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Guava Leave Herbal Mouth Ulcer Gel Formation and Evaluation: A Review

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ABSTRACT
This article specifically addressed the management of mouth ulcers, often known as canker sores. These uncomfortable sores appear on the oral cavity's mucous membranes. The use of herbal gel to treat these ulcers is the main topic of conversation. The article explores a long number of herbs that are well-known for having a lot of flavonoids, explaining why they are so important in treating mouth ulcers. This investigation aims to clarify the effectiveness and therapeutic possibilities of flavonoid-enriched herbal treatments in reducing the discomfort brought on by this oral condition.
Since ancient times, indigenous cultures around the world have incorporated traditional medicinal practices into their cultural fabric and health perspectives. With a long history of using herbal and traditional medicine, India has successfully applied this knowledge to both prevent and treat illness. The popularity of herbal medication stems from its significant benefit of having less adverse effects than synthetic substitutes, which increases patient

Keywords: herbal formulations, guava leaves, mouth ulcers, and herbal medication.

I. INTRODUCTION:

Aphtha, the medical term for a mouth ulcer, is characterized by a lesion on the oral cavity's mucous membrane[1]. Even though they are common and frequently associated with different illnesses, the majority of cases do not point to a serious underlying problem. On the other hand, chronic ulcers that don't go away could be an indication of oral cancer. Known as a "crop" of ulcers, these ulcers can develop singly or in groups. The ulcer may persist after it has formed due to inflammation and/or subsequent infection.

The two main causes of oral ulceration, a common condition, are aphthous stomatitis, also known as "canker sores," and local trauma. Incidents like the abrasive friction from damaged dental fillings or orthodontic braces, as well as accidentally biting one's lip, can cause local trauma, a common trigger. On the other hand, aphthous stomatitis, a mysterious ailment, manifests as the frequent development of mouth ulcers, the cause of which is still mostly unknown.

For those who suffer from them, these mouth ulcers, regardless of their cause, portend a period of pain and suffering. People are frequently forced to make dietary changes as they recover, avoiding meals and drinks that are acidic, sweet, salty, or spicy. This strict diet is the result of a practical need to lessen the discomfort that these foods cause in the delicate environment of the healing mouth. Thus, the complex fabric of oral ulceration is characterized by the interaction of etiology, symptomatology, and dietary adaptation.

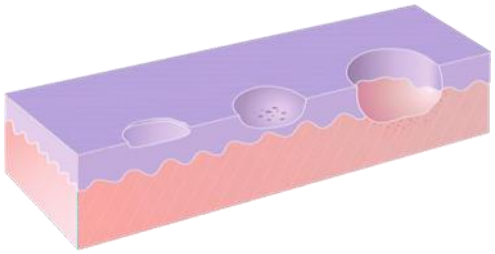

Fig.1- Diagrammatic representation of mucosal erosion (left), excoriation (centre), and ulceration(right).

A rupture in the skin or mucous membrane that causes the loss of surface tissue as well as the breakdown and necrosis of epithelial tissue is known as an ulcer, which is derived from the Latin word "ulcus" meaning sore [2]. An ulcer that forms on a mucous membrane is specifically referred to as a mucosal ulcer [3]. Any area of the body with mucous membranes, including the mouth, throat, genital areas, and gastrointestinal tract, can develop this kind of ulceration. A number of things, such as infections (such stomach H. pylori), trauma, inflammatory diseases (like Crohn's disease or ulcerative colitis), or specific drugs, can result in mucosal ulcers. The severity, symptoms, and methods of treatment of mucosal ulcers might

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differ depending on the underlying cause and the site. Quick medical attention Mucosal ulcer severity, symptoms, and treatment options can vary depending on the underlying cause and location. To decide on the best course of action and avoid any consequences, a prompt medical evaluation is crucial.

With its base extending deep into the submucosa, muscle, or even periosteum, an ulcer is a major tissue defect that transcends the epithelial-connective tissue border [4]. This sets it apart from shallower lesions such as excoriations or erosions. In contrast to these surface damages, an ulcer affects both the underlying lamina propria and the epithelium, penetrating deeper. In order to encourage healing and stop more tissue damage, this depth of penetration may result in more severe symptoms and problems, requiring careful assessment and suitable intervention [5].

A superficial rupture of the epithelium with little harm to the underlying lamina propria is referred to as erosion.[5] In particular, mucosal erosion happens on a mucous membrane, causing only the outermost layers of the mucosa to be destroyed. The lesion may even reach the basement membrane's depth [4]. Erosions do not pierce the underlying tissue layers as deeply as ulcers do. Erosion has the amazing capacity to heal without leaving scars, usually through the process of epithelial regeneration, even while surface tissue is lost. Without causing long-term damage or changes to the tissue architecture, this healing process restores the integrity of the mucosal barrier. Addressing the root cause of the erosion is crucial, though, in order to stop it from happening again or getting worse. Without causing long-term damage or changes to the tissue architecture, this healing process restores the integrity of the mucosal barrier. To avoid recurrence or the development of more serious lesions like ulcers, it is imperative to treat the underlying cause of the erosion. To encourage the best possible healing and mucosal health, management may entail addressing elements like infection, inflammation, or mechanical damage [4].

An epithelial rupture that occurs between the depth of an erosion and an ulcer is referred to as excoriation. Although it is shallower than an ulcer, it is distinguished by a deeper degree of tissue involvement than erosion. The rete pegs, which are structures that run from the epidermis into the dermis and create the interlocking pattern of the skin's surface, are usually tangential to this kind of lesion. Because the tissue injury exposes capillary loops, excoriations frequently show punctiform hemorrhage, which appears as tiny, pinhead-sized patches. When there is slight trauma or friction, these exposed capillaries are likely to bleed. Numerous factors, including as inflammatory processes, chemical irritation, or mechanical abrasion, can result in excoriations. They are frequently seen in diseases including dermatitis, eczema, and damage from scratches. To promote healing and stop more tissue damage or problems, the underlying cause must be promptly identified and appropriately managed [4].

