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Review Article

Formulation and Evaluation of Herbal Mouth Ulcer Gel by Utilizing Psidium Guajava and Jasminum Officinale

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ABSTRACT

This study addresses the formulation and evaluation of Herbal mouth ulcer gel containing extracts of Psidium Guajava and Jasminum officinale. The herbal mouth ulcer gel is Formulation using leaves of Psidium Guajava and Jasminum officinale. The Extraction of Guava and Jasmine leaves is Prepared by Ethanolic Extraction and herbal mouth ulcer gel is Prepared by Compounding Method. The herbal mouth ulcer gel formulation was prepared by using guava leaf extract, jasmine leaf extract, Carbopol 934, methyl paraben and propyl paraben, Triethanolamine and required amount of distilled water. The physicochemical parameters of formulation such as PH, Spreadability, Viscosity, Homogeneity, Patch test, Clarity activity were determined. The Results showed that the optimized herbal mouth ulcer gel formulation containing guava leaf extract and jasmine leaf extract shows that all physicochemical parameters were found to be compatible with normal range. The current formulation study demonstrates that it is possible to prepare, develop and evaluate herbal mouth ulcer gel containing extract of Psidium Guajava and Jasminum officinale.

INTRODUCTION

Mouth ulcers, also known as oral ulcers or canker sores, are painful lesions that occur on the mucous membranes of the oral cavity. These ulcers can be caused by various factors such as trauma, stress, hormonal changes, nutritional deficiencies, and microbial infections. While conventional

treatments for mouth ulcers are available, there is a growing interest in exploring natural remedies due to their perceived safety and efficacy. Guava (Psidium guajava) and jasmine (Jasminum officinale) are two medicinal plants that have been traditionally used for their therapeutic properties. Guava leaves are rich in bioactive compounds such as tannins, flavonoids, and phenolic

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compounds, which possess antimicrobial, anti-inflammatory, and wound-healing properties. Similarly, jasmine leaves contain phytochemicals

like saponins, flavonoids, and alkaloids, known for their antioxidant and anti-inflammatory effects.



Fig 1: Guava Leaves

The aim of this is to formulate and evaluate a herbal mouth ulcer gel utilizing extracts from guava leaves and jasmine leaves. By harnessing the medicinal properties of these plant extracts, it is hypothesized that the developed gel will offer an effective and natural solution for the treatment of mouth ulcers. This research seeks to contribute to the growing body of knowledge on herbal formulations for oral health care and provide insights into the potential benefits of utilizing botanical extracts in pharmaceutical preparations. The following chapters will delve into the methodology employed for extracting the active compounds from guava and jasmine leaves, formulating the herbal gel, and evaluating its physicochemical properties, stability. Through rigorous experimentation and analysis, this study aims to ascertain the feasibility and efficacy of the herbal mouth ulcer gel and its potential as an alternative or adjunctive therapy for managing oral ulcers.

ADVANTAGES:

1. **Natural Ingredients:** Utilizing extracts from guava leaves and jasmine leaves offers a natural and potentially safer alternative for



Fig 2: Jasmine Leaves

treating mouth ulcers compared to synthetic medications.

2. **Therapeutic Properties:** Guava and jasmine leaves are rich in bioactive compounds with antimicrobial, anti-inflammatory, and wound-healing properties, which can help in alleviating symptoms and promoting healing of mouth ulcers.
3. **Potential Synergistic Effects:** Combining extracts from multiple botanical sources may result in synergistic effects, enhancing the overall efficacy of the herbal mouth ulcer gel.
4. **Cost-Effective:** Herbal formulations often use readily available plant materials, making them cost-effective compared to synthetic drugs.
5. **Reduced Side Effects:** Natural remedies typically have fewer adverse effects compared to synthetic medications, making them suitable for individuals with sensitivities or allergies.

DISADVANTAGES:

1. **Variable Potency:** The concentration of bioactive compounds in herbal extracts can vary depending on factors such as plant

species, growth conditions, and extraction methods, leading to inconsistency in efficacy.

2. **Limited Scientific Evidence:** While traditional use of guava and jasmine leaves for oral health is well-documented, scientific evidence supporting their efficacy as mouth ulcer treatments is still limited, warranting further research.
3. **Regulatory Challenges:** Herbal products may face regulatory hurdles related to standardization, quality control, and labeling requirements, which can impact their market availability and acceptance.
4. **Potential Allergic Reactions:** Despite being natural, herbal ingredients can still cause allergic reactions or sensitivities in some individuals, necessitating caution in formulation and usage.
5. **Cultural Acceptance:** Herbal remedies may not be widely accepted or trusted in certain cultures or communities, leading to reluctance in adopting them as treatment options for mouth ulcers.

