

# A Review on Nature Cure : Medicinal Plants for Effective Management of Mouth Ulcer

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**Abstract:** A mouth ulcer also termed an oral ulcer or a mucosal ulcer is an ulcer that happens on membrane of the oral cavity. It is defined as “a break within the mucosal surface of the oral cavity. Ulcers are an open sore of the skin or mucus membrane characterized by removing of inflamed dead tissue. The mouth ulcer often caused pain and discomfort and can alter the person choice of food while healing occurs. The foremost common oral ulceration is ‘Apthous stomatitis. This review focuses on the causes of mouth ulcer and factors in charge of the mouth ulcer. There are various synthetic drugs which are available to treat mouth ulcer. As we all know herbal medicine is that the most stay of primary healthcare thanks to better culture acceptability, better computability with natural object and lesser side effects. And the literature also revealed that there are various medicinal plants which can be utilized within the treatment of mouth ulcers. Therefore, this review summarizes about the medicinal plants which could be used for the treatment of mouth ulcer as drug.

**Keywords:** Ulcers, apthous stomatitis, herbal plants

## I. INTRODUCTION

A mouth ulcer also termed an oral ulcer a mucosal ulcer is an ulcer that occurs on the mucous membrane of the oral cavity. It is defined as “a break within the mucosal surface of the oral cavity” (1). They are painful round or oval sores that form in the mouth, mainly on the inside of the cheeks or lips. The two most common causes of oral ulceration are local trauma e.g. rubbing from a sharp edge on a filling and apthous stomatitis canker sores (2). Apthous stomatitis is an ulcerative condition that is related to the oral mucosa and is characterized by repeating ulcers in the throat and oral cavity (3).



**Figure 1:** mouth ulcer

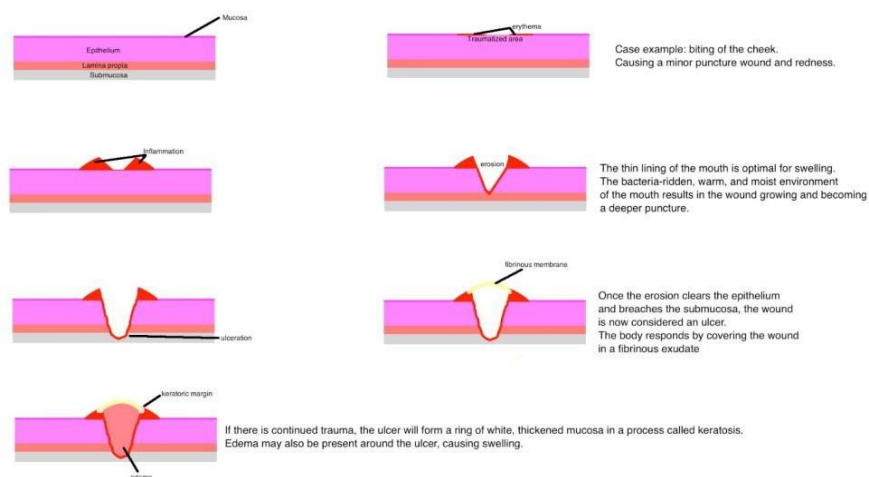
A mucous membrane Ulcers are an open sore of the skin or mucus membrane characterized by removing of inflamed dead tissue (4). An ulcer is a tissue defect which has penetrated the epithelial -connective tissue border, with its base at a deep level in the sub-mucosa even within muscle or periosteum (5). An ulcer is deeper branch of epithelium compared toanerosion or exocoriation, andinvolves damage to both epithelium and lamina propria (6). Mouth ulcers are yellowish or white depression with red margination in the mucus lining of the mouth cavity, characterized by inflammation and pain. Synthetic and semi- synthetic medicaments are suggested to treat mouth ulcers like antibiotics and antiseptics, local anesthetics, local analgesics, steroidal and non-steroidal anti-inflammatory drugs. Topical steroids are the inal disturbance; etc (7).

Therefore, oral hygiene is very important for Health. The tongue is the gastrointestinal tract's (GIT) mirror. Mukhapak Stomatitis, or mucous membrane inflammation, displays in cheek, tongue, and lips. These concerns are global in nature and impact all individuals (8). A Characterized as painful, discomfort, single or multiple ulcers in the upper part of throat and oral cavity. Mouth ulcer may be caused by a fungal called *Candida albicans*. Also it can be due to stress, illness, hormonal changes, menstruation and deficiency of vitamin B12, iron and folic acid. Aphous stomatitis has been classified as minor apathies, major apathies and herpetic form ulcer (9). Common causes of mouth ulcers include nutritional deficiencies such as iron, vitamins especially B12 and C, poor oral hygiene, infections, stress, indigestion, mechanical injury, food allergies, hormonal imbalance, skin disease etc. Mouth ulcers, also known as aphous ulcers, can be painful while eating, drinking or brushing teeth (10).

