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GUAVA USED TO TREAT MOUTH ULCER

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ABSTRACT

The aim of this study was to formulate and evaluate an herbal gel from dried powdered guava leaves for the treatment of oral ulcers. The herbal gel was prepared using different concentrations of powdered guava leaves and propylene glycol Carbopol 934 as the gel base. The preparations were evaluated for various parameters. Infrared spectroscopy showed that there was no interaction between the ground guava leaves and the polymer. The prepared gel was transparent, homogeneous and the pH value varies between 7 and 7.5. The formulation showed acceptable rheological behaviour with adequate spreading and extrusion properties. Antifungal studies of the preparations have shown excellent efficacy against Aspargilious aureus, Candida albicans. Experimental evidence from invitational studies showed that powdered guava leaves contained flavonoids, so they had significant antioxidant activity. The developed herbal formula was stable, safe and effective compared to synthetic preparations for the treatment of mouth ulcers.

INTRODUCTION

Guava is known for its medicinal properties. It is rich in antioxidants, vitamin C, fiber and many other nutrients. The leaves are used in traditional medicine to treat diarrhoea, diabetes and respiratory problems. Guava's antibacterial properties may also aid oral health. However, a doctor should be consulted before using it for therapeutic purposes.

Turmeric is a common ingredient used in almost every Indian dish. Scientific name:- Curcuma Longa Family:- Zingiberaceae, Chemical constituents:- Diarylheptanoids, Curcumin, dimeth-Oxy curcumin, and Bisdemethoxycur-Cumin. Uses:- Anti-inflammatory, Antiulcer and anti-Arthritic activity.[2]

Aloe vera can reduce pain caused by canker sores and speed up the healing process. Scientific name:- Aloe bar-Badensis Miller. Family:- Liliaceae. Chemical constituents:- Amino acids, anthraquinones, enzymes, minerals, Vitamins, lignins, Monosaccharides, Polysaccharides, Salicylic acid, saponins, and sterols are Among the many Substances found in Plants. Uses:- Properties that are Anti- inflammatory, Anti-oxidant, anti-Cancer, healing, Anti-ulcer, and Anti- diabetic.[3]

In Ayurveda, palm tree or mehendi leaves and amla leaves can be boiled along with alum to make a puree. Frequent gargling with soup may help relieve pain.

Preface Guava, scientifically known as Psidium guajava, has been traditionally used for its medicinal parcels, especially in treating colourful oral health issues. In the environment of a drugstore design fastening on its use for mouth ulcers, you might want to include information on its active factors, similar as tannins, flavonoids, and essential canvases, which contribute to its anti-inflammatory and antimicrobial parcels. Likewise, it would be essential to cave into its medium of action, potentially pressing how guava's factors help in reducing inflammation, promoting mending, and combating microbial growth, thereby abetting in the treatment of mouth ulcers. Also, you could unfold on the colourful phrasings and delivery styles through which guava can be administered for the treatment of mouth ulcers, including mouthwashes, gels, and tablets. Agitating the lozenge recommendations, possible contraindications, and any implicit side goods would also be pivotal in furnishing a comprehensive understanding of its remedial use. Also, it's important to incorporate any recent exploration studies or clinical trials that support the efficacy of guava in treating mouth ulcers, therefore furnishing credibility and applicability to your design. Incipiently, you can outline unborn prospects or implicit areas of farther exploration to encourage disquisition and development in this field.

A mucosal wound is an open wound characterized by the removal of inflamed dead tissue. Although ulcers can occur anywhere, they often occur on the skin of the lower extremities and in the digestive tract.

There are many different types of ulcers, including vaginal, esophageal, and mouth ulcers. These are painful round or oval sores that usually appear on the inside of the cheeks or lips and inside the mouth.

Currently available topical application for the treatment of mouth ulcers is a gel or cream base that must be applied to the body, which Is painful and often impossible to easily access the ulcer. The goal is to create a liquid dosage form so that it can be administered directly through the container and easily applied to the affected area, where the liquid film becomes semi-solid. This semi-solid layer lasts longer in the wound compared to a liquid film, which improves the treatment in terms of a longer duration of action. In addition, unlike semi-solid dosage forms, the formulation spreads spontaneously and thus does not require force applied to the wound, ultimately improving patient compliance.