2.1 Mouth Ulcer: Causes and Symptoms and Types:

Mouth ulcers, also known as oral ulcers or canker sores, are painful lesions that develop on the mucous membranes inside the mouth. They can appear on the inner cheeks, lips, tongue, gums, and roof of the mouth. Mouth ulcers can vary in size, shape, and severity, ranging from small, shallow lesions to larger, more painful sores.



Fig 3: Mouth Ulcer

1. Causes:

1. Trauma or injury to the mouth from accidental biting, sharp edges of teeth or dental appliances, or dental procedures.
2. Stress or anxiety, which can weaken the immune system and increase susceptibility to mouth ulcers.
3. Hormonal changes, such as those occurring during menstruation, pregnancy, or menopause, which may predispose individuals to develop mouth ulcers.
4. Nutritional deficiencies, particularly deficiencies in vitamins B12, B6, and folate, as well as iron and zinc.
5. Allergic reactions to certain foods, medications, or oral hygiene products.

2. Symptoms:

- Pain or discomfort, especially when eating, drinking, or speaking.
- Redness and inflammation around the ulcer site.
- Swelling of the surrounding tissues.
- Difficulty in brushing teeth or maintaining oral hygiene around the affected area.
- Tingling or burning sensation before the ulcer appears.
- Fever or general malaise in cases of severe infection.

3. Types:

Based on their Size of lesions and the number,

1.Minor Ulcer: These are about 2-8mm wide and usually rot in 10 days to 2 weeks.



Fig 4: Minor Ulcer

2.Major Ulcer: These are large and deep, usually with a raised or Irregular border.



Fig 5: Major Ulcer

3.Herpetiform Ulcer: They are Characterized by multiple small Pinpoint-sized lesions that cluster together to form larger ulcerated areas.



Fig 6: Herpetiform Ulcer

2.2 Guava Leaves and Jasmine Leaves

1. Guava Leaves:



Fig 7 - Guava Leaves

Guava leaves, derived from the guava tree (*Psidium guajava*)

1. Medicinal Properties: Guava leaves are rich in bioactive compounds such as tannins, flavonoids, phenolic compounds, and essential oils, which contribute to their therapeutic effects. These compounds possess antioxidant, antimicrobial, anti-inflammatory, analgesic, and wound-healing properties.

2. Antimicrobial Activity: Guava leaf extract has demonstrated significant antimicrobial activity against a wide range of microorganisms, including bacteria, fungi, and parasites. It is particularly effective against oral pathogens such as *Streptococcus mutans*, which is implicated in dental caries and mouth infections.

3. Anti-inflammatory Effects: Compounds present in guava leaves exhibit potent anti-inflammatory properties, helping to reduce inflammation and swelling in various conditions. This makes guava leaf extract beneficial for soothing inflamed tissues, including those affected by mouth ulcers and oral infections.

4. Antioxidant Activity: The antioxidant compounds in guava leaves help neutralize

harmful free radicals and oxidative stress, protecting cells from damage and supporting overall health. This antioxidant activity contributes to the anti-aging and disease-preventive effects of guava leaf extract.

2. Jasmine Leaves:



Fig 8- Jasmine Leaves

Jasmine leaves, derived from the jasmine plant (*Jasminum officinale*)

1. Medicinal Properties: Jasmine leaves contain various bioactive compounds, including flavonoids, phenolic acids, alkaloids, and essential oils, which contribute to their medicinal properties. These compounds exhibit antioxidant, anti-inflammatory, analgesic, antimicrobial, and sedative effects.

2. Anti-inflammatory Effects: Compounds found in jasmine leaves possess potent anti-inflammatory properties, helping to reduce inflammation and alleviate pain associated with inflammatory conditions. Jasmine leaf extract may be beneficial for soothing oral tissues affected by mouth ulcers and other oral infections.

3. Antimicrobial Activity: Jasmine leaf extract exhibits significant antimicrobial activity against a wide range of microorganisms, including bacteria, fungi, and viruses. It may help inhibit the growth

of oral pathogens and promote oral hygiene, contributing to overall oral health.

4. Analgesic Effects: Jasmine leaves contain compounds with analgesic properties, which can help relieve pain and discomfort. Topical application of jasmine leaf extract may provide symptomatic relief for conditions such as mouth ulcers, sore throat, and dental pain.

2.3 Selection of Herbal Ingredient:

1. **Guava Leaves:** The guava leaves were collected from campus of sandip university college examine by Dr. Sandhya Borse Mam. And Collected Leaves wash with distilled water for further drying kept it for two days at sunlight. Then dry leaves were crushed and kept it for ethanolic extraction.