### History:

William Brinton was one of the first doctors to describe the stomach ulcer in 1857. However, without diagnostic tools such as endoscopy and X-rays, detecting ulcers remained difficult. The Merck Manual, the bible of diagnosis and therapy, did not include ulcers in its first edition in 1899. Doctors began to recognise ulcers as an infection at the beginning of the twentieth century, treating the condition with antacids or surgery. However, because scientists were unable to identify a causative agent, the "focal infection" theory fell out of favour. There was no single associated germ, as there was with cancer, stroke, and heart disease, the three most common killers. As a result, the focus shifted to the investigation of psychic and environmental factors. Theories about infection and dyspepsia eventually gave way to the theory that diet, smoking, and stress cause ulcer (11).

### Mechanism of action :



**Figure 2:** mechanism of action for mouth ulcer.

## II. TYPES OF MOUTH ULCER

### Aphous stomatitis:



**Figure 3:** Aphous stomatitis

The word “apthous originated” from the Greek word “aptha,” the Meaning of which is ulcer. Aphthous stomatitis is one of most common ulcerative disease associated mainly with the oral Mucousa characterized by the extremely painful, recurring solitary, multiple ulcers in the upper oral cavity. This type of ulcer are usually small, multiple, avoid and round margins which are having grey or yellow floors and are encompassed by erythematous haloe (12,13).

It was delineated in 400 B.C by Hippocrates; the disease is known by lay public and professionals by several other names such as cold sores, canker sores, recurrent aphthous stomatitis (RAS), this is the most prevailing oral ulcerative disorder affecting up to 10-20% of our inhabitants and recurrence rate of 3 months in 50% of population (3).

These are quite painful that leads to difficulty in eating, swelling that’s why it negatively affect the patient quality of life (14).

Aphthous stomatitis is divided in to three categorized as major, minor, and herpetiform based on the size and number of ulcers. The following are the most common forms of mouth ulcers.

1. Minor ulcer
2. Major ulcer
3. Herpetiform ulcer

	MINOR RAS	MAJOR RAS	HERPETIFORM RAS
Gender predilection	Equal	Equal	Female
Morphology	Round or oval lesion Gray white pseudomembranes Erythematous halo	Round or oval lesion Gray white pseudomembranes Erythematous halo	Small, deep ulcers that commonly converge irregular contour
Distribution	Lips, cheeks, tongue, Floor of mouth	Lips, soft palate, pharynx	Lips, cheeks, tongue, floor of mouth, gingiva
Numbers of ulcers	1-5	1-10	10-100
Size of ulcers	<10mm	>10mm	2-3mm
Prognosis	Lesions resolve in 4-14 days No scarring	Lesions persist >6 weeks High risk of scarring	Lesions of resolve in <30 days Scarring uncommon

**Table 1:** Clinical features of minor, major, and herpetiform recurrent aphthous stomatitis.

#### Minor ulcer:

Minor aphthous ulcers are the most frequent type, accounting for around 80% of occurrences. These are approximately 2-8 mm in diameter and usually clear up in 10 to 2 weeks. These ulcers are often superficial, small in size (less than 1.0 cm in size), few in number, occur alone or in clusters, and heal without scarring.



**Figure 4:** minor ulcer

#### Major ulcer:

Major Aphthous ulcers, which affect roughly 10% of patients, are the second category. These are larger and deeper in shape, with a raised or uneven border with a diameter of over 1 cm. They might appear as a single lesion or as a group of lesions. Because of the level of necrosis, this form of the ulcer may take many days to recover and can cause complications inside the mouth.



**Figure 5:** major ulcer

#### **Herpetiform ulcer:**

This ulcer consists of a cluster of dozens of tiny lesions the size of pinheads. It has nothing to do with the herpes virus. These appear in enormous numbers, ranging from 10 to 100 at a time, and are made up of several tiny lesions that eventually join to form larger plaques. They may heal with a scar in 7 to 30 days depending on the size and depth of the ulcer (15).



**Figure 6:** Herpetiform ulcer

#### **Causes:**

There is no definite etiology and pathology known for mouth ulcer; although some factors are considered important which include nutritional deficiencies such as iron, vitamins especially B12 and C, poor oral hygiene, infections, stress, indigestion, mechanical injury, skin disease etc. Some other factor include such as:

#### **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 (16).

#### **Food allergies:**

There are various foods which is able to cause allergies. Antibodies to cow's milk and wheat protein (celiac disease) are demonstrated in patients with recurrent aphthous stomatitis. Therefore, many foods that are commonly allergenic (e.g., strawberries, tomatoes, and nuts) haven't been causally associated with recurrent aphthous stomatitis (17). Foods like chocolate, coffee, peanuts, cereals, almonds, strawberries, cheese, tomatoes (even the skin of the tomatoes) and flour (containing gluten) could even be implicated in some patients (18).