Types of Mouth Ulcer

On the basis of ulcer size and number, mouth ulcer can be Classified as minor, major and Herpetiform ulcers. The main types Of mouth ulcer are:

- Minor ulcers: Minor aphthous ulcers are the foremost Common form considering for about 80% of cases. These Are around 2-8mm in diameter which they typically clear Up in 10 days to 2 weeks. Typically, these ulcers are Superficial in nature, small in size, usually but 1 cm in Diameter, few in number, occurring singularly or in Groups, and heal without scarring.[22]

- Major ulcers: The second type is major aphthous ulcers, It occurs in about 10% of patients. These are bigger and Deeper in shape often over 1cm in diameter, with a raised Or irregular border.[23] And they occur either singly or as Multiple lesions. This type of ulcer can take several Weeks to heal and can leave a scar within the Mouth because of the extent of necrosis.[24]

- Herpetiform ulcers: These are a collection of tiny ulcers, each no larger than a pinhead. Very small ulcers, measuring 2-3 mm in diameter, can occur in huge, irregular lesions that Can fuse together in numbers of 100 or more at once and remain for 7–10 days without Leaving scars.[6- 8]

Causes

The exact etiology and pathology of oral ulcers are unknown; although some factors are considered important, including nutritional deficiencies such as iron, vitamins, especially vitamins B12 and C, poor oral hygiene, infections, stress, digestive disorders, mechanical injuries, skin diseases, etc.[25] Other factors include e.g.

- Genetic factors: There is a genetic component in patients with aphthous ulcers, and approximately 30-40% of patients have a family history.[26] Some patients apparently have a family history of recurrent aphthous ulcers. A known link involves young onset and symptoms that have increased. Recurrent aphthous ulcers are highly correlated in identical twins.[27]
- Physical or Psychological Stress: The presence of aphthous ulcers is strongly associated with a stressful life.[28] Psychological stress can trigger or play a role as a modifying factor in the development of recurrent aphthous stomatitis. No study has conclusively

demonstrated stress as a cause or precipitating factor for recurrent apoptotic stomatitis.[29]

- Nutritional deficiency: Various nutritional deficiencies Have been implicated in a subset of aphthous ulcer patients, which involving of iron, folic acid, vitamin B12, B1,B2 and B6. The contribution of nutritional Deficiencies to aphthous ulcers are likely to vary across Different regions based on diet and food supplementation.[30]
- Trauma: The most likely causes of aphthous ulcers are local trauma and stress. Damage to the oral mucosa can be the result of unintentional self-biting, dental procedures, toothbrush bristles and food with sharp edges (e.g. potato chips), anesthetic injection. In addition, environmental and emotional stress also cause aphthous ulcers.[31]
- Food allergies: There are different foods that can cause allergies. Antibodies against cow's milk and wheat protein (celiac disease) have been shown in patients with recurrent aphthous stomatitis. Therefore, many commonly allergenic foods (eg strawberries, tomatoes and nuts) have not been associated with recurrent aphthous stomatitis.[32] Foods such as chocolate, coffee, peanuts, cereals, almonds, strawberries, cheese, tomatoes (even tomato skins) and flour (containing gluten) may even be involved in some patients.[33]

Herbal Remedies for Mouth Ulcer[1]

Photogenic substances have been used since ancient times to prevent and treat mouth ulcers. Some anti-ulcer botanical compounds include flavonoids (i.e., quercetin, naringin, silymarin, anthocyanosides, sophoradine derivatives), saponins (i.e., Panaxjaponicus and Kochia Scoparia), tannins (i.e., from Lin deraeumbellatae species), gum are.

And myrrh). Licorice, aloe gel and paprika (chili pepper) can be widely used as herbal remedies. They have an excellent effect in the treatment of Mouth ulcers. In ethno medical systems, several plant extracts are used to treat the wound.

Some herbs that can be used as anti-ulcer drugs[35,36]

1. Harra (Terminalia chebula)[4] chewed after dinner cures mouth ulcers.
2. Basil leaves (Ocimum sanctum)[5] and tomato juice (Lycopersicum esculentum) are used for mouth ulcers.
3. Nirgundi (Vitex negundo) and musli powder (Chlorophytum borivilicum) are prepared and can be taken four times a day to treat mouth ulcers.
4. For this disease, babies are given the juice of the mulberry tree (Morus Alba).
5. Akarkara (Spilanthes calva) flower is chewed in the mouth Ulcers. It gives strength to the teeth.