Fig 9- Guava Leaves

Family: myrtaceae

Synonym: lychee, pawpaw, pomelo

Biological name: *Psidium guajava*

Chemical Consistent: Carbohydrate, Gallic acid, ascorbic acid, protein, phenolic compound.

Uses:

- May Help Lower Blood Sugar Level
- May Boost Heart Health

- May Benefit Your Digestive System
- May Help Boost Your Immunity
- Reduce The Size of the ulcer

2. Jasmine Leaves: The Jasmine Leaves were Collected from campus of Sandip University College Examine by Dr. Sandhya Borase Mam. And Collected Leaves wash with distilled water for further drying kept it for two days at sunlight. Then dry leaves where crushed and kept it for Ethanolic Extraction.



Fig 10- Jasmine Leaves

Family: Oleaceae

Synonyms: Jessamine, Jasmin, Jessamy, Jasmine

Biological Name: Jasminum officinale

Chemical Consistuent: Benzyl Alcohol, Benzyl acetate, Linolool, Indol, Benzyl Benzonate, Cis Jasmine, Geroniol, Methyl antrolinate.

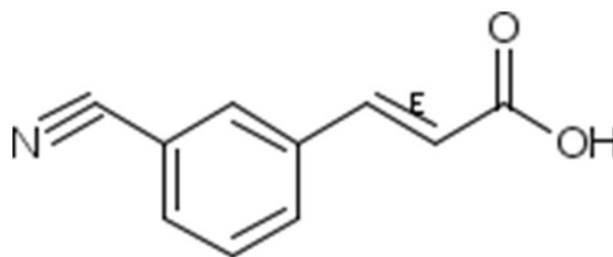
Uses:

- ✓ It give anti-inflammatory action
- ✓ It used has Pain Removal

2.4 Selection of Synthetic Ingredient:

1. Carbopol 934:

Structure:



IUPAC Name: Poly (acrylic acid)

Other name: PAA, PAAc, Acrysol, Acumer.

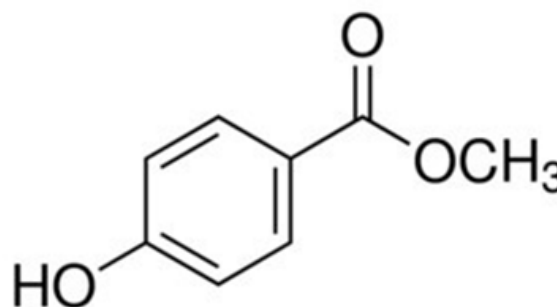
Chemical formula: $(C_3H_4O_2)_n$ Molar

Uses:

1. Polyacrylic acid and its derivatives are used in disposable diapers, ion exchangeresins and adhesive and popular as thickening, dispersing, suspending and emulsifying asents.

2.Methyl Paraben:

Structure:



Chemical Formula: $C_8H_8O_3$

Molar Mass: 152.15 g. mol-1

Uses:

1. Methyl paraben is an antifungal agent.
2. It is also used as a preservative

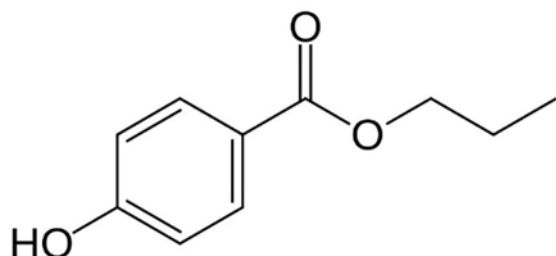
3. Methyl paraben is commonly used as a fungicide.

Molecular Formula: C₃H₉N

Molecular Mass: 101.19 g/mol

3. Propyl Paraben:

Structure:



Chemical Formula: C₁₀H₁₂O₃

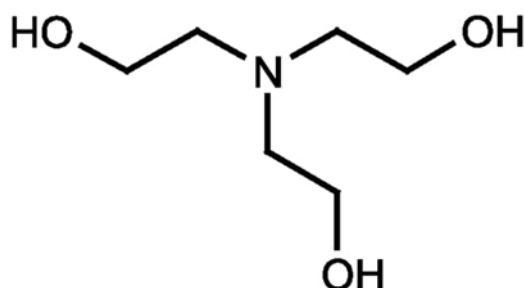
Molar Mass: 180.2 g/mol

Uses:

1. Protect products against the growth of bacteria and mold and improve the shelf life of a formulation preservatives by pharmaceutical and cosmetic industries.
2. It is used as antibacterial, antifungal properties