Fig. 2 - Mouth Ulcer

Causes:

• Chemicals that are frequently present in many toothpaste formulations, such as sodium lauryl sulfate (SLS), have been linked to the development of mouth ulcers [6]. [7]These ulcers, which are sometimes referred to as aphthous or oral ulcers, may develop as a result of SLS irritating the sensitive oral mucosa. Because SLS has a tendency to induce tissue damage and irritation, public health agencies like the National Health Service (NHS) have recognized it as a potential risk factor for mouth ulcers. Through the disruption of the protective mucosal barrier, SLS causes inflammation and damage to the epithelium, which can result in painful oral ulcers.Therefore, toothpaste formulations free of SLS or other possible irritants may be beneficial for people who are prone to mouth ulcers in order to reduce the likelihood of ulcer formation and ease related discomfort[8].

• Infections like those brought on by herpes viruses. Accidental damage such biting the lip, tongue, or cheek, as well as mechanical irritation from eating hard foods that can scrape the sensitive oral tissues, can all result in injuries to the oral mucosa. Furthermore, consuming hot meals or drinks at high temperatures might result in thermal burns to the oral mucosa. Inflammation, tissue damage, and the development of oral erosions or ulcers can result from these injuries.Inflammation, tissue damage, and the development of oral erosions or ulcers can result from these injuries. Hard foods

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can produce abrasions or cuts if they come into contact with the oral mucosa with enough power, whereas biting the lip, tongue, or cheek can result in localized abrasions or lacerations. In a similar vein, eating hot food can result in thermal damage, which can burn the oral tissues. The risk of oral mucosal injuries can be reduced and oral health can be enhanced with good oral hygiene and knowledge of possible injury triggers.

• Oral cavity erosions and ulcers can be exacerbated by nutritional issues, including vitamin deficits. Vitamin B12, folate, and vitamin C are examples of essential vitamins that are vital for preserving the integrity and health of oral tissues. The body's capacity to regenerate and repair oral epithelial cells may be hampered by vitamin deficiencies, making the body more vulnerable to oral mucosal diseases.

• For instance, a lack of vitamin B12 can cause pernicious anemia, a disorder that can cause symptoms including mouth ulcers and glossitis, or inflammation of the tongue. Similarly, the development of oral mucosal lesions, such as ulcers and erythema, has been linked to folate deficiency.

• Scurvy, also known as a vitamin C deficiency, can harm mucosal tissues all over the body, including the mouth. Scurvy can present orally as ulceration, edema, and bleeding of the gingiva.

• In general, keeping a healthy nutritional status—which includes getting enough vitamins and minerals—is crucial for the wellbeing of oral tissues and can help stop the erosions and ulcers linked to nutritional deficiencies. Under the supervision of medical practitioners, people who are at risk of nutritional disorders—such as those with malabsorption syndromes, bad eating habits, or certain medical conditions—should be careful to achieve their nutritional needs through dietary supplements or adjustments.

•Heavy metals, including cadmium, which is present in phosphate rock, may play a role.

Pathophysiology:

The underlying source of the ailment determines how it develops specifically. Xerostomia, or dry mouth brought on by a reduction in saliva production, is one of the simple mechanisms that raises the risk of oral trauma and ulcers. The mouth lining may become more vulnerable to damage if saliva production is reduced because it typically lubricates the mucous membrane and aids in bacterial control. Furthermore, especially following treatments like radiation therapy, there may be epithelial atrophy, or thinning of the mucosal lining. This weakening increases the likelihood of trauma and ulcer development by making the mucosal membrane more brittle and susceptible to breaching [11]. Ulceration frequently coexists with stomatitis, a condition that refers to inflammation in the mouth.This inflammation can worsen tissue damage and increase the risk of developing oral ulcers. All things considered, these disorders emphasize how critical it is to preserve oral health and treat underlying issues that may make people more vulnerable to mouth trauma and ulcers[12].

From a pathological perspective, the mouth serves as a conduit between the digestive system and the skin. This anatomical characteristic makes the mouth cavity susceptible to many conditions that impact the gastrointestinal system and skin. Some conditions can only manifest in the mouth, even though they often impact the entire digestive system. Orofacial granulomatosis and oral Crohn's disease are two examples of related conditions. Two types of inflammatory bowel diseases that primarily affect the mouth cavity include orofacial granulomatosis and oral Crohn's disease. Because symptoms may manifest in the mouth before they become apparent in other areas of the body, the mouth is crucial for both diagnosing and monitoring systemic disorders. It is essential to comprehend the relationship between gastrointestinal and skin conditions and their possible oral signs for effective diagnosis and treatment, especially when oral symptoms may be the first or only indication of a systemic issue [3].Likewise, skin disorders can impact the mouth and may sometimes only affect the oral cavity without involving the skin. The unique conditions found in the mouth, such as saliva, thinner mucosal layers, and the risk of injury from teeth and food, lead to specific manifestations of skin disorders in the oral area. As a result, certain skin conditions that typically produce distinct lesions on the skin may only appear as vague lesions in the mouth [14].Due to moisture and the possibility of food and tooth trauma, vesicles and bullae in blistering mucocutaneous illnesses such as pemphigus or pemphigoid can rapidly develop into oral ulcers. The clinical picture is further complicated by the increased risk of secondary infections in these ulcers due to the high bacterial presence in the mouth. Furthermore, the majority of cytotoxic medications used in chemotherapy target cells that divide quickly, including malignant cells. However, the oral cavity's epithelial cells are susceptible to these medications due to their high turnover rate. Chemotherapy can also result in oral mucositis, characterized by ulceration and inflammation of the