#### **Genetic factors:**

Patients with aphthous ulcers have a genetic component, with about 30 percent to 40 percent of patients having a family background. Some sufferers have a family background of recurrent aphthous ulcers. A common link is the start of symptoms at a young age and the severity of the symptoms. In identical twins, recurrent aphthous ulcers are substantially associated.



#### **Chemical injuries:**

Chemicals like aspirin or alcohol that are kept or came in contact with the mucous membranes can cause necrosis and sloughing, resulting in an ulcerated surface. There is little evidence to link sodium laurel sulfate (SLS), one of the key chemicals in most toothpaste to an increased risk of mouth ulcers.

#### **Immune system:**

Many researchers believe that aphthous ulcers are the result of a variety of disease processes, all of which are mediated by the immune system. Aphthous ulcers are hypothesized to emerge when the body becomes aware of compounds it doesn't recognize and assaults (15).

#### **Physical or psychological stress:**

In a survey it has been said that 50 to 60% of students and military personnel were affected by daily stressful tasks like exams (19).

#### **Trauma:**

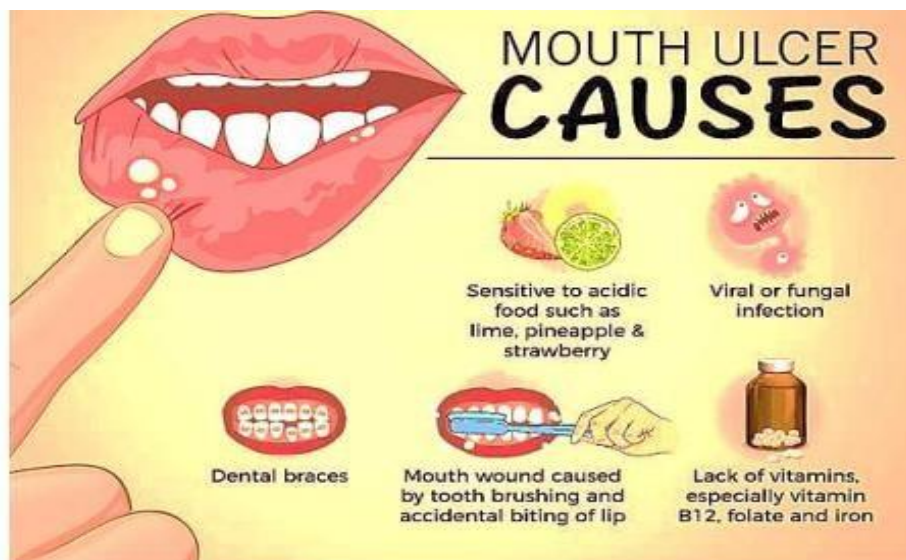
Trauma caused due to a sharp tooth or over hanging restoration, aggressive tooth brushing local application of aspirin, self biting and dental treatments will lead to the formation of mouth ulcers (1).

#### **Drugs:**

Some of the medications such as Nicorandil, NSAIDS, and Ibuprofen and nicotine replacement therapy may induce mouth ulcer (20).

#### **Tobacco smoking:**

The use of smokeless tobacco is expounded to a significantly lower prevalence of recurrent aphthous stomatitis. Nicotinecontaining tablets also appear to control the frequency of recurrent aphthous stomatitis (21).



**Figure 7: Causes of Mouth Ulcer**

#### **Pathophysiology of Aphthous Stomatitis:**

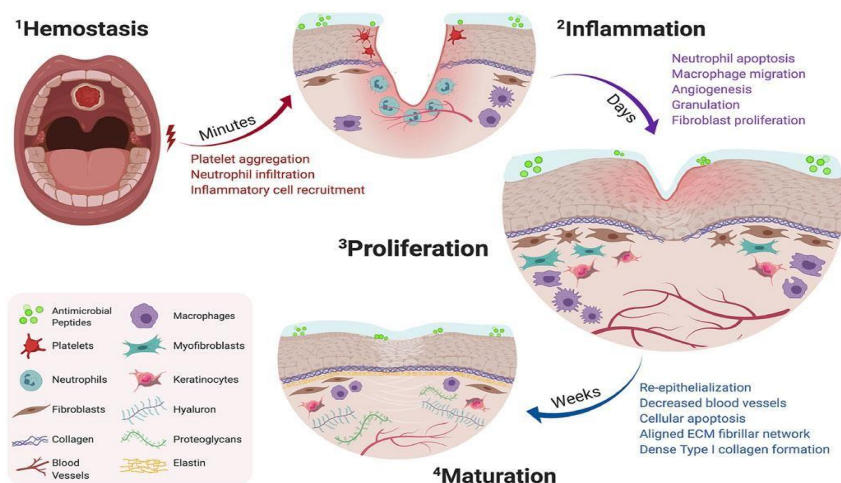
The aphthous stomatitis remains imperfectly understood. The cause is believed to be multifactorial, involving a cell-mediated immunological reaction and a genetic predisposition. Histopathological changes are seen before ulceration occurs.