4. Triethanolamine:

Structure:



IUPAC Name: 2,2',2''-Nitrilotri(ethan-1-ol)

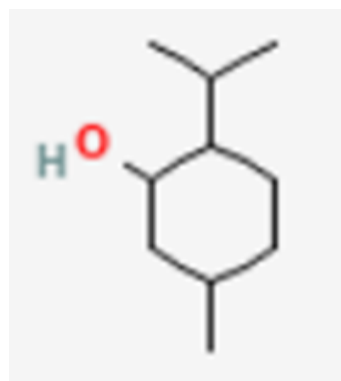
Other Name: TEA, TELA

Uses:

Trimethylamine is used in the synthesis of choline, tetramethylammonium hydroxide, plant growth regulators, herbicides, strongly basic anion exchange resins, dye leveling agents and a number of basic dyes.

5. Peppermint oil:

Structure:



Chemical Formula: C₁₀H₁₈O

Molecular Weight: 154.25 g/mol

Use:

Peppermint oil is promoted for topical use (applied to the skin) for problems like headache, muscle aches, joint pain, and itching.

3. Background:

Mouth ulcers, characterized by painful lesions on the mucous membranes of the oral cavity, are a common oral health issue affecting individuals worldwide. These ulcers can significantly impair oral functions such as eating, speaking, and swallowing, leading to discomfort and decreased quality of life for affected individuals. While most

mouth ulcers resolve spontaneously within a week or two, recurrent or persistent ulcers may require medical intervention for symptom relief and healing promotion. Traditional treatments for mouth ulcers typically include topical medications such as analgesic gels, antiseptic mouthwashes, and corticosteroid preparations. However, some individuals may experience adverse reactions or find these treatments ineffective in providing relief. As a result, there is growing interest in exploring alternative therapies, particularly those derived from natural sources such as medicinal plants. Guava (*Psidium guajava*) and jasmine (*Jasminum officinale*) are two botanicals with a long history of use in traditional medicine for various ailments, including oral health conditions. Guava leaves are rich in bioactive compounds such as tannins, flavonoids, and phenolic compounds, which possess antimicrobial, anti-inflammatory, and wound-healing properties. Similarly, jasmine leaves contain phytochemicals like saponins, flavonoids, and alkaloids, known for their antioxidant and anti-inflammatory effects. The utilization of guava and jasmine leaves extracts in the formulation of a herbal mouth ulcer gel presents an opportunity to harness the therapeutic potential of these botanicals for the management of oral ulcers. By developing a natural, plant-based remedy, it is hoped that the herbal gel will offer a safe, effective, and affordable alternative for individuals seeking relief from mouth ulcer symptoms. Furthermore, exploring the pharmacological properties of guava and jasmine leaves extracts may uncover novel mechanisms of action and contribute to the development of innovative oral care products. Against this backdrop, this aims to investigate the formulation and evaluation of a herbal mouth ulcer gel using guava and jasmine leaves extracts, with the goal of providing evidence-based insights into its efficacy and potential as a complementary therapy for oral ulcer management. Through

systematic experimentation and analysis, this research endeavors to contribute to the advancement of natural remedies in oral health care and address the unmet needs of individuals suffering from mouth ulcers.

4.Objective of the Study:

The primary objective of this study is to formulate and evaluate a herbal mouth ulcer gel using extracts from guava leaves and jasmine leaves. Specifically, the study aims to achieve the following objects:

- 1.To extract bioactive compounds from guava leaves and jasmine leaves using suitable extraction methods.
2. To formulate a herbal mouth ulcer gel incorporating the extracted guava and jasmine leaves extracts.
- 3.To evaluate the physicochemical properties of the formulated herbal gel, including pH, viscosity, Spreadability, homogeneity, clarity, stability, patch test and estimation of drug content.
4. To show that the herbal product is cheaper and easily available and easy to apply.

5. Scope and Limitations:

5.1 Scope:

- The scope of this study includes the formulation and evaluation of a herbal mouth ulcer gel using extracts from guava leaves and jasmine leaves.
- It encompasses the extraction of bioactive compounds from the plant materials, formulation of the gel, and evaluation of its physicochemical properties.
- The study also involves assessing the stability of the herbal mouth ulcer gel.

5.2 Limitations:



- The study may face limitations related to the availability and quality of plant materials. Variations in plant sourcing and growth conditions could affect the composition and potency of the extracts.
- Standardization of the herbal extracts may pose challenges, leading to variability in the formulation and efficacy of the gel.
- The scope of the study may not cover all possible factors influencing the effectiveness of the herbal mouth ulcer gel.
- Regulatory constraints and resource limitations may impact the scale and duration of the study, as well as the potential for commercialization of the herbal product.
- Lastly, the generalizability of the study findings may be limited to the specific formulations and experimental conditions employed in the research.

