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

OPEN ACCESS

Research Paper

Formulation And Evaluation of Herbal Mouth Ulcer Gel

Nikita Kor[1], Pradnya Tarmale[2], Vaibhavi Vishe[3], Pratiksha Sonawane[4]

[1,2,3]*Research Scholar of Siddhi's Institute of Pharmacy, Nandgaon*
[4]*Assistant Professor of Siddhi's Institute of Pharmacy, Nandgaon*

ARTICLE INFO

Published: 05 June 2025
Keywords:
Mouth Ulcer, Curcuma longa, healing.
DOI:
10.5281/zenodo.15597838

ABSTRACT

The current study focuses on the "Formulation and Evaluation of a Herbal Gel" that combines natural substances with therapeutic capabilities to heal mouth ulcers. Selected herbes such as Guava, Polyalthia longifolia, Curcuma longa (turmeric), Aloe vera, Capsicum were incorporated due to their anti-inflammatory, antimicrobial, and wound-healing activities. The gel was prepared using a suitable gelling agent to ensure appropriate consistency and ease of application. Physical parameters like pH, spreadability, viscosity, and stability were evaluated. The gel exhibited satisfactory physical characteristics and showed significant antimicrobial and healing potential. The herbal formulation provided a safe and effective alternative to synthetic treatments.

INTRODUCTION

Aphthous stomatitis, also known as a Mouth Ulcer, is a condition that lining of mouth and causes painful sores that come back regularly in the mouth and throat.[1] Mouth ulcer can be caused by various factors, including accidentally biting the inside of the cheek, allergic reaction to certain foods, brushing to hard, hormonal changes, lack of vitamins, bacterial infection, and underlying health conditions.[2]

Gels are semisolid substances made by thickening a ingredients. They are commonly used on the skin or to help medicines pass through the skin into the body. Gels can also be applied to mucous membranes for localized treatment.[3] A mouth ulcer is a small, round sore or wound that can appear red, yellow, white or grey in colour. It forms on soft lining inside the mouth, most often on the inner side of the lips or cheeks.[4]

Herbal medicines are becoming more popular due to their natural origin and fewer side effects compared to allopathic (conventional) medicines, leading to higher patients acceptance. However, there are still concerns about their safety, effectiveness, and quality, which are important issues for both industrialized and developing nations. It's noteworthy that around 1.42 billion people-about a quarter of world's population-rely

***Corresponding Author:** Nikita Kor
Address: *Research Scholar of Siddhi's Institute of Pharmacy, Nandgaon*
Email ✉: kornikita23@gmail.com
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.

on traditional medicines to treat a wide range of health conditions.[3]

❖ **Types of Oral Ulcers Based on Lesion Size :**

1. **Minor Ulcers :** These are small ulcers, typically ranging from 2 to 8 millimeters in diameter. They are usually mild in pain and tend to heal on their own within 1 to 2 weeks without leaving scars.
2. **Major Ulcers :** Larger and deeper than minor ones, major ulcers often have irregular or raised edges. They may take longer to heal and can be more painful and persistent.
3. **Herpetiform Wounds:** These are collections of pinhead-sized lesions that typically occur near one another.

4. Ulcerative Conditions : Mouth sores are quite common and often result form physical damage like ill-fitting dentures, sharp or broken teeth, or dental fillings.[5]

❖ **A number of things can lead to mouth ulcers, such as:**

1. **Toothpastes and mouthwashes with sodium lauryl sulfate :** This common foaming agent can irritate the lining of the mouth in some people.
2. **Emotional or mental stress :** High stress levels can weaken the immune system, making the mouth more prone to ulcers.
3. **Hormonal fluctuations :** Changes in hormone levels, such as those during menstruation or pregnancy, can trigger ulcers in some individuals.
4. **Lack of essential nutrients :** Mouth sores can develop as a result of vitamin deficiencies, including those in folic acid, iron, and vitamin B12.
5. **Physical irritation :** Injuries from the sharp teeth, dental applience, Or accidental bite can cause ulcer .
6. **Viral infection :** Viruses such as herbs, simplex can lead to painful sores in the mouth.
7. **Allergic reactions and sensitivities :** certain foods or ingredients can trigger ulcer formation in sensitive individuals.
8. **Family history :** A genetic predisposition can increase the likelihood of developing mouth ulcer
9. **Infection :** Both bacterial and viral infection can cause ulceration in the mouth.
10. **Underlying medical issue :** Conditions like celiac disease, Crohn's disease, or autoimmune disorders may be associated with recurring mouth ulcer.[5]