6. Ashes of burnt watermelon rind are also given
7. Bardock and ginger oil are also used for mouth ulcers.

Guava

The origin of guava is Psidium Guajava. It belongs to the Myrtaceae family.

Shape: Guava fruits are usually 4 to 12 centimeters (1.6 to 4.7 inches) long and round or oval in shape, depending on the species. They have a clear and precise smell, reminiscent of lemon peel, but less sharp. The skin can be hard, often bitter, or soft and sweet. The skin can vary in thickness and is usually green before growth, but can turn yellow, maroon or green as it matures. The pulp inside can be sweet or sour, white ("white" guava) to dark red ("red" guava). The number and hardness of the seeds in the average weight varies from variety to variety.

Plant part used: leaves, roots, fruits

Chemical composition: Guava leaves contain carotenoids and polyphenols such as (+)-gallocatechin and leucoanthocyanins. Red- orange guavas contain more polyphenols and carotenoids than yellowish-green guavas, as some of these phytochemicals are responsible for skin color and texture.

Use: Due to its high pectin content, guava is widely used to make desserts, preserves, jellies, jams and marmalades (such as Brazilian goiabada and Colombian and Venezuelan bocadillo) and as a bright jam. Red guava can be used as a base in the preparation of savories such as sauce, especially in place of tomatoes to reduce acidity. The drink can be made from the leaves and juice of guava leaves, which is called "tea" and is considered medicine.

Guava (Psidium guajava): For the herbal treatment of a number of oral conditions, Including toothaches, sore throats, inflamed gums, and ulcers, Psidium guajava has been Utilised. Guava leaf decoction has also been administered as mouthwash.[19] In two separate Investigations, Shaikh et al. and Thombre et al. created and assessed an aqueous gel of Powdered guava leaves for the treatment of oral ulcers. They found that the powdered guava Leaves contained flavonoids and had a sizable antioxidant effect. When compared to synthetic Formulations for the treatment of oral ulcers, the herbal formulation proved to be stable, safe, And efficacious.[19,20] In another study researcher found that using mouthwash made from Guava leaves helped aphthous ulcers heal more quickly and with less

discomfort.[21]

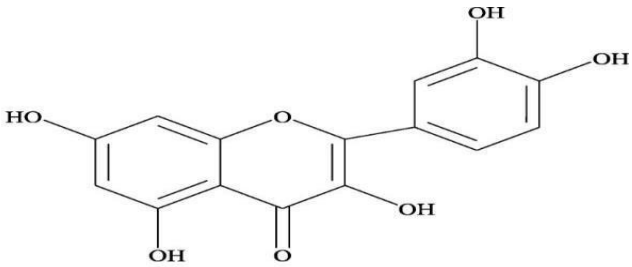
CONSTITUENTS

Flavonoids are phytochemicals found in many plants, fruits, vegetables and leaves and can be used in medicinal chemistry. Flavonoids have many medicinal properties, including antibacterial, antifungal, antiviral and antibacterial properties. They also have neuroprotective and cardioprotective effects. These activities depend on the type of flavonoid, its (possible) mode of action and bioavailability. These cost- effective medicinal ingredients have important biological functions and their anti-inflammatory effects have been demonstrated. Recent studies have focused on their isolation, synthesis of analogues using various techniques and animal models, and their effects on human health.

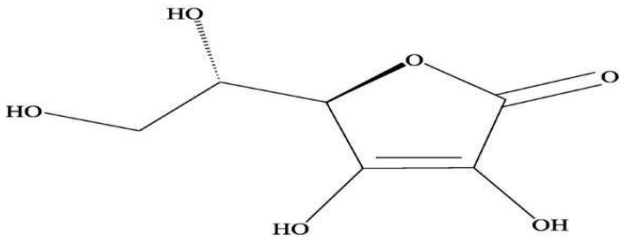
Thousands of flavonoids have been successfully isolated, and this number is constantly increasing. Therefore, we tried to summarize isolated flavonoids with important functions to better understand their effects on human health.

