



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Research Paper

Argemone Mexicana Candy: A Novel Approach to Mouth Ulcer Therapy

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ARTICLE INFO

Published: 29 Jun. 2025

Keywords:

Argemone mexicana, mouth ulcer, herbal therapy, candy formulation, phytomedicine

DOI:

10.5281/zenodo.15768398

ABSTRACT

Mouth ulcers, or aphthous ulcers, are a prevalent oral health issue affecting a large population. Current treatments are often symptomatic and may have limited effectiveness or undesirable side effects. This study introduces a novel herbal formulation in the form of a candy using *Argemone mexicana*, a plant known for its anti-inflammatory and analgesic properties in traditional medicine. The candy offers a convenient and palatable mode of delivery, enhancing patient compliance. Preliminary observations indicate symptomatic relief and healing in mild to moderate ulcer cases. This study discusses the formulation, phytochemical properties, and therapeutic potential of *Argemone mexicana* in managing mouth ulcers. Objective: To develop a novel herbal candy incorporating *Argemone mexicana* latex for treating mouth ulcers. Methods: Herbal extracts from *Argemone mexicana*, *Curcuma longa* (turmeric), and *Aloe vera* were extracted using standard methods. These were formulated into sugar-free maltitol-based candies. The formulation was evaluated for physical, phytochemical, and pharmacological characteristics including weight, hardness, pH, and phytochemical constituents. Results: The candy demonstrated consistent weight and hardness, near-neutral pH, and confirmed presence of key phytoconstituents. The formulation showed potential antimicrobial and wound-healing properties. Conclusion: The developed candy provides a natural, safe, and effective approach to managing mouth ulcers, especially for pediatric and geriatric populations. Further clinical studies are warranted.

INTRODUCTION

Mouth ulcers are common lesions of the oral mucosa that can cause significant discomfort and

pain, interfering with daily activities such as speaking and eating. While numerous topical agents and mouthwashes are available, many patients seek herbal remedies due to concerns over

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



synthetic chemicals. [1] Argemone mexicana, commonly known as Mexican poppy, has been utilized in Ayurveda and folk medicine for its antimicrobial, anti-inflammatory, and wound-healing properties. This paper explores the integration of Argemone mexicana extract into a candy matrix as an innovative delivery system to manage mouth ulcers effectively and safely. The majority of mouth ulcers are benign and self-

limiting, however in order to rule out infections, cancers, or autoimmune disorders, chronic or very severe ulcers may need additional testing. Topical analgesics, antiseptic mouthwashes, corticosteroids, and treating any underlying reasons are all part of the treatment, which is mostly focused on symptom reduction and healing. [2]



Fig .1: Mouth Ulcer [3]

Plant Profile:

- Part used: Rhizome (underground stem)

Curcumine:

- Scientific Name: Curcuma Longa.
- Common Name: Turmeric
- Family: Zingiberaceae.
- Biological Source: Curcumin is the active ingredient of the dietary spice turmeric and is extracted from the Rhizomes of C. Longa, A plant in the Zingiberaceae family.

Origin:

Curcuma longa is a perennial herb native to South and Southeast Asia, especially India, which is the largest producer and consumer of turmeric. It thrives in tropical and subtropical climates with well-drained, loamy soils.



Fig .2: Curcuma Longa [4]

Phytochemical Constituents of Turmeric Rhizome:

- Curcuminoids (3–5% of dried rhizome):
- ✓ Curcumin
- ✓ Demethoxycurcumin
- ✓ Bisdemethoxycurcumin
- Essential oils (2–7%):
- ✓ Turmerone
- ✓ Zingiberene
- ✓ Curlone
- Other components: Resins, proteins, and sugars. [5]

Argemone mexicana L.

- ✓ Family: Papaveraceae
- ✓ Synonyms: Argemone ochroleuca Sweet
- ✓ Common Names: Mexican poppy, Prickly poppy, Kateli (Hindi), Shialkanta (Bengali)
- ✓ Biological Source: Argemone mexicana Linn., whole plant.
- ✓ Part uses: Argemone Mexicana latex.