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oral mucosa, which can have a major impact on a patient's quality of life and the outcome of treatment. Only the mucosal epithelial layer is affected by erosions, which typically have a red appearance because the underlying lamina propria can be seen through the thinning epithelium. However, the lesion gets covered in a fibrinous exudate and appears yellow-grey when the entire thickness of the epithelium is compromised, leading to ulceration. When viewed in cross-section, ulcers are distinguished by their crater-like appearance, which is caused by the tissue integrity of the mucosal lining deteriorating. In addition to their outward appearance, ulcers usually exhibit localized inflammation. Edema, or swelling, around the ulcer is also commonly seen, and there may be a "halo" appearance, in which the surrounding mucosa seems inflamed. An ulcer with a keratotic edge [5], which is characterized by thickened, white mucosa surrounding the afflicted area, can result from persistent irritation. When surrounding tissues invade the mucosa or when the mucosa itself grows haphazardly, disturbing the normal tissue structure, malignant lesions may develop ulcers. Low immunoglobulin levels in the oral mucous membranes may be a sign of an underlying immunodeficiency, which may be the cause of frequent mouth ulcers. Oral ulcers are a typical symptom of immunodeficiency or immunosuppression caused by conditions like chemotherapy, HIV, mononucleosis, and autoimmune illnesses. Oral ulcers can also be caused by autoimmune diseases. For instance, mucous membrane pemphigoid, an inflammatory reaction that targets the epithelial basement membrane, can cause the oral mucosa to peel and ulcerate. Multiple oral aphthous ulcers may be the initial sign of Behçet's disease, an inflammatory autoimmune condition that can progress to skin lesions and uveitis in the eyes. Additionally, scurvy, which prevents wounds from healing and promotes the development of ulcers, can be brought on by a vitamin C shortage [15]. In conclusion, for an accurate diagnosis and successful treatment of oral ulcers, it is essential to comprehend their numerous causes and underlying mechanisms.

A medical history is typically taken before an oral examination and evaluation of any additional afflicted regions are performed in order to diagnose mouth ulcers. The length of time the ulcer has existed, its position, the number of ulcers, their size, color, texture, inclination to bleed, and whether or not they have a rolled edge are all significant characteristics that are assessed. In general, a medical expert should be consulted for any mouth ulcer that persists for more than two or three weeks [1][16]. Nearby sharp surfaces may be the reason of an ulcer that continues coming up in the same place, but Recurrent Aphthous Stomatitis (RAS) is likely to be the origin of ulcers that heal and then recur in other places.Multiple ulcers are less likely to indicate oral cancer than single ulcers, which are more suggestive of malignant diseases. Different forms of RAS can be distinguished by the size and location of the ulcers; large RAS can develop anywhere in the mouth or oropharynx, whereas minor RAS usually affects non-keratinizing mucosa. Malignant ulcers may be indicated by symptoms such induration, bleeding upon contact, and rolling edges [17]. It's also important to consider possible causes, such as sharply edged teeth that break. Other linked conditions, such eye or genital lesions or digestive disorders, may also be discovered through the medical history. Although the medical history and physical are the primary determinants of the diagnosis, additional testing may be necessary to screen for vitamin deficiencies, anemia, leukemia, HIV, the Epstein-Barr virus, or diabetes. Urinalysis may be done to check for diabetes, and microbiological swabs can assist in determining infectious causes. In order to rule out cancer or look into suspected systemic disorders, a biopsy—which entails extracting a little sample of the ulcer for microscopic examination, potentially with immunofluorescence—may be necessary in certain situations [5]. Local trauma-induced ulcers are typically tender and painful to the touch, with red borders and an uneven border. A keratotic halo, which is characterized by thicker, white mucosa, may emerge as these ulcers heal, and their base may appear yellow [11][52].

Diagnosis of differentiation:

Because of the presence of saliva, the thinness of the oral mucosa, and the possibility of damage from teeth and chewing, vesicles and bullae that form on the mucous membranes of the oral cavity are very delicate. As a result, these lesions often decompose rapidly, leading to ulcers.

Among the most frequent causes of oral ulcers are aphthous stomatitis, often known as recurring aphthous ulcers or canker sores, and local trauma. Recurrent painful ulcers that typically go away on their own in one to two weeks are a symptom of aphathous stomatitis. Oral ulcers can result from local damage caused by biting accidents, eating rough or sharp foods, dental operations, or poorly fitted dental equipment.

International Journal of Pharmaceutical Research and Applications
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Although local trauma and aphthous stomatitis are major causes of mouth ulcers, other possible causes are comparatively rare. These include autoimmune diseases like Behçet's disease or pemphigus vulgaris, systemic ailments like inflammatory bowel disease, fungal infections like oral candidiasis, viral infections like herpes simplex virus or coxsackievirus, and malignancies like oral squamous cell carcinoma. However, compared to aphthous stomatitis and local trauma, these disorders make up a smaller fraction of occurrences of oral ulceration.

Traumatic Ulceration:

Local trauma is the primary cause of the majority of mouth ulcers that are not brought on by recurrent aphthous stomatitis. Because the oral mucous membrane is thinner and more delicate than skin, it is more vulnerable to damage from a variety of factors. This includes dental operations, rough or sharp foods, misfitting dental equipment, and mechanical trauma from unintentional biting. In addition to chemical irritants found in some foods, beverages, or dental care products, thermal injuries can result from hot or cold food and beverages. The oral mucosa can also be harmed by radiation (either accidental or therapeutic), some drugs, and environmental pollutants. The oral mucosa's vulnerability to these many injuries emphasizes the importance of maintaining proper oral hygiene and limiting exposure to possible irritants in order to help avoid mouth ulcers.

Mechanical:

The sharp edges of teeth, dental fillings, crowns, dentures, or orthodontic devices like braces can all generate friction, which is a common cause of mouth ulcers. Accidental biting can also result in the development of ulcers, especially when sensitivity returns during dental procedures following local anesthesia. Consuming firm foods like potato chips might harm the lining of the mouth. By careless behaviors or deliberate self-harm, such as biting their lips, tongue, or cheeks or rubbing items like toothpicks, pens, or fingernails inside their mouths, some people may unintentionally cause factitious ulceration, which damage to the interior of their mouths. Tearing and subsequent ulceration of the upper labial frenum may be signs of non-accidental injury in child abuse instances [5]. Unintentional abrasions to the soft tissues of the mouth during dental operations can result in iatrogenic ulceration, which requires a medical intervention. Before beginning dental work, some dentists apply a protective coating of petroleum jelly to the lips in order to lower this danger. The lingual frenum may get ulcerated as a result of "cunnilingus tongue," which is the term for repeated friction during oral sexual activity [18]. Additionally, infants may occasionally develop ulcers on the tongue or lower lip from friction caused by their own teeth, a condition known as Riga-Fede disease [19].