Flavonoids are abundant and widespread throughout the plant kingdom. They work as plant pigments and are responsible for the color of many flowers and fruits. Flavonoids are abundant in plants and found in human foods, especially foods rich in fruits and vegetables. The word "flavonoid" comes from the Latin word flavus, meaning yellow, and many flavonoids are yellow in color. However, many other anthocyanins are white, while specific anthocyanins related to flavonoids are red, blue, or purple. (See the blueberry monograph for a discussion of the pharmacological properties of anthocyanins) Flavonoids are also found in the leaves and are said to protect tissue from damage caused by ultraviolet radiation.

Flavonoids have a benzene ring attached to the benzo-gamma-pyrone structure. They are made from three parts acetate and one part phenylpropane (via the shikimate pathway). More than 2000 species are known; About 500 of these exist in the free form (aglycones) and the remainder are O- or C-glycosides. Flavonoid glycosides are mostly water soluble. There are three main types of carbon 3 based on its oxidation state. These are flavones, flavonols and flavonones. The properties of isoflavonoids are discussed in the Phytoestrogens section.



(a)



(b)

Flavonoids and their derivatives can be isolated from guava. These compounds inhibit the growth of different bacteria at different dilutions. Terpinene and pinene are found in aqueous

extracts of the leaves and have antimicrobial activity.

MATERIAL AND METHODS

Psidium guava fresh plant material was collected from the local area. Fresh plant leaves were washed under running distilled water and tap water and dried in the shade. The collected plant was checked in the Department of Industrial Pharmacy, Shivajirao Jondhale College of Pharmacy, Asangaon. All other analytical ingredients purchased from Loba Chemicals Mumbai.

Preparation of herbal Gel

The specified amount of Carbopol 934 was dispersed in the required amount of distilled water with constant stirring. 5 ml of distilled water was taken and the required amount of methylparaben and propylparaben was dissolved by heating in a water bath. After cooling, propylene glycol was added. In addition, different concentrations of Psidium guava powder were mixed with the above mixture and the volume was adjusted to 20 ml with distilled water. Finally, the completely mixed ingredients were thoroughly mixed with Carbopol 934 gel with constant stirring and triethanolamine was added dropwise to the formulation to adjust the required pH (6.8-7 (Das, 2010).[9,10]

The composition of herbal gel prepared from guava leaves coded G1, G2 and G3 is shown in Table 1.

Table 1: Composition of powder gel preparations of different guava leaves.

Ingredients	G1	G2	G3
Guava leaves powder	2%	1%	0.5%
Carbopol 934	2%	2%	2%
Methyl paraben	0.0015%	0.0015%	0.0015%
Propyl paraben	0.01%	0.01%	0.01%
Triethanolamine	q.s + pH 6.5-7	q.s + pH 6.5-7	q.s + pH 6.5-7
Distilled water	Up to 20ml	Up to 20ml	Up to 20ml

Evaluation of Herbal Gel

- Physical Appearance: Physical parameters such as appearance and color were checked
- Measurement of pH: The pH of the herbal gel preparations was determined using a digital pH meter. 1 g of gel was taken, dispersed in 10 ml of distilled water and reserved for two hours. The pH of the formula was measured three times and the average values are reported (Sanghavi, 1989). The pH of the gel composition is presented in Table No. 2.
- Homogeneity: The homogeneity of all developed gel preparations was tested by visual

inspection after placing the gels in the container. They were tested for the presence and appearance of aggregates (Gupta, 2010). The homogeneity of the gel composition is presented in Table No. 2.

- Spreadability: Diffusibility was determined using a glass plate and wood block apparatus. Weights of approximately 20 g were added to the pan and the time required for the top slide to move to completely separate from the stationary slide was recorded (Shivhare, 2009). An additional amount of 2 g of the gel to be tested was placed on this base plate. The gel was then placed between this slide and another glass plate with a fixed glass slide and an attached hook. A 1 kg weight was placed over the slides for 5 minutes to form a uniform film of the gel and remove air from between the slides. Excess gel was removed from the edges. The top plate was then pulled by a string attached to the hook and timed to travel a distance of 7.5 cm in seconds. A shorter or smaller gap means a better spread. Gel dispersibility was calculated using the following formula (Pawar, 2013). Spreadability of the gel is given in table No. 2.
- $S = M \times L / T$

