long pepper
- **Family***:* Piperaceae
- **Common Names**: Pippali / long pepper
- **Description:** Pippali consists of small, elongated, cylindrical, spike-like dried fruits. The powder is brownish to dark brown, aromatic, pungent and slightly bitter in taste.



Figure 7: Pippali Powder

4.8 Lemon Premix:[15]

- **Botanical Name:** Citrus limon (L.) Osbeck
- **Family:** Rutaceae
- **Description**: Lemon is a small, yellow, ovoid citrus fruit. Its juice is pale yellow, clear to slightly cloudy, strongly acidic and has a characteristic refreshing citrus aroma and

Sour taste. Fig.8:Lemon Premix

Approximate Nutritional Value of 1 Herbal Candy (10gm):

Table 2: Nutritional Value

Nutrient	Approximate Value
Energy	30 – 33 kcl

Nutrient	Approximate Value
Carbohydrates	7.5 – 8.0 g
Sugar	7 – 7.5 g
Protein	< 0.2 g
Fat	< 0.1 g
Dietary fibre	0.2 – 0.4 g
Moisture	Variable
Sodium	Very low

ROLE OF HERBAL INGREDIENTS IN SORE-THROAT MANAGEMENT:

Herbal ingredients may have a supportive role in throat preparations because several contain compounds with antimicrobial, antioxidant, anti-inflammatory, analgesic or soothing properties. Vasaka and Pippali have traditional associations with respiratory complaints. Guava leaves, pomegranate peel, rose and ginger provide sources of phytochemicals with reported biological activities. Honey has comparatively useful clinical evidence for symptomatic relief of cough in upper respiratory tract infections [4].

A study of traditional herbs used for sore throat reported antimicrobial activity in several plant extracts, including Adhatoda vasica [3]. However, laboratory activity of an extract does not establish clinical efficacy of a finished candy. The complete proposed combination requires formulation-specific testing.

1.HERBAL CANDY FORMULATION AND PREPARATION:

1. Clean selected plant materials to remove dust and foreign matter.
2. Dry leaves, pomegranate peel and rose petals under suitable conditions; powder and sieve separately.
3. Accurately weigh and uniformly mix the herbal powders.
4. Prepare the sugar base by dissolving sugar with a suitable small quantity of water and concentrating under controlled heating
5. Add honey with appropriate mixing while avoiding unnecessary prolonged heating.
6. Gradually incorporate the herbal powder mixture and mix uniformly.
7. Add fresh ginger juice and lemon premix at the selected processing stage and mix thoroughly.
8. Transfer the mass into suitable moulds or form uniform candy pieces.
9. Cool and solidify under clean, dry conditions.
10. Pack in a suitable moisture-protective package and store under controlled conditions.

2.EVALUATION OF HERBAL SORE-THROAT CANDY:

1.Appearance:

- Check color, shape, surface, and overall physical appearance.
- The candy should be uniform, smooth and free from cracks or visible impurities.

2.Oranoleptic Evaluation: `

- **Color:** Uniform and characteristic of the ingredients.
- **Odour:** Pleasant and characteristic.
- **Taste:** Sweet with a mild herbal/spicy taste.
- **Mouthfeel**: Should be smooth and comfortable in the mouth.

3.Weight variation:

- Weigh individual candies and calculate the average weight.
- Determine the percentage deviation from the average weight.
- This checks uniformity of each cand

4.Hardness:

- Determine the force required to break/crush the candy using a suitable hardness tester.
- The candy should have sufficient hardness to withstand handling but should dissolve/suck comfortably.

5.Friability:

- Assess resistance to abrasion during handling and packaging.
- Excessive friability indicates poor mechanical strength.

6.Moisture content:

- Determine moisture by a suitable drying method.

- Excess moisture may cause stickiness, softening and reduced stability.

7. pH:

- Prepare an aqueous solution/dispersion of the candy and determine its pH using a calibrated pH meter.
- This is particularly relevant because the formulation contains lemon premix and herbal ingredients.

8. Disintegration/dissolution Time:

- Determine the time required for the candy to dissolve or disperse.
- A throat candy should dissolve gradually rather than disintegrate immediately.