Thermal and Electrical Burns:

Due to the absence of normal pain perception, thermal burns are common when consuming hot meals or beverages, especially before the effects of local anesthesia wear off. Thermal burns in the mouth can also result from microwave-heated food, which may have uneven temperatures. The palate or the back of the mouth are typically affected by these burns, which manifest as red, ulcerated patches with dead tissue around the edges. Electrical burns, on the other hand, usually occur around the corners of the lips and may not hurt at first. They look yellow and burnt and flow little. Swelling occurs, resulting to tissue death and the eventual loss of the skin by the fourth day following the burn [18]. Young toddlers who chew on live wires frequently sustain electrical burns to their mouths because saliva may conduct electricity, forming an arc that produces extreme heat and can harm tissues [18][20].

Chemical Injury:

If high concentrations of caustic chemicals come into touch with the oral mucosa for an extended period of time, it can lead to ulceration. Children, those under psychiatric care, or others who do not completely comprehend the risks may hold drugs in their mouths instead of taking them. For instance, placing an aspirin tablet against a painful tooth to relieve toothache can lead to tissue damage. It is recommended to swallow chewable aspirin and quickly rinse the mouth to avoid harm. Tissue necrosis can also be brought on by other caustic chemicals, such as chlorpromazine and eugenol. Hydrogen peroxide, often used for gum disease treatment, can harm tissues at concentrations of 1-3%.As a chemical cauterant, silver nitrate, which is used to treat canker sore pain, can exacerbate mucosal damage and kill nerve endings. Some over-the-counter remedies for canker sores contain phenol, which is used in dental procedures to cauterize and sterilize cavities. At concentrations of 0.5%, mucosal necrosis has been reported. Additionally, certain endodontic materials are caustic, leading to recommendations

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Volume 10, Issue 3 May-June 2025, pp: 2143-2158 www.ijprajournal.com ISSN: 2456-4494

for using a rubber dam to limit tissue exposure during procedures [18].

Irradiation:

Radiation-induced stomatitis, which is typified by ulcers and mucosal erosions, can result from radiation therapy administered to the mouth. Salivary gland radiation can result in xerostomia, or dry mouth, which lessens saliva's lubricating properties and increases the oral mucosa's susceptibility to friction-induced damage. Additionally, there may be mucosal atrophy, which raises the possibility of epithelial breaches. Radiation exposure to the jawbones can cause hypovascular, hypocellular, and hypoxic hard tissues by harming osteocytes and interfering with the blood supply. Osteoradionecrosis, which frequently affects the mandible and results in surface sores and chronic discomfort, is caused when irradiated bone fails to repair. In extreme situations, soft tissue flaws may reveal non-healing bone. Teeth with unknown results are frequently extracted before to beginning radiotherapy in order to prevent osteoradionecrosis [18].

Aphthous Stomatitis:

About 10–25% of people have aphathous stomatitis, sometimes known as "canker sores," which is a prevalent cause of mouth ulcers. Based on how they look, it is divided into three categories: minor, major, and herpetiform major aphthous ulceration. Small (2-4 mm in diameter), round or oval, yellow-grey ulcers with a red "halo" surrounding them are the hallmark of the most common kind, known as minor aphthous ulceration. These ulcers can repeat every 1-4 months and often heal without leaving scars in 7-10 days. Less frequent but more severe, major aphthous ulceration causes bigger ulcers (diameters greater than 1 cm), takes longer to cure (10–40 days), and may leave scars. Although major ulcers can, though they are less common, develop on keratinized surfaces, both minor and major types usually develop on non-keratinized oral mucosa. Herpetiform ulceration, the least frequent kind, begins as tiny blisters and grows into 2-3 mm ulcers. It resembles primary herpetic gingivostomatitis. Larger ulcerated areas may result from the merging of these, which can occasionally number in the hundreds. Herpetiform ulcers can recur regularly, are extremely painful, and frequently leave scars after healing. Quitting smoking, stress, menstruation, trauma, food allergies, and sensitivity to sodium lauryl sulfate, a common ingredient in toothpaste, are all factors that can cause aphthous stomatitis. Although there are no obvious indications or symptoms outside the mouth, recurring ulcers can cause substantial discomfort.Using systemic or topical steroids, analgesics, antiseptics, anti-inflammatory drugs, or barrier pastes to protect the afflicted areas, treatment attempts to alleviate discomfort, minimize swelling, and encourage healing [5].

Infection:

Infectious causes of oral ulceration[5].

Agent	Example (s)
Viral	Chickenpox, hand, foot and mouth disease, her angina, herpetic stoma it is, human immunodeficiency virus, Infectious mononucleosis
Bacterial	Acute necrotizing ulcer ativegingivit is, gangrenous tom at it is, syphilis, tuberculosis
Fungal	blast mycosis, cryptococcosis, histoplasmosis, paracoccidioidomycosis
Parasitic	leishmaniasis

Oral ulcers can result from a number of infections, but the most common ones are the coxsackie A virus (which causes hand, foot, and mouth disease), varicella-zoster virus (which causes shingles and chickenpox), and herpes simplex virus (which can manifest as primary herpetic gingivostomatitis or herpes labialis). Immunodeficiency brought on by the human immunodeficiency virus (HIV) might facilitate the growth of malignancies or opportunistic diseases. Mycobacterium tuberculosis, which causes tuberculosis, and Treponema pallidum, which causes syphilis, are two bacterial illnesses that can produce ulceration. Combinations of often innocuous bacteria, including aerobic streptococci, Neisseria, Actinomyces, spirochetes, and Bacteroides species, can result in opportunistic infections that prolong ulcers. Valley fever-causing Coccidioides immitis, cryptococcosis-causing Cryptococcus neoformans, and "North American Blastomycosis"-causing Blastomyces dermatitidis are examples of fungal infections [15]. Furthermore, the parasite protozoan Entamoeba histolytica can occasionally cause mouth ulcers by forming cysts. Epstein-Barr virus-positive mucocutaneous ulcer is an uncommon form of Epstein-Barr virus-associated lymphoproliferative disease that is typified by isolated, distinct ulcers on skin and mucous membranes as a result of Epstein-Barr virus-infected B lymphocytes infiltrating the body [21].

International Journal of Pharmaceutical Research and Applications
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Drug-Induced:

Mouth ulcers can be an adverse effect of several drugs. Typical examples are non-steroidal anti-inflammatory medications, nicorandil for angina, propylthiouracil for hyperthyroidism, chemotherapy medications such as methotrexate, alendronate [22], a bisphosphonate commonly taken for osteoporosis, and others. Additionally, some recreational substances, such cocaine, can cause ulcers [24].