Where, S = Spreadability,

M = Weight in the pan which is tied to the upper slide L = Length moved by the glass slide

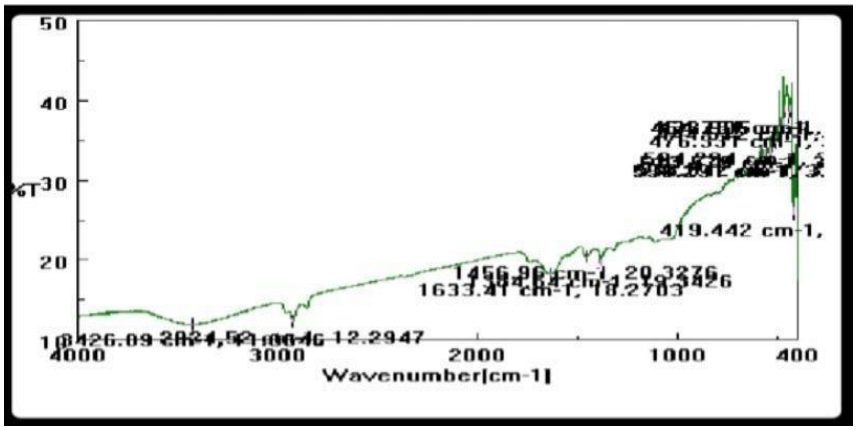
T = Time in second taken to separate the slide Completely each other.

- Viscosity: Viscosity was determined using a Brookfield viscometer (programmable DV-III rheometer). The prepared gels were tested for their rheological behaviour at 250 °C. The measurement was made in the speed range from 10 rpm to 100 rpm for 30 seconds between two consecutive speeds and then in reverse order A (Bhramaramba, 2015).
- Extrudability: The gel formulations were filled into collapsible aluminium tubes with standard caps and sealed. Extrudability was determined by thumb pressure.
- Clarity: The brightness of all three sets was determined by visual inspection (Pandey, 2011).

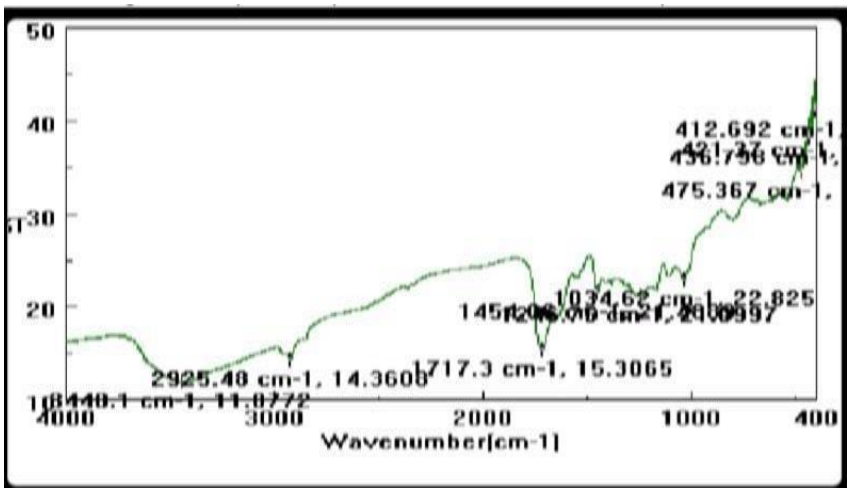
Formulation	Physical Appearance	pH	Homogeneity	Spreadability
G1 (2%)	Greenish	6.8-0.9	Good	5.30-0.1
G2 (1%)	Greenish	7-0.9	Good	5.76-0.15
G3 (0.5%)	Greenish	6.9-0.5	Good	6.23-0.057

RESULT AND DISCUSSION

IR spectra of powder guava leaves



IR spectra of powder guava leaves and carbopol 934



CONCLUSION

Based on the data presented in this study, it was revealed that the developed herbal gel has a significant, therapeutically effective, suitable vehicle for drug delivery with low cost but definitely high potential. The developed new herbal gel composition is suitable for the treatment of mouth ulcers.

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