❖ **Herbs used in mouth ulcer :**

1) Guava :

Guava leaves are shaped somewhere between oval and oblong, typically measuring 7 to 15 centimeters in length and 3 to 5 centimeters in width. They grow in pairs directly across from each other On the stem are attached by short stalks called petioles. The leaves have tough, leathery texture with a broad surface, Dark green color and subtle white veins. Some leaves may also show light Brown spots. When crushed guava leaves give off a fragnant, smell similar to the guava fruit. These leaves grow on a small tree with spreading branches and bark that peels away in flakes, revealing the greenish layer underneath.[3]

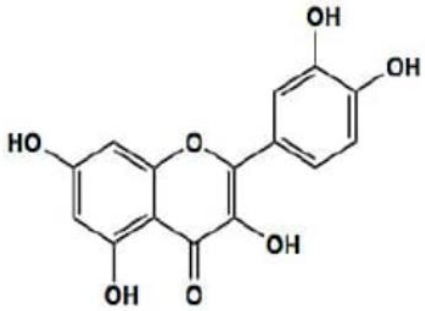
Fig.1-Guava leaves

- **Taxonomical classification :**

Kingdom : plantae
Sub Kingdom : viridiplantae
Intra kingdom : Streptophyta
Superdivision : Embryophyta
Division : traqueophyta
Subdivision : Spermatophytina
Class : Magnoliopsida
Super order : Rosanae
Family : Myraceae
Genus : Psidium
Species : P. guajava [6,7]

- **Chemical Constituents :**

It contains tannin, resin and crystals of calcium oxalate. Leaves contain quercetin, resins, fat, cellulose, tannin, volatile oil, chlorophyll, and mineral salt vitamin C, vitamin B, antioxidant tannin. [3,8,9]



Quercetin

- **Medicinal properties :**

Antiulcer
Anti oxidant
Antibacterial.
Anti inflammatory
Anti cancer
And fungal.
Anti microbial.
Anti tumor.
Anti allergic.
Anti hyperglycemic
Anti mutagenic. [10]

2)Polyalthia Longifolia :

Polyalthia Longifolia known as false Ashoka and mast tree,This plant, which is a member of the Annonaceae family, is employed in many indigenous medical systems. [11]

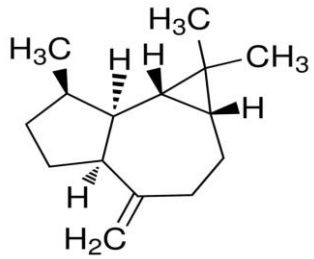
Fig.2-Polyalthia longifolia

[1] Taxonomical classification :

Kingdom : Plantae
Division : Magnoliophyta
Class : Magnoliopsida
Order : Magnoliales
Genus : Polyalthia
Botanical name : Plyalthia longifolia cv. Pendula. [12]

[2] Chemical Constituents :

Sesquiterpenes : allo-aromadendrene (19.7%, 7.4%), caryophyllene oxide (14.4%), β-selinene (8.6%, 7.9%), α-copaene (8.7%), α-muurolol (8.7%), viridiflorene (8.1%), α-guaiene (7.8%), α-humulene (7.0%),ar-curcumene (6.8%), δ-cadinene (7.0%), sesquiterpenoid
Monoterpenes: α-pinene (0.5%), camphene (trace). [13]



Allo-aromadendrene

[3] Medicinal properties :

Anti ulcer
Antimicrobial
Antioxidant
Antibacterial
Anti-inflammatory
Anticancer
Antifungal
Anti-leishmanial
Antiviral
Analgesic activity [14]