5.3 Significance:

1.Natural Treatment option: The study explores the formulation of a herbal mouth ulcer gel using extracts from guava leaves and jasmine leaves, offering a natural and potentially safer alternative to conventional synthetic medications for managing mouth ulcers. 2.Therapeutic Potential: Guava and jasmine leaves contain bioactive compounds, suggesting that the herbal mouth ulcer gel may provide effective relief from symptoms and promote faster healing of oral ulcers.

3.Noval Formulation: Investigating the synergistic effects of combining extracts from multiple botanical sources in a gel formulation adds to the body of knowledge on herbal remedies for oral health care, potentially leading to the development of innovative treatment options for mouth ulcer.

4.Reduced Side Effects: Natural remedies typically have fewer adverse effects compared to synthetic medications, making them suitable for

individuals with sensitivities or allergies. The herbal mouth ulcer gel may offer a well-tolerated treatment option for a wide range of patients.

5.Contribution to scientific Research: The study contributes to the advancement of scientific knowledge by providing evidence-based insights into the efficacy and mechanisms of action of herbal treatments for oral health conditions. This information may inform future research endeavors and clinical practice guidelines in the field of natural medicine.

6.Potential Public Health Impact: Mouth ulcers are a common oral health issue affecting individuals worldwide. By offering a natural and effective treatment option, the herbal mouth ulcer gel has the potential to improve the quality of life for individuals suffering from this condition, leading to better oral health outcomes on a broader scale.

6. Literature review:

1.K. Upadhye, K Charde, G. Dixit, S. Bakhle (2021)

Mouth ulcers is the most common condition. Clinically the lesions are single or multiple superficial and deep sealed and are associated with microbial irruptions. This study was conducted with the end of assessing the effectiveness of herbal medicines for treatment of In the exploration work, mouth ulcer gels were formulated incorporating the excerpts of as and using 934 as the gelatinizing agent. Seven batches were formulated by varying the attention of the herbal constituents. The set phrasings were estimated for colorful parameters like physical appearance, pH, Unity and antimicrobial exertion against fungi and bacteria. The antimicrobial exertion was also compared with a retailed gel expression. All the set expression using different attention of factory excerpt showed the pH values



in between 6.1 ± 0.2 to 7.0 ± 0.1 . The values ranged between the 5.0 to 8.0 cm.

2. Yuvraj Saini, Akshay. K. Sharma, D. Phura, Om Sivam (2022)

According to studies canker sore or mouth ulcer is the most common condition that we encounter. Clinically the lesion is the single or multiple superficial and deep sealed and are associated with microbial invasions. The main purpose of this work is formulating a mouth ulcer gel by using natural ingredients with nature. The natural herbs are leaf extract of euphorbia thymifolia, leaf extract of Indian jasmine, leaf extract of mint, leaf extract of tridax procumbens, where dried and extract by using Soxhlet method and other ingredients are viscous honey, acacia Arabica the extract where the concentration and are stored for further use. These herbs have flavonoids, alkaloids, cardiac glycosides, terpenoids, saponins, quercetin, vit. A, vit. C and many inorganic elements.

3. Sangeetha Yogarajah, Jane Setterfield (2021)

Frequently chronic and can occur because of underlying systemic disease. Diagnosis can be challenging because of similarities in clinical presentation between different conditions. The most common presentations include mucosal ulceration and abnormalities of the lips and tongue. Ulceration represents a full-thickness breach in the epithelium. This can result in pain and difficulty with eating, drinking, speech and maintaining oral hygiene. The wide range of causes of oral ulceration includes trauma, recurrent aphthous stomatitis, lichen planus, immunobullous disease, drugs and erythema multiforme. Lesions on the tongue can be caused by primary oral disease or secondary to systemic disease. Abnormalities include nutrient-deficient glossitis, geographic tongue, burning mouth

syndrome and, more rarely, amyloidosis. The lips can be affected by skin diseases such as eczema (exfoliative cheilitis) and actinic damage or conditions with potential systemic involvement such as orofacial granulomatosis. The priority with mucosal lesions is to exclude carcinoma, as early detection and treatment significantly decreases morbidity and mortality. This article reviews these disorders and their distinguishing features and highlights the importance of history-taking, clinical examination and further investigation in making a definitive diagnosis.