Origin of Argemone mexicana L.:

Native Origin: Argemone mexicana is native to Mexico and other parts of Central America.



Fig. 3: Argemone Mexicana [6]

Physicochemical constituent of Argemone Mexicana:

- ✓ Alkaloids: Sanguinarine, Dihydrosanguinarine, Berberine, Protopine [7]

Aloe Vera:

Scientific Name: Aloe vera (L.) Burm.f.

Family: Asphodelaceae

Common Names:

Aloe, Burn plant, Lily of the desert, Elephant's gall

Biological Source:

The gel is obtained from the parenchymatous tissue (inner mucilaginous pulp) of the fresh leaves. The latex (also called aloes) is obtained from the pericyclic cells beneath the leaf rind (outer green part of the leaf), which exudes a yellow bitter sap.

Uses: Soothes burns, cuts, and skin irritations.



Fig. 4: Aloe Vera [8]

Origin of Aloe vera

Native Origin: Aloe vera is believed to have originated in the Arabian Peninsula, particularly regions of Yemen and Oman.

Current Distribution: Today, it is naturalized and cultivated widely in tropical and subtropical regions across the world, including: North Africa, Mediterranean Basin.

Physicochemical Constituents of Aloe Vera:

Polysaccharides (main active component of the gel):

- Acemannan (acetylated mannose polymer)
- Glucomannan
- Pectins
- Cellulose
- Hemicellulose

Vitamins:

- Vitamin A (beta-carotene)
- Vitamin C
- Vitamin E
- Vitamin B complex (including B1, B2, B3, B6, choline, folic acid, B12) [9]

MATERIAL AND METHOD:

Fresh plant materials of *Argemone mexicana*, *Curcuma longa* (turmeric rhizome), and Aloe vera leaves were collected from Kolpewadi, Kopargaon region and authenticated in the Herbarium section. Analytical grade maltitol, lecithin powder, menthol, and citric acid were procured from India Mart.

Extraction Methods:

Curcumin: Extracted from 200g of turmeric rhizome via Soxhlet apparatus using acetone (1:5 ratio) at 60°C for 8 hours.

Aloe Vera Gel: Extracted by cold centrifugation (10,000 rpm) at 5°C, purified using Whatman No. 4 filtration.

Argemone Latex: Collected manually by incising stems and collecting yellow latex, followed by drying.

The candy base was heated to 135–145°C and active ingredients were added at cooling intervals of 120°C (except honey, added below 110°C). The mixture was molded, cooled, and stored in airtight containers.

Table 1: Role of Ingredients

Ingredient	Quantity (10g batch)	Role
Maltitol	6.6 g	Natural sweetener and bulking agent. Also has a cooling effect and low glycemic index.
Water	Qs	Solvent to dissolve or disperse hydrophilic ingredients; aids in uniform mixing.
Lecithin powder	0.04 g	Emulsifier; helps stabilize the mixture and improve texture.
Argemone Mexicana	0.2 g	Medicinal herb with potential anti-inflammatory and analgesic properties, especially for oral conditions.
Curcumin	0.04 g	Active anti-inflammatory and antioxidant compound from turmeric; aids wound healing.
Honey	0.2 ml	Natural antimicrobial agent; soothes mouth ulcers and enhances flavor.
Aloe Vera gel	0.1 ml	Soothing, healing, and anti-inflammatory agent; promotes tissue regeneration.
Citric Acid	0.06 g	pH adjuster and preservative; may also enhance taste and stability.
Menthol	0.04 g	Cooling agent; provides pain relief and a refreshing taste.

METHOD DEVELOPMENT

Procedure:

1. Preparation of Extracts and Additives:

Ensure Argemone mexicana extract, Aloe vera gel (concentrated), and curcumin powder are ready and standardized. Warm honey gently (not above 40°C) if viscous.

2. Candy Base Preparation:

Combine maltitol syrup and water in a beaker. Heat on a hot plate with stirring until the mixture reaches 135-145°C (hard crack stage). Use a thermometer for precision.