9.Stability study:

- Store the candy under suitable conditions and periodically examine
- Colour
- Odour
- Taste
- Weight
- Hardness

Preliminary Phytochemical Test of Herbal Ingredients:

Table 3: Preliminary Phytochemical Test of Herbal Ingredients

Ingredient	Important constituents	Chemical test	Positive result
Fresh Ginger Juice (Zingiber Officinale)	Gingerols Shogaols Volatile oil	Ferric chloride test (Gingerols)	Greenish/blue/Color may indicate phenolics
		Volatile oil test	Characteristic aromatic odour
Vasaka leaves powder (Adhatoda vasica)	Alkaloids flavonoids Tannins	Dragendorff's test (Alkaloids)	Orange / brown PPT
		Mayers test (flavonoids)	Cream PPT
Guava leaves powder (Psidium guajava)	Tannins Flavonoids Phenolics	Ferric chloride test (Tannin)	Greenish / blue –black color
		Shinoda test-Flavonoid	Pink / red color
Pomegranate Peel Powder (Punica granatum)	Tannins Phenolics Flavonoids	Ferric chloride test (Tannins)	Blue /green colour
		Alkaline reagent test (Flavonoids)	Yellow colour
Rose Petal Powder (Rosa spp.)	Flavonoids Tannins Phenolics	Ferric chloride test (Tannins)	Green / blue colour
		Shinoda test (Flavonoids)	Pink / red colour
Pippali Powder (Piper longum)	Alkaloids Volatile oil Phenolics	Dragendorffs test (Alkaloids)	Orange PPT
		Mayer's test (flavonoids)	Cream PPT
Sugar	Sucrose	Molisch test	Violet ring
	Reducing sugar after hydrolysis	Fehlings test	Brick-red PPT
Lemon premix	Citric acid	Acidic reaction/pH test	Acidic Ph
	Citrate	Calcium chloride test	White calcium citrate PPT under suitable conditions

1. ADVANTAGES OF HERBAL SORE-THROAT CANDY:

1. Convenient and easy-to-administer dosage form.
2. Slow dissolution can provide prolonged contact with the mouth and throat.
3. Portable and easy to handle.
4. Provides an opportunity to combine several herbal ingredients in one dosage form.
5. Honey, lemon and rose may improve flavour and palatability.
6. Provides scope for formulation optimization and development as a patient-friendly oral preparation.

8. LIMITATIONS:

1. Clinical evidence for the complete formulation may be limited.

2. Phytochemical composition of herbal materials can vary with species, origin cultivation.
3. Standardization of multiple herbal constituents can be challenging.
4. Strong or bitter herbal flavours may reduce palatability.
5. Moisture and heat can affect candy texture and stability.
6. Herbal raw materials may carry microbial contamination if not properly processed and tested.
7. Sugar-containing formulations may not be suitable for everyone and may require reduced-sugar alternatives.
8. Natural ingredients can still cause adverse effects or interactions.
9. The final product should not replace appropriate medical assessment or treatment for severe or persistent throat disease.

9. STORAGE AND PACKAGING:

The candies should preferably be packed individually or in a suitable moisture-resistant container. Possible materials include aluminium foil, blister packs, moisture-resistant laminated pouches, food-grade plastic containers or suitable glass containers. Packaging should be clean, non-toxic, compatible with the formulation and protective against moisture, light, air, contamination and physical damage.

The product should be stored in a cool, dry and clean place away from direct sunlight and excessive heat. The container should remain tightly closed. During stability studies, colour, odour, taste, hardness, moisture, weight and microbiological quality can be monitored. Labeling should include product name, ingredients, net quantity, batch number, manufacturing date, expiry/best-before date, storage conditions, manufacturer details, directions for use and 4 appropriate precautions.

10. FUTURE PROSPECTS:

Future work may include optimization of ingredient quantities and processing conditions; authentication and standardization of herbal raw materials; quantitative estimation of marker phytoconstituents; antioxidant, antimicrobial and anti-inflammatory studies; long-term and accelerated stability studies; improved moisture-protective packaging; reduced-sugar or sugar-free versions where appropriate; safety and interaction studies; and well-designed clinical studies of the complete finished formulation.

CONCLUSION :

Sore throat is a common condition associated with throat pain, irritation, dryness, cough and difficulty in swallowing. Herbal medicines provide a source of diverse bioactive compounds and have traditionally been used for respiratory and throat-related complaints. The proposed herbal sore-throat candy combines Vasaka leaves, guava leaves, pomegranate peel, rose petals, ginger, honey, Pippali and lemon in a convenient oral dosage form.

The selected ingredients have reported antioxidant, antimicrobial, anti-inflammatory, analgesic, antitussive or soothing properties in different types of evidence. Honey has comparatively useful clinical evidence for symptomatic relief of cough in upper respiratory tract infections. Nevertheless, pharmacological findings for individual ingredients cannot be considered direct evidence that the complete candy is effective. The final formulation requires appropriate standardization, physical and chemical evaluation, microbiological testing, stability assessment and safety studies.

Overall, herbal sore-throat candy represents a potentially useful plant-based dosage-form concept that combines traditional herbal ingredients with a convenient, palatable preparation. Further evidence-based research is necessary before specific therapeutic claims can be made.

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