4. Vani Madaan, T. Manjula, Nishita Soni (2022)

Mouth ulcer is also known as canker sore – painful lesions that develop in mouth at base of your gum. They can cause problem during eating drinking and talking uncomfortable. Treatment of mouth ulcer may include antiseptic mouthwash, such as chlorhexidine mouthwash or povidone iodine mouthwash or use antibiotic or analgesic gel formulation semi-solid formulation include gel having a liquid phase which are then thickened by other components. Topical gel is intended for the application on skin or to certain mucosal surface for local action or percutaneous penetration of medicament preparation. A large number of Indian herbal medicinal plants are attributed with various pharmacological activities as they contain herbs. The leaf of euphorbia thymifolia is also known as milk hedge belonging to family of euphorbiaceae and genus euphorbia and it acts as anti-inflammatory, anti-microbial agent.

5. Nem Kumar Jain, Rituparna Roy, Santosh Kumar (2020)

Mouth ulcers often cause pain and irritation of the sores by salty, spicy and sour food items and may cause discomfort while healing occurs due to the use of chemical formulations. This project focuses



on the preparation of a herbal mouth ulcer healing gel because of better cultural acceptability, better compatibility with human body and lesser side effects. The gel was prepared by using alcoholic extract of *Psidium guajava*, and betel leaves and aqueous extract of liquorice. Developed formulations were transparent, homogeneous and pH ranges from 6.8-7. Formulation showed acceptable rheological behaviour with applicable Spreadability and Extrudability properties. Anti-fungal studies of formulations showed excellent efficacy against *Aspergillus aureus*, *Candida albicans*. Therefore, developed formulations have potential to treat mouth ulcers. However, further clinical studies are required to establish clinical efficacy of prepared herbal gels.

7. Plan of Work:

7.1 Materials and Methods.

7.2 Selection of method of Extraction of Guava and Jasmine Leaves.

7.3 Preparation of Herbal Mouth Ulcer Gel.

7.4 Evaluation parameters of Herbal Mouth Ulcer Gel

7.5 Results and Discussion of Herbal Mouth Ulcer Gel

7.1 Material and Methods:

Materials:

Chemicals:

- Carbopol 934 (gelling agent)
- Methyl Paraben (preservatives)
- Propyl Paraben (preservatives)
- Triethanolamine (for adjust pH)
- Peppermint oil (Analgesic, Antimicrobial)
- Ethanol (Solvent)
- Distilled Water

Instrument:

- PH Digital Meter
- Digital Viscometer
- UV-Spectrophotometer

Methods:

1.Preparation of Extraction of Guava and Jasmine leaves by Ethanolic Extraction.

2.Formulation of Herbal Mouth Ulcer Gel by Compounding Method.

7.2 Preparation of Extraction of Guava and Jasmine Leaves:

• Preparation of Extraction of Guava Leaves:

1. For isolating the extract from guava leaves, Guava leaves were properly wash and clean to remove any dirt or impurities. Then, dry them to remove excess moisture.
2. Crush the dried guava leaves.
3. The 50 gm of dried guava leaves place in a container and cover them with 80 ml of Ethanol. Let the Mixture sit for 48 hours to allow the ethanol to extract the bioactive compound.
4. Then after 48 hours, the Filter the mixture to separate the liquid extract from the solid plant material. This can be done using Whatman filter paper.

• Preparation of Extraction of Jasmine Leaves:

1. For isolating the extract from Jasmine Leaves, Jasmine leaves were properly wash and clean to remove any dirt or impurities. Then, dry them to remove excess moisture.
2. Crush the dried Jasmine leaves.
3. The 50 gm of dried jasmine leaves place in a beaker and cover them with 80 ml of Ethanol. Let the mixture sit for a 48 hours to allow the ethanol to extract the bioactive compound.
4. Then after 48 hours, the filter the mixture to separate the liquid extract from the solid plant



material. This can be done using Whatman filter paper.



Fig 11: Extract of Guava Leaves and Jasmine Leaves.

7.3 Preparation of Herbal Mouth Ulcer Gel:

Table 1: Composition Of Mouth Ulcer Gel

Sr. No	Ingredients	Quantity taken in gm or ml
1	Gauva leaves Extract	4 ml
2	Jasmine leaves Extract	2 ml
3	Carbopol ⁹³⁴	8.5 gm
4	Methyl paraben	0.15 gm
5	Propyl paraben	0.10 gm
6	Triethanolamine	q.s PH – 6.5
7	Peppermint oil	q.s
8	Distilled water	Up to 50ml

Procedure:

1.Dispersion of Gelling agent:

The choosen gelling agent (Carbopol 934) was dispersed in required amount of distilled water with continuous stirring. The stirring was continuous and helped in the even distribution of the gelling agent in the water.