Malignancy:

Rarely, a mouth ulcer that doesn't go away could be an indication of cancer. Although lymphomas, sarcomas, and other forms may also manifest, oral malignancies typically manifest as carcinomas. Mouth tumors can originate in the mouth or spread from the nasal cavity, salivary glands, maxillary sinus, or skin surrounding the mouth. Squamous cell carcinoma is the most prevalent type of oral cancer, and long-term alcohol and tobacco use, especially when coupled, as well as betel nut use are significant risk factors. Although it can develop anywhere in the oral cavity, oral cancer typically affects the lower lip, the floor of the mouth, the sides and bottom of the tongue, and the mandibular alveolar ridge. A common malignant ulcer is a chronic, growing lesion that might be completely red (erythroplasia) or have a mixed red and white appearance (erythroleukoplakia). Oral malignancies can look different. The borders of malignant lesions may be "rolled" or appear punched out, and they frequently feel hard and are firmly linked to the surrounding tissues. They also frequently bleed readily when touched [25]. A general practitioner or dentist may need to refer a patient to a hospital for additional evaluation in order to rule out oral cancer if the patient has had an unexplained mouth ulcer for longer than three weeks [26].

Vesiculobullous Disease:

Vesiculobullous illnesses are a group of viral infections that were previously discussed. Additional instances include dermatitis herpetiformis, linear IgA disease, epidermolysis bullosa, pemphigus vulgaris, mucous membrane pemphigoid, and bullous pemphigoid. [27] [1] [22].

Allergy:

Although they are rare, allergic responses that affect the lips and mouth can cause erosions, but they typically do not result in visible ulceration. As a common allergen, balsam of Peru can cause stomatitis and cheilitis in persons who are sensitive to it. These conditions are characterized by rashes, inflammation, or severe erosions on the lips, oropharyngeal mucosa, or corners of the mouth [28][29][30][31]. Peruvian balsam is used to flavor food and beverages, add fragrance to cosmetics and fragrances, and provide therapeutic effects in pharmaceutical and medical products [28][29][30].

Other causes:

Other medical disorders can also result in mouth ulcers. Anemia, malnutrition, neutropenia, hypereosinophilic syndrome, leukemia, myelodysplastic syndromes, various abnormalities of white blood cells, and gammopathies are examples of hematological problems. Additionally implicated are gastrointestinal conditions such ulcerative colitis, Crohn's disease (which is connected to orofacial granulomatosis), and celiac disease. Angina bullosa hemorrhagica, lichen planus, erythema multiforme (including Stevens-Johnson syndrome), and chronic ulcerative stomatitis are examples of dermatological conditions. Additionally, aphthous stomatitis, pharyngitis, and adenitis, as well as systemic diseases such as lupus erythematosus, Sweet syndrome, reactive arthritis, Behçet syndrome, granulomatosis with polyangiitis, periarteritis nodosa, giant cell arteritis, diabetes, glucagonoma, sarcoidosis, and periodic fever, can also cause mouth ulcers [5].

Additionally, diseases like necrotizing sialometaplasia and eosinophilic ulcer can cause oral ulcers. Ulceration may result from macroglossia, a larger tongue that frequently protrudes from the mouth [18]. A common vascular aberration known as the caliber persistent artery occurs when a main arterial branch continues into the superficial submucosal tissues without constricting. This condition, which is frequently observed on the lip in older persons, may be linked to ulceration [18].

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Volume 10, Issue 3 May-June 2025, pp: 2143-2158 www.ijprajournal.com ISSN: 2456-4494

Overview of Plants:

CommonName	BotanicalName	PartUsed	Uses
Guava	Psidiumguajava	Leaves,roots,fruits	Guavasareextensivelyusedtomake candies, preserves, jellies, jams.
Capsicum	Capsicumannum	Fruit	Asaspice:thesweetervarietyarecalledas bell peppers and the hot ones as chilies. In GIdisorders:Intestinalgas,upsetstomach, cramps, stomach pain, diarrhea etc.
Nonifruit	Morindacitrifolialinn	Fruit	Abnormal menstruation, acne / boils, constipation,diarrhea,arthritis,diabetes, fever,highbloodpressure,gastriculcers.
Aloevera	Aloebarbadensis	Leaves, flowers, stems,roots,fruits, seed.	analgesic,antibacterial,antiviral,antifungal, antioxidant,immunemodulating,antiseptic, anti-inflammatory
Papaya	Caricapapaya Linn	bark,leavesand fruits	Papain is used extensively for tenderizing meat. Another use of this enzyme is an ingredient in cleansing solution for soft lenses. Papain is used as digestant for protein.
Turmeric	Curcumalonga	Rhizomesandstem	canned beverages, baked products, dairy products,icecream,yogurt,yellowcakes, orange juice, biscuits, popcorn color, cereals, sauces, and gelatine.
Liquorice	Glycyrrhiza glabra L.	Rootsand stolen	Tonic,demulcentlaxativeemollientare used in ganito-urinary diseases.

1. Guava:

The tropical fruit guava, which is a member of the Myrtaceae family and is derived from the Psidium guajava plant, is prized for both its nutritional value and sweet taste. Originally from Central America, it is currently grown in many tropical and subtropical regions worldwide. The guava tree is a tiny tree or evergreen shrub with aromatic oval leaves and smooth bark. Usually round or pear-shaped, the fruits have thin, edible skin that can be green, yellow, or maroon. The flesh can be white, pink, or red, and it contains a lot of tiny, useful seeds. Rich in essential elements like vitamin C, vitamin A, potassium, fiber, and antioxidants, guavas are frequently eaten raw or processed into nectar and puree, as well as in juices, jams, salads, and desserts. Guava is a popular fruit that is valued for its flavor and health benefits all over the world. In addition to its culinary applications, guava has a long history of usage in traditional medicine due to its possible immune-boosting, anti-inflammatory, and antibacterial qualities.