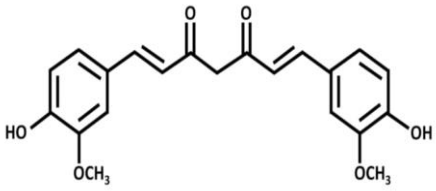
3) Turmeric :

Turmeric is the common name for Curcuma longa. Curcuma longa, a member of the Zingiberaceae family, is the biological source of turmeric. Its rhizomes contain important natural compounds called curcuminoids, which include curcumin, demethoxycurcumin, and bisdemethoxycurcumin. These curcuminoids make up about 3-6% of the rhizome and are known for their antioxidant properties. Among them,The most common component, curcumin, gives turmeric its characteristic yellow hue. [15]

Fig.3-Turmeric

- **Chemical Constituents:**

The rhizomes contain important chemical compounds called curcuminoids, that include curcumin, bisdemethoxycurcumin and demethoxycurcumin. [15]



Curcumin

[4] Medicinal Properties :

Analgesic
Anti-inflammatory
Antiseptic
Anticarcinogenic
Antioxidant
Antibacterial
Immunomodulatory [16]

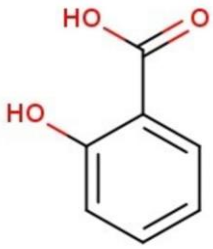
4) Aloevera :

Aloe vera belonging to the family liliaceae is commonly known as “aloe gel”. Aloe barbadensis is the biological source of aloe vera.· [17,18]

Fig.4-Aloevera

[5] Chemical Constituents :

Aloe vera contains anthraquinones, saccharides, prostaglandins, fatty acids, enzymes, amino acids, vitamins, minerals, cholesterol, triglycerides, steroids, uric acid, lignins, beta-sitosterol, gibberellin, and salicylic acid. Plant are aloin, isobarbaloin, and emodin. [18]



Salicylic acid

[6] Medicinal Properties :

Wound healing
Anti-inflammatory
Antibacterial
Antifungal
Antioxidant
Antitumor
Immune boosting [16]

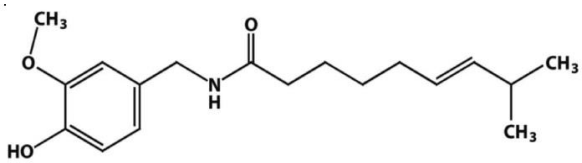
5) Capsicum :

Capsicum is made from the dried fruts of two plants : Capsicum annuum and the smaller fruits of Capsicum frutescens. It is a member of the Solanaceae (nightshade) family.

Fig.5-Capsicum

[7] Chemical Constituents :

The main ingredients that give capsicum annuum its fiery flavor and color are capsaicin, dihydrocapsaicin, and paprika oleoresin.