2.Swelling of Gelling agent:

Once the gelling agent was dispersed in water, the beaker was set aside for approximately half an hour. This allowed to geling agent to swell,

absorbing water and forming a gel-like structure. Swelling is a crucial step in the gel formulation process, as it determines the final consistency and texture of gel.

3.Preparation of Preservative Solution:

In a separate beaker, Methyl and Propyl Paraben were dissolved in 10 ml distilled water. This dissolution was achieved by gentle heating the beaker on a water bath at a specific temperature.

4.Addition of Guava and Jasmine Leaves Extract:

The Guava and Jasmine leaves extract was added to the preservative solution. The solution was thoroughly mixed to ensure uniform distribution of the extract within the solution. This step incorporates the herbal component into the gel formulation, imparting its potential therapeutic properties.

5.Incorporation into Gelling Agent Mixture:

The Preservative solution containing the herbal extract was then added to the gelling agent dispersion. Continous stirring was maintained throughout this process to ensure proper mixing and uniform distribution of all components.

6.Volume Adjustment:

To achieve the desired final volume (100 ml), distilled water was added to the mixture. This step helps in achieving the intended concentration of active ingredients and the overall consistency of the gel.

7.pH Adjustment:

For Formulations containing carbopol gelling agent, the pH of the gel was adjusted to the range of 6.8-7, which is consistent with the pH of the

mouth skin. Triethanolamine was used for pH adjustment to attain the desired consistency of the gel.

8.Add Flavourant:

Add a few drops of peppermint oil was added as flavourant.



Fig 12: Prepared Herbal Mouth Ulcer Gel

Experiment Work:

7.4 Evaluation Parameters of Herbal Mouth Ulcer Gel:

1.Physical Appearance:

Color: The Color of gel Formulation was visually assessed. The formulation was Observed through Visual Inspection.

Odor: The Odor of gel Formulation was evaluated by Dispersing a small amount of the gel in water and observing the resulting smell. The Odor implies that formulations has a distinct smell that can be associated with the ingredients or extracts used in the gel.

Consistency: The Consistency of gel formulation was checked by applying on skin.

2.Measurement of PH:

The PH of Herbal Gel Formulation were determined by using digital pH meter. 1 gm of gel was taken and dispersed in 10 ml / 50 ml of distilled water and keep aside for 2 hour. The Measurement of pH of gel formulation was carried out in three times and the average values are reported.

3.Homogeneity:

The developed Gel Formulation were tested for homogeneity by visual inspection after the gel have been set in to the container. They were tested for their presence and appearance of any aggregates.

4.Spreadability:

Spreadability is expressed in terms of time in seconds taken by two slides to slip off from gel that is placed in between the slides under the direction of certain load. Lesser the time taken for separation of two slides , better the spreadability. The Spreadability of the gel formulation was determined, by measuring diameter of 1 gm gel between horizontal slides after 1 min.

Spreadability is calculated by using the formula-

$$S = \frac{M \cdot L}{T}$$

Where, M= Weight of upper

L= Length of glass slide

T= time taken to separate the slides.

5.Viscosity:

The Viscosity were measured by Brookfield Viscometer. The prepared gel was poured into the container and the proper spindle no.L2 was attached. Then the viscosity were measured in 60°C and 50-250 rpm.

6. Clarity:

The Clarity of gel was determined by visual inspection.

7. Patch Test:

Patch Test was determined by the apply the prepared gel on small area of skin, After the Specified time , examine the patch area for any signs of irritation, redness, itching, swelling, or other adverse reactions.

8. Stability Study:

Stability Study were done with open or close container. Here , by Subjecting the product at room temperature for 1 month.

9. Estimation of drug content:**Sample Preparation:**

A precisely weighted amount 1 gm of the herbal gel was taken and placed in 50 ml of ethanol, which served as solvent. The mixture was continuously shaken untill the entire gel dissolved completely in ethanol.

Filtration:

After complete dissolution of the gel in ethanol, the resulting solution was filtered using whatman filter paper to remove any insoluble particle or impurities.

Dilution and Analysis:

A portion of 0.1 ml from the filtrate was pipetted out and further diluted with ethanol to a final volume of 10 ml. This diluted solution was taken then analyzed for drug content using uv-visible spectrophotometer at a specific wavelength of 210 nm and 255 nm.

UV-Visible Spectrophotometer:

The UV-Visible Spectrophotometer measured the absorbance Sample at 210 nm and 255 nm.