Morphology:

The morphological characteristics of guava fruits vary by species, but they typically range in length from 4 to 12 centimeters (1.6 to 4.7 inches), having an oval or spherical appearance. They smell distinctively of lemon peel, but not as strongly. Guava fruit skins can range in texture from smooth and sweet to rough and slightly bitter. Different species have different skin thicknesses,

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Volume 10, Issue 3 May-June 2025, pp: 2143-2158 www.ijprajournal.com ISSN: 2456-4494

and as they ripen, they may turn yellow, red, or stay green. The pulp, which is off-white in "white" guavas and deep pink in "red" guavas, can taste either sweet or sour when cut open.Depending on the guava species, the number and hardness of the seeds in the middle pulp vary. These morphological characteristics add to the guava fruits' diversity and appeal by offering a range of tastes, scents, and textures for culinary applications as well as nutritional advantages.

Plant parts used:
The parts of the plant that are utilized include leaves, rhizomes, and reproductive structures like fruits.

Chemical constituents:

Leucocyanidin and (+)-gallocatechin are two prominent carotenoids and polyphenols found in guava leaves, among other chemical substances. These phytochemicals contribute to the guavas' vivid skin and flesh hues and are crucial for the fruit's nutritional content and aesthetic appeal. The distinctions between red-orange and yellow-green guava types highlight the connection between fruit color and phytochemical content. Red-orange guavas typically have larger concentrations of carotenoids and polyphenols than yellow-green ones, suggesting a relationship between phytochemical content and color intensity. This intricate chemical composition demonstrates the guava leaves' diverse function in the plant kingdom as a source of both aesthetic appeal and health advantages.

Uses:

Guavas are used extensively in cooking due to their high pectin content. They are a main ingredient in a variety of sweets, jellies, jams, and marmalades, including the well-known Brazilian goiabada and the Colombian and Venezuelan bocadillo. Additionally, guavas are frequently used to make marmalade jams, which add a distinctive flavor to breakfast spreads. Because of their flavor and texture, red guavas can be used as a base for a variety of savory recipes. They can also be used in place of tomatoes in sauces to lessen their acidity. Furthermore, in Brazil, chá-de-goiabeira, often known as "guava tree leaf tea," is made by brewing guava fruits and leaves. This beverage is a well-liked herbal treatment because of its purported therapeutic qualities. Guavas so fulfill a variety of functions, from sating sweet tooths to offering possible health advantages, thereby establishing their significance in a wide range of cultural and culinary customs worldwide.

2. Capsicum:

Capsicum, scientifically referred to as Capsicum annuum L., includes the dried fruits of Capsicum annuum plants and the smaller dried fruits from Capsicum frutescens. It belongs to the Solanaceae family.

Morphology:

This plant's stem is heavily branched and can reach a height of 60 cm (24 in). Its flowers are typically off-white, occasionally with a tint of purple. The berries are mature fruits that come in a variety of colors, such as red, orange, yellow, and green. Although it can grow in a variety of frost-free conditions, Capsicum annuum thrives in warm, arid areas and has excellent productivity there.

Plant part used:
Fruit

Chemical constituents:

Paprika oleoresin, dihydrocapsaicin, and capsaicin are the primary chemical components found in capsicum annuum. By triggering heat and pain receptors in the tongue, capsaicin is the substance that gives chili peppers their distinctive heat and spiciness. Derived from paprika, paprika oleoresin is a mixture of pigments, tastes, and essential oils that is frequently used to color and flavor food goods. Another ingredient that gives chili peppers their spiciness is dihydrocapsaicin, which shares structural similarities with capsaicin. These substances, which give capsicum annuum its flavor, color, and possible health advantages, are crucial to its culinary and therapeutic uses.

Uses:

There are numerous health benefits associated with capsicum. Both mild bell peppers and spicier chili peppers are used as spices to add flavor and heat to food. Gas, an upset stomach,

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 3 May-June 2025, pp: 2143-2158 www.ijprajournal.com ISSN: 2456-4494

cramps, discomfort, and diarrhea are among the gastrointestinal problems that it can help with.

Capsicum may contribute to overall cardiovascular health by lowering cholesterol, enhancing blood circulation, and preventing heart disease.

Because of its anti-irritating qualities, it can be used in skincare products like ointments and plasters to relieve pain from rheumatism, shingles, and lumbago.

Due to its analgesic qualities, capsicum is also helpful in the management of nerve-related conditions. It can help people with diabetes, HIV, fibromyalgia, and back pain by relieving nerve pain, which can enhance their quality of life.

It has also long been used to treat mouth ulcers; topical treatments have been shown to provide calming and restorative effects on oral sores. All things considered, capsicum's many qualities make it a useful tool for treating a range of illnesses affecting several body systems.

3. Noni fruit:

Other names for the tropical fruit, which is formally known as Morindacitrifolia Linn., include Indian Mulberry, Nuna, Cheese fruit, Tookunja, Great Morinda, Mouses' pineapple, and Yellow root. Although it is currently grown in tropical regions worldwide, it is native to Southeast Asia and is a member of the Rubiaceae family.

Morphology:

An evergreen species, the noni tree normally has a stem that is around 13 cm in diameter. Its bark varies from gray to brown and is normally smooth to somewhat rough, while its sapwood is soft and yellowish-brown in hue. In addition to improving the tree's aesthetic appeal, this mix of hues and textures makes it more resilient to environmental stresses. Because of their four-angled shape and light green color, the noni tree's twigs give its branches flexibility and stability. The noni tree's distinctive structure enables it to withstand the difficulties of its native environment and adjust to a variety of environmental circumstances.Overall, the noni tree's morphology demonstrates how it has adapted to tropical climates and emphasizes the characteristics that make it a robust and resilient evergreen.

Plant part used:

Fruit

Chemical constituents:

The chemical components of the Indian Mulberry plant, such as anthraquinones, flavonoids, and phenolics, are principally responsible for its medicinal qualities. Additionally, it contains a variety of anthraquinones, including molindone, rubiadin, nordamnacanthal, rubiadin methyl ether, potassium, vitamin C, terpenoids, oligo- and polysaccharides, glycosides, alkaloids, and octanoic acid. Carotene, vitamin A, flavone glycosides, linoleic acid, alizarin, amino acids, aucubin, lasperuloside, caproic acid, caprylic acid, ursolic acid, rutin, and maybe proxeronine are other substances present in noni. These substances work together to provide the many therapeutic advantages of noni.