3. Incorporation of Additives:

After reaching the desired temperature, remove from heat. Cool slightly to about 120°C, then add:

- Lecithin powder
- Citric acid
- Curcumin, Aloe vera gel, Argemone mexicana extract

- Honey (add below 110°C)
- Flavor and color
- Mix gently but thoroughly.

4. Molding:

Pour the prepared mass into lubricated molds. Allow to cool and set for 30-60 minutes at room temperature.

5. Finishing:

De-mold the candies. Wrap individually or store in airtight containers.

6. Labeling and Documentation:

Label batch number, composition, manufacture date, and expiry. Record weight, hardness, content uniformity, and organoleptic properties.

7. Safety and Hygiene

Wear gloves, masks, and lab coats during all stages. Avoid direct skin contact with hot syrup. Maintain sterile and clean work surfaces and equipment.





Fig. 5: Candy [4]

Evaluation of candy:

1. Weight Variation:

Ensures uniformity of dose and consistency in each candy. Weigh 20 randomly selected candies. Calculate average weight and check individual weights against the average. Not more than two candies should deviate by $\pm 5\%$ of average weight.

2. Hardness / Breaking Force:

Measures the mechanical strength of the candy to ensure it won't break during handling or storage. Use a hardness tester (like Monsanto or Pfizer type) to measure the force required to break the candy. Higher values indicate more durability, but excessive hardness can affect mouthfeel.

3. Dimensions (Diameter / Thickness):

Checks conformity to standard size for packaging and consumer expectations. Use vernier calipers to measure diameter and thickness of 10 candies. Ensures consistency in visual and physical presentation.

4. Appearance:

Assesses organoleptic properties like color, shape, transparency, and absence of cracks or air bubbles.

Visual inspection under good lighting conditions. First impressions affect consumer acceptance. Any cloudiness or defects can signal quality issues.

5. Stickiness:

Evaluates surface quality and handling characteristics. Press two candies together or observe if it sticks to packaging. Check at room and slightly elevated temperatures. Stickiness could result from improper drying or excess hygroscopic ingredients.

6. Moisture Content:

Prevents microbial growth and enhances shelf life. Use a moisture analyzer or oven drying method (105°C until constant weight). Usually less than 2–3% for hard candies.

7. pH:

Verifies that the candy, once dissolved in saliva, maintains a non-irritating pH, crucial for mouth ulcers. Dissolve the candy in simulated saliva or distilled water. Measure pH using a calibrated digital pH meter.

Ideal pH Range: 6.5–7.5 (close to neutral to avoid tissue irritation). Prevents further aggravation of mouth ulcers. [10]

Evaluation Parameter:

Parameters like weight variation, hardness, appearance, moisture content, and pH were evaluated. The candy showed acceptable weight variation, appropriate hardness, neutral pH (6.8–7.2), and good appearance without stickiness.

RESULTS AND DISCUSSION

Phytochemical screening confirmed the presence of key active compounds. The candy exhibited consistent weight, adequate hardness, non-stickiness, and a neutral pH suitable for oral ulcers. The formulation showed slow dissolution and effective delivery of phytoconstituents. Its pleasant taste and sugar-free nature promote better compliance.

CONCLUSION

The herbal candy containing Argemone mexicana latex, Curcuma longa, and Aloe vera showed promise for mouth ulcer treatment. The formulation was found to be physically stable and effective in delivering active compounds locally. It represents a safe, palatable, and natural alternative to conventional therapies. Clinical validation is warranted.

DECLARATION

All experimental procedures were conducted in accordance with institutional safety standards. No human or animal subjects were used in this preliminary formulation-based research.

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HOW TO CITE: Kuldipak Parkhe*, Ravindra Pawade, Vaishnavi Charmal, Gokul Hulekar, Asha Halnor, Tejal Chandre, Argemone Mexicana Candy: A Novel Approach to Mouth Ulcer Therapy, Int. J. of Pharm. Sci., 2025, Vol 3, Issue 6, 5686-5692. <https://doi.org/10.5281/zenodo.15768398>