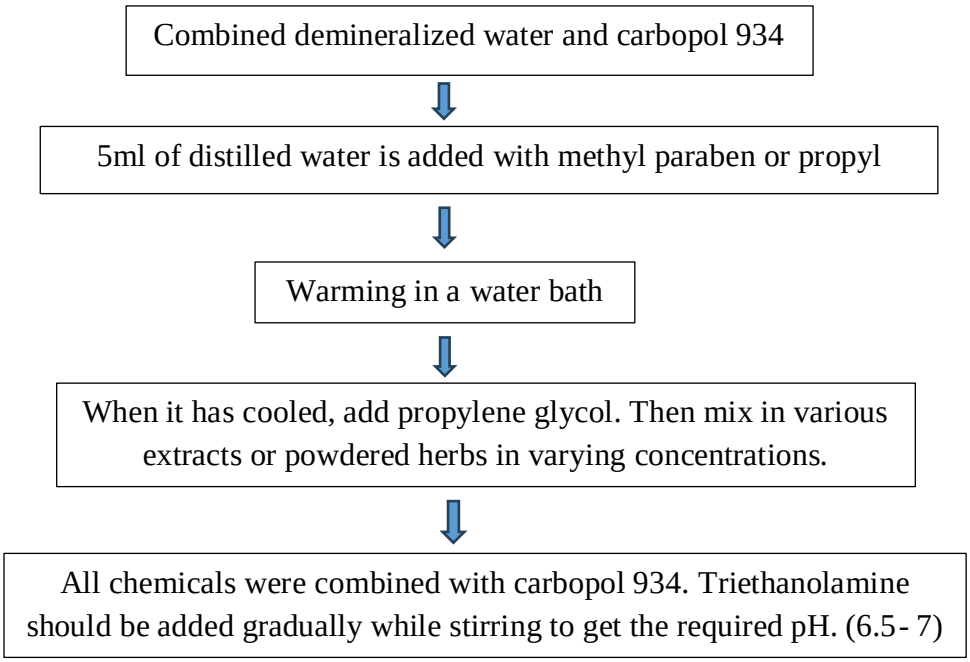


Capsaicin

- **Medicinal Properties :**

Mouth Ulcers
Gas in the stomach
Cramps
Stomach pain
Diarrhoea [19]

❖ **Method of preparation of simple herbal gel: [5]**



❖ **Evaluation :**

I. Visual Appearance (Clarity) :

The gels were examined for their color, clarity, texture, transparency, and whether any grit was present. When taken as a whole, these elements show how the formulation looks.

II. Physical Evaluation :

The product was examined visually to assess its physical traits, including colour, smell, and trxture.

a) Colour :

The colour of the formulation was checked through simple visual observation.

b) Consistency :

The texture of the product was tested by applying a small amount to the skin to feel its consistency.

c) Odour :

To evaluate the scent, the gel was mixed with water and then smelled to identify its fragrance. [20]

III. Stability Study:

The product's stability was tested by storing it in both open and closed containers at room temperature for one month. After this period, the formulation was examined to observe any changes in its appearance, texture, or smell. [21]

IV. Homogeneity

After the gels were placed into containers, they were visually inspected to check for uniformity. The formulations were examined to ensure there were no clumps or possible particles, confirming a smooth and even appearance.[21]

V. Measurement of pH :

A digital pH meter was used to measure the herbal gel compositions' pH. To perform the test, 1 gram of the gel was dispersed in 10 ml of distilled water and left to stand for two hours. The pH was measured three times for accuracy, and the average value was recorded. As part of the stability study, any changes in the gel's pH over time were also noted. [22]

VI. Spreadability:

Spreadability refers to how easily the gel can be spread, and it is measured by the time is takes for two glass slides to separate under a certain

weight. A small amount of gel is placed between two slides, and a specific weight is applied on top. The quicker the slides move apart, the better the gel's spreadability. The spreadability is calculated using the formula:

S = M*L/T

Where :

S = Spreadability

M = Weight applied to the upper slide

L = Length of the glass slides

T = Time taken for the slides to separate. [20]

CONCLUSION

Herbal mouth ulcer gels formulated with various medicinal herbs offer a natural and effective alternative to conventional treatments. Ingredients such as the guava, polyalthia longifolia, curcumin longa, aloe vera, capsicum provides anti-inflammatory, anti-microbial, soothing properties. These herbs work synergistically to reduce pain, swelling, and healing time unlike the synthetic option, herbal gel have fewer side effects, and are well tolerated. They promote tissue regeneration and help to maintain oral hygiene. The gel was stable, easy to apply, and physical parameters such as pH, viscosity, spreadability were within the acceptable ranges. The overall study support the use of herbal formulation as a safe, effective alternative for managing mouth ulcer.