Uses:

Noni fruit juice has long been used to cure a wide range of illnesses in different cultures. It has been used to alleviate digestive discomfort and ailments like acne, boils, constipation, diarrhea, and irregular menstruation. Noni juice is also sought for its possible advantages in treating diabetes, fever, high blood pressure, and arthritis, suggesting that it is useful in treating long-term health conditions and fostering general well-being.

As evidence of its many uses in both physical and mental health, noni juice has also been used to cure sprains, mental distress, senility, and stomach ulcers. Its consumption is associated with a number of cardiovascular health benefits, including better digestion, prevention of atherosclerosis, and treatment of blood vessel problems. Noni juice has also been studied for its possible use in treating drug addiction, potentially assisting with withdrawal symptoms and promoting the healing process. It is a preferred choice for people looking for natural therapies because of its holistic approach to health, which takes into account several body systems.

Noni juice's traditional uses are mostly based on anecdotal evidence and cultural customs,

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 3 May-June 2025, pp: 2143-2158 www.ijprajournal.com ISSN: 2456-4494

although more recent studies are starting to look at its possible medical benefits. To completely comprehend and validate noni juice's efficacy for the aforementioned illnesses, more scientific research is necessary. However, the fact that it has been used for so long in many cultures emphasizes how important it is as a natural medicine with many health advantages.

4. Aloe vera:

Aloe vera, which comes from the Aloe barbadensis plant, belongs to the Xanthorrhoeaceae family.

Morphology:

Typically reaching heights of 60 to 100 cm (24 to 39 in), aloe vera is a plant that either has no stem or a short stem and reproduces by offsets. Its thick, meaty leaves might be green or grey-green in hue, with white dots on the upper and below surfaces. The leaves have tiny white teeth that serrate their margins. During the summer, it has drooping yellow tubular blooms that are 2-3 cm (0.8-1.2 in) long on a spike that can grow up to 90 cm (35 in) tall. Aloe vera, like other plants in its genus, develops arbuscular mycorrhiza, which enhances the absorption of soil mineral nutrients.

Plant parts used:

Leaves, flowers, stems, roots, fruits, seeds.

Chemical constituents:

Numerous chemical substances, such as fatty acids, prostaglandins, anthraquinones, and saccharides, are found in aloe vera. In addition, it contains vitamins, minerals, amino acids, and enzymes. Aloe vera also contains lignins, beta-sitosterol, gibberellin, uric acid, cholesterol, triglycerides, steroids, and salicylic acid.

Uses:-

Pain reduction, antibacterial, antiviral, antifungal, antioxidant, immune-boosting, antiseptic, and anti-inflammatory qualities are just a few of the many health advantages of aloe vera. It is used to treat a variety of oral and dental health concerns, including the healing process following periodontal surgery, chemical burns, canker sores, gum abscesses, dry socket, lichen planus, benign pemphigus, and gum difficulties associated with diseases like leukemia and AIDS. Aloe vera also aids in the treatment of vesiculobullous disorders, dry mouth, burning mouth syndrome, migrating glossitis, geographic tongue, sore patches from dentures, candidiasis, desquamative gingivitis, and acute monocytic leukemia.

5. Papaya:-

A member of the Caricaceae family and known scientifically as Carica papaya Linn, papaya is prized for its many therapeutic uses. While papaya seeds are known for their antibacterial, anti-parasitic, and antiamoebic qualities, papaya fruit is known for its capacity to prevent ulcers.

Morphology:

The papaya plant is a tall herbaceous perennial with a single stem that can reach a height of 20 to 30 feet. With smooth edges and palmate lobed or deeply cut leaves that can grow up to 2½ feet in width, it has huge leaves that are held up by petioles that are 1 to 3 feet long. The stems are hollow, roughly 8 inches in diameter, pale green to tan brown in color, and clearly scarred.

Plant parts used:

Bark, leaves, and fruit.

Chemical constituents:

Papain, a potent digestive enzyme with a wide range of applications, is the primary active component of papaya. Along with vital elements like potassium, the fruit is high in vitamins C and E. Papain and chymopapain, two potent proteolytic enzymes, are also present.

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 3 May-June 2025, pp: 2143-2158 www.ijprajournal.com ISSN: 2456-4494

Uses:

A combination of proteolytic enzymes presents in the unripe fruit make up papain, which is derived from the dried and processed latex of the Carica papaya fruit. It is frequently used to tenderize meat and is a component of soft contact lens cleaning solutions. Additionally, papain works similarly to pepsin as a protein digestant and acts on milk casein to alleviate episiotomy symptoms.

6. Turmeric:

The therapeutic properties of turmeric, which is derived from Curcuma longa in the Zingiberaceae family, have been extensively studied. Studies suggest it may help treat gastric and duodenal ulcers in rats. Furthermore, Curcuma longa's volatile oil has anti-inflammatory and anti-arthritic qualities. Curcumin extracts that are both fat-soluble and water-soluble have potent antioxidant properties that are on par with those of vitamins C and E.

Morphology:

Growing up to one meter tall, turmeric is a perennial herbaceous plant with pungent, heavily branching rhizomes that range in color from yellow to orange. It has two rows of alternating leaves with a blade, petiole, and leaf sheath. The leaf sheaths give rise to a false stem, and the petioles are between 50 and 115 cm long. The simple leaf blades are oblong to elliptical, tapering at the tip, and usually measure 76 to 115 cm in length, and sometimes up to 230 cm. They are 38 to 45 cm wide.

Plant portion utilized:

Stems and rhizomes

Chemical components:

The phytochemical components found in turmeric are mostly diarylheptanoids, which include curcumin, demethoxycurcumin, and bisdemethoxycurcumin, among other curcuminoids. For example, curcumin makes up around 3.14% (average of 1.51%) of the commercial turmeric powder samples that were analyzed, while curry powder has a far lower percentage (average of 0.29%). Turmeric also contains about 34 essential oils, with turmerone, germacrone, atlantone, and zingiberene being its main ingredients.

Uses:

Mostly used as rhizome powder, turmeric has several uses but is most valued for its capacity to add a vivid golden-yellow color. Cans, baked goods, dairy products, ice cream, yogurt, yellow cakes, orange juice, biscuits, popcorn colors, cereals, sauces, and gelatin are just a few of the many products that benefit from its many uses. Turmeric is used extensively in many dishes, especially in East Asian cooking, and is a necessary ingredient in curry powders.