7.5 Results and Discussion of Herbal Mouth Ulcer Gel:**1. Organoleptic Evaluation:**

Table no 2: Organoleptic Evaluation of gel formulation

Formulations	Color	Consistency	Odour
F1	greenish	Good	minty
F2	greenish	Good	minty
F3	greenish	Good	minty

From the above mention results in table no.2 , It is clearly shows that prepared gel formulation have greenish in color, and gel formulation have good consistency and minty in Odour.

2. PH:

Table no 3: PH of gel Formulation

Formulations	pH
F1	6.7
F2	6.5
F3	6.3

PH of all formulations is found to be around 6-7 which is compatible with saliva PH and which is shown in Table no.3 The observed PH is match with saliva PH. Therefore, it reduces possibilities of irritation.

2. Homogeneity:

Table no.4: Homogeneity of gel Formulation

Formulations	Homogeneity
F1	Good
F2	Good
F3	Good

The homogeneity of all formulations batches was studied and it shows better homogeneity and it is shown in Table no.4



2. Spreadability:

Table no.5: Spreadability of gel Formulation

Formulations	Spreadability (gm.cm/sec)
F 1	5.20
F 2	5.50
F 3	6.15

The Spreadability of all formulation batches was studied and it shows better Spreadability and it is shown in Table no.5 In that Spreadability of formulations ranged from 5.0 to 8.0 which is compatible Spreadability of gel formulation.

Viscosity:

Table no.6: Viscosity of gel Formulation

Formulations	Viscosity (CPS)
F 1	38.5
F 2	35.2
F 3	30.8

Viscosity is an expression of the resistance of the fluid to flow. The higher the viscosity, the greater the resistance. Here, all formulation shows viscosity between 30.0 cps to 40.0 cps which is shown in Table no.6

Clarity:

Table no.7: Clarity of Gel Formulation

Formulations	Clarity
F 1	Good / Clear
F 2	Good / Clear
F 3	Good / Clear

Clarity of all formulation was observed by visually and noticed that each formulation is clear and good clarity. The results are shown in Table no.7

Patch test:

Table no.8: Patch test of Gel Formulation

Formulations	Patch Test
F 1	No Irritation Found
F 2	No Irritation Found
F 3	No Irritation Found

Patch test of all formulation was observed visually by applied the gel on skin surface and noticed that each formulation have no irritation found. The results are shown in Table no.8

Stability Study:

Table no.9: Stability Study of Gel Formulation

Open Container	Close Container
Not Stable	Stable



Fig 13: Open Container

Twenty days stability study was done with open and close container and it showed that open container containing gel was not stable and close container gel was stable. Formulated gel



Fig: 14: Close Container

containing open container when exposed to ambient room temperature then syneresis was observed. Syneresis, it means the form of instability in aqueous gel.

Estimation of drug content:**Table no.10: Estimation of drug content of Gel Formulation (F1 Batch)**

Solvent Concentrations	Absorbance Wavelength
Blank (Ethanol) 0.2	0.2122 -
Ulcer gel 0.3	0.1772 210
Ulcer gel 0.4	0.1874 255

(F2 Batch)

Solvent Concentrations	Absorbance Wavelength
Blank (Ethanol) 0.2	0.2421 -
Ulcer gel 0.3	0.1924 210
Ulcer gel 0.4	0.2147 255

(F3 Batch)

Solvent Concentrations	Absorbance Wavelength
Blank (Ethanol) 0.2	0.2312 -
Ulcer gel 0.3	0.1569 210
Ulcer gel 0.4	0.1757 255

8. DISCUSSION:

From the results it is clearly shown that the all prepared gel formulations having good homogeneity and gelling properties. The pH of all gel formulations was in the range of compatible with normal pH range of the skin. The rheological behavior also indicates that the gel were neither too thick nor too thin. The spreadability shows that the increasing viscosity of formulation, spreadability decreases. Study was done by pressing thumb and its easily extendable. The gelling and strength was found in the suitable range. The Patch test was done by prepared gel

applied on skin there are no irritation found. The all-prepared gel formulations clarity was good.

9.SUMMARY AND CONCLUSION:

This work gives clear information that the natural occurring constituents of herbs are definitely able to resolve oral ulcer. This work provide the information of treatment of ulcer by different herbal medicinal plant and give information of its family, kingdom, chemical constituents, uses etc. This work also provides, the herb was introduced a good for treatment of various mouth ulcers. In present days the demand of herbal formulation in the market due to their cost effective and less side effects and above experimental data, it is clear that the gel formulation with herbal ingredient such as Indian Guava leaves, Indian Jasmine, Peppermint oil has good characteristic, viscosity and also good homogeneity, good spreadability, good clarity which is necessary in the management of mouth ulcer.

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