REFERENCES

1. Charde K, Upadhye KP, Gholse YN, Chaple DR. Current updates on recurrent aphthous stomatitis: etiology, pathogenesis and management. World J Pharm Sci. 2020;9(5):448-462.
2. Deshmane S. A review on oral mouth ulceration. Int J Pharm. 2014;(1):216-29.
3. World Journal of Pharmaceutical Research, Overview: on herbal mouth ulcer gel, Shivani K. Dahihande, Pragati V. Pawar, Gauri B. Chilkwar and Rekha B. Dhangare.
4. Radhakrishnan R. What Are the Causes of Mouth Ulcers. 2020. https://www.medicinenet.com.
5. Formulation and evalution of pharmaceutical aqueous gel for mouth ulcer treatment: Miss Harshada B. Tribhuvan*1, Miss. Sapana S. Mhaske2, Miss. Vaishnavi G. Wayal3, Miss. Priti R. Pawar4, Prof. Kajal Walunj,2022:5:35-38.
6. Hidalgo, F.R.; Gómez, U.M.; Escalera, C.D.; Quisbert, D.S. Beneficios de la guayaba para la salud. Rev. Inv. Inf. Salud 2015, 10, 27–32.
7. ITIS—Integrated Taxonomic Information System. Available online: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search topic=TSN&search_value=27240#null (accessed on 17 February 2020).
8. Kumari Subitha T, Ayyanar M, Udaya Kumar M, Sekar T. "Ethnomedicinal plants used by Kani tribals in Pechiparaiforests of Southern Western Ghats, Tamil Nadu, India," International Research Journal Plant Science 2011;2(12):349-354.
9. Jadhav ST. Formulation and Evaluation Pharmaceutical Aqueous Gel of Powdered Guava, Aloe Vera and Acacia Leaves for Treatment of Mouth Ulcer. Int J Sci Res. 2019; 8(5): 1693-1697.
10. Guintu FZ, Chua AH. Effectivity of guava leaves (Psidium guajava) as mouthwash for patients with aphthous ulcers. Philipp J. Otolaryngol Head Neck Surg. 2013;28(2):8–13.
11. The chemistry, pharmacologic, and therapeutic applications of Polyalthia longifolia K. V. Katkar 1, A C Suthar 1, V S Chauhan 1,Pharmacogn Rev. 2010 Jan-Jun;4(7):62–68.

12. Thombare V, Shamkuwar P, Chavan S. A comprehensive review on Polyalthia longifolia. Tradit Indian Med. 2021:4-6. doi:10.12032/TMR20201218212.
13. Ogunbinu A.O, Ogunwande I.A, Essien E. Sesquiterpenes-Rich Essential Oils of Polyalthia longifolia Thw.(Annonaceae) from Nigeria. J Essent Oil Res. 2007;19:419–21.
14. Development And Evaluation Of Herbal Oral Gel Containing Extract Of Polyalthia Longifolia Leaves For The Treatment Of Mouth Ulcers S. S. Chavan, V. D. Thombare, B. Shejul.
15. Nadkarni's KM. Indian Materia Medica, Popular Prakashan, Mumbai, India 1976;1:776-783.
16. Oral Ulceration and Indian Herbs: A Scoping Review Archna Agnihotri1, Antervir Kaur2, Rosy Arora1.
17. Rogers RS. Recurrent aphthous stomatitis: clinical characteristics and evidence for an immunopathogenesis. J. Invest Dermatol 1977; 69:499-509.
18. Amar Surjushe, Resham Vasani, D G Saple. Aloe vera a short review. Indian journal of Dermatology.2008;53(4):163-166.
19. Herbal Remedies Used For The Treatment of Mouth Ulcer Shubham Mittal1 ,Ujjwal Nautiyal1, International Journal of Health and Clinical Research, 2019;2(1):17-23.
20. Formulation and evaluation of Herbal Oral Gel Containing Extracts of Powdered Psidium guajava Linn Leaves with Curcuma longa Linn Rhizomes to Treat Mouth Ulcer: Richa Sing*, Sagar Bansal and Manoj Kumar Mishra, 2020, 1-7.
21. Formulation and Evaluation of Polyherbal Aqueous Gel from Psidium guajava, Piper betel and Glycyrrhiza glabra Extract for Mouth Ulcer Treatment: Nem Kumar Jain1, Rituparna Roy1, Hero Khan Pathan1, Aditi Sharma1, Shakhi Ghosh1, Santosh Kumar,2020:2:145-148.
22. Preparation and evaluation of herbal mouth ulcer gel: A Research Pratiksha Vadde1, Mayuri Jagtap1, Komal Sul2.

HOW TO CITE: Nikita Kor, Pradnya Tarmale, Vaibhavi Vishe, Pratiksha Sonawane, Formulation and Evaluation of Herbal Mouth Ulcer Gel, Int. J. of Pharm. Sci., 2025, Vol 3, Issue 6, 846-853. https://doi.org/10.5281/zenodo.15597838