Like ginger, fresh turmeric is also used, though it is more often used in its dried, powdered form. Fresh turmeric is widely used in East Asian cooking, particularly in pickles that have large, soft turmeric bits.This new variety enhances culinary creations with subtle color and flavor, adding to the rich tapestry of scents and flavors that are appreciated in many different cuisines across the world.

7. Glycyrrhiza glabra L.:

Glycyrrhiza glabra L., commonly referred to as liquorice, is a flavoring plant that is sweet, moist, and calming. It belongs to the family Fabaceae.

Morphology:

The saponin glycyrrhizin, which is about 60 times sweeter than cane sugar, is found in the roots of Glycyrrhiza glabra Linn. Along with more recent flavonoids such glucoliquiritinapioside, prenyllicoflavone A, shinflavanone, shinpterocarpin, and 1-methoxyphaseolin, the roots also contain a variety of flavonoids, including liquirtin, isoliquertin, liquiritigenin, and rhamnoliquirilin. In addition, new compounds have been extracted and structurally characterized, such

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 3 May-June 2025, pp: 2143-2158 www.ijprajournal.com ISSN: 2456-4494

as glisoflavone, licoarylcoumarin, licopyranocoumarin, and a new coumarin called GU-12. The roots also include four novel isoprenoid-substituted phenolic compounds: licoriphenone, isoangustone A, 1-methoxyficifolinol, and semilicoisoflavone B.

Plant part used:-
Roots and stolen

Chemical components:

The saponin glycyrrhizin, which is about 60 times sweeter than cane sugar, is found in the roots of Glycyrrhiza glabra Linn. Along with more recent flavonoids such glucoliquiritinapioside, prenyllicoflavone A, shinflavanone, shinpterocarpin, and 1-methoxyphaseolin, the roots also contain a variety of flavonoids, including liquirtin, isoliquertin, liquiritigenin, and rhamnoliquirilin. In addition, new compounds have been extracted and structurally characterized, such as glisoflavone, licoarylcoumarin, licopyranocoumarin, and a new coumarin called GU-12. The roots also include four novel isoprenoid-substituted phenolic compounds: licoriphenone, isoangustone A, 1-methoxyficifolinol, and semilicoisoflavone B.

Uses:

According to published research, this plant species, Glycyrrhiza glabra, is well known for a wide range of biological activities. In addition to its hormonal effects, it has anti-inflammatory qualities, acts as an expectorant, and efficiently reduces coughing. Additionally, it contributes to liver protection and detoxification.

Glycyrrhiza glabra is used internally in medicine to treat a variety of conditions, such as Addison's disease, bronchitis, asthma, peptic ulcers, arthritis, allergic reactions, and steroid therapy. On the outside, it is used to relieve and aid in the treatment of ailments like shingles, herpes, and eczema.

Glycyrrhiza glabra helps treat aplastic anemia and has been shown to lower women's serum testosterone levels. Additionally, it shows promise in autoimmune diseases and provides therapeutic advantages in immunodeficiency diseases such as AIDS. Interestingly, parts of licorice root have both estrogenic and antiestrogenic properties, which makes it useful for female hormone problems.

Additionally, the root of Glycyrrhiza glabra is used in many formulations and is used as an energy tonic, especially for the stomach and spleen. Famous for its emollient, laxative, tonic, and demulcent qualities, Glycyrrhiza glabra roots are used to treat genitourinary disorders, relieving symptoms and fostering well-being in those who are afflicted.

II. CONCLUSION:

The essay goes into great detail about how to cure mouth ulcers, also known as canker sores, with an emphasis on using herbal gel that has been enhanced with flavonoids. These excruciating lesions, which appear on the oral cavity's mucous membranes, cause patients a great deal of suffering and difficulty. In addition to shedding light on alternate methods of treating oral illnesses, the study emphasizes the therapeutic potential of herbal remedies and the significance of ancient medical practices that are firmly embedded in indigenous communities around the world.

The article highlights the efficacy of herbal formulations in preventing and healing diseases, drawing on the long history of traditional and herbal medicine, especially in places like India. Herbal medication is preferred because it has the significant benefit of having less side effects than synthetic alternatives, which aligns with the growing need for natural treatments in contemporary healthcare.

Furthermore, the investigation of herbal treatments enhanced with flavonoids is evidence of the collaboration between scientific study and traditional knowledge in tackling modern health issues. The study not only advances our knowledge of herbal medicine but also emphasizes the significance of incorporating traditional knowledge into current healthcare procedures by clarifying the important function of flavonoids in reducing the discomfort associated with mouth ulcers.

The paper essentially promotes a comprehensive strategy for managing oral health in which the medicinal benefits of herbal remedies—especially those with a high flavonoid content, like guava leaves—are acknowledged and used in conjunction with traditional therapies. In addition to providing patients with a wider range of treatment choices, this integrated approach emphasizes the continued value of conventional medical procedures in addressing the healthcare requirements of various populations.

A promising approach to the treatment of oral health issues, especially mouth ulcers, is the creation and testing of a herbal mouth ulcer gel made from guava leaves. Through careful investigation and testing, the study has shown how

International Journal of Pharmaceutical Research and Applications
Volume 10, Issue 3 May-June 2025, pp: 2143-2158 www.ijprajournal.com ISSN: 2456-4494

effective it is to formulate medicinal gels using natural materials like guava leaves, which are prized for their high flavonoid content.

The evaluation's findings demonstrate the potential of herbal formulations to reduce the discomfort brought on by mouth ulcers while reducing the negative side effects typically connected to synthetic substitutes. In addition to highlighting the value of traditional knowledge in contemporary healthcare, the study opens the door for the creation of safer and more easily available treatment solutions for oral diseases by utilizing the therapeutic qualities of herbal substances.

Additionally, the creation of herbal mouth ulcer gel offers patients a comprehensive approach to managing their dental health by combining traditional wisdom with scientific innovation. As a result, the study's conclusions have important ramifications for both researchers and medical professionals, highlighting the importance of looking into natural solutions to today's health issues.

All things considered, the development and testing of guava leaf herbal mouth ulcer gel represents a positive step toward incorporating herbal medicine into conventional medical procedures, which will ultimately enhance patient outcomes and quality of life.

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