Lymphocytes (mononuclear cells) infiltrate the oral epithelium, edema develops, and Keratinocyte (epithelial cell) undergo vacuolization and vasculitis. This results in localized swelling and later ulceration of the epithelium. Infiltration with neutrophils, lymphocytes, and plasma cell occurs before the epithelium heals and regenerates. The pathogenesis of RAS is a T-cell-mediated immunological reaction involving the inflammatory cytokine named tumor necrosis factor-  $\alpha$  (TNF- $\alpha$ ). TNF- $\alpha$  activates the chemo taxis of neutrophils, generating an acute inflammatory response and the expression of the major histocompatibility (MHC) complex (22). Consequently, the epithelial cells are targeted for destruction by the CD8+ T-cells (23). Other cytokines, including interleukins IL-2, IL-10, IL-1b, and IL-6, may also be involved (22).

It has also been suggested that the T-cell-mediated reaction seen in RAS is in response to streptococcus sanguis antigens that cross-react with mitochondrial heat shock proteins, causing damage the oral mucosa (24).

There is a genetic predisposition to RAS; a family history of the condition is seen in 24% to 46% of patients (25). These patients usually develop more rapid and severe ulceration (22).

### Treatment:



### Mechanism of Treatment:

Time line of mouth wound and healing oral mucosal remodeling. Following injury, the haemostatic cascade is initiated to prevent excessive bleeding at the wound site.



In the days following injury, inflammation peaks through neutrophils debridement and macrophage-mediated secretion of inflammatory cytokines.



Within a week, the proliferation phase promotes fibroblast migration, increases vascular networks by angiogenesis, and enhances macrophage migration.



Following fibroblast migration, the tissue surrounding the defect begins to re-epithelial and mature by aligned fibrillar and dense collagen (26).

At this stage, the wound repair process shifts from the inflammatory expansion phase to the phase of inflammation resolution and tissue repair

### Importance of herbal medicines:

Herbal medicines are easy to use, needs no processing and have very minimal side effects compared to chemical medications (27).

Most of the under developed countries still use herbal medicine as their primary health care. Traditional medicine has been in use around hundred years before the modern medicine was developed. Traditional medicine is considered as the most expensive form of indigenous medicine practiced by the doctors. Traditional medicine has also been mentioned in the literature of various countries and is made up of organic material, minerals and medicinal plants (28).

Phytogenic agents are used for the prevention and treatment of ulcer. This article gives a detailed review on the anti-ulcer properties of certain herbs and their identified active constituent (29, 30).

#### **Herbal remedies used in treatment of mouth ulcer:**

Phytogenic agents are traditionally used by herbalists and indigenous healers for the prevention and treatment of ulcer. This article reviews the anti-ulcer properties of the most commonly employed herbal medicines and their identified active constituents.

Botanical compounds with anti-ulcer activity include flavonoids (i.e. polysaccharides, monosaccharide, saponins, salicylic acid (Among herbal drugs aloe vera, papaya, ginger, guava, jasmine, aloe gel and tulsi have been used extensively. Ethnomedical systems employ several plant extracts for the treatment of ulcer (31).

#### **Aloe vera**

**Common name:** Aloe vera

**Scientific name:** Aloe Barbadensis miller.

**Biological source:** Aloe is dried latex of leaves of Aloe Barbadensis miller.

**Family:** Liliaceae

**Chemical constituents:** sterols, amino acids, enzymes, anthraquinones, lignins, vitamins, minerals, polysaccharides, monosaccharide, saponins, salicylic acid



**Figure 8:** Aloe vera

**Plant part used:** leaves, flower, stem, (whole plant)

**Biological activities:** It is used of analgesic; antibacterial, antiviral, antifungal antioxidant immune modulating antiseptic anti-inflammatory aloe vera is used mouth ulcer (32).

#### **Traditional uses of aloe vera:**

**Ingredients:** fresh aloe vera leaf

**Method:** extract fresh gel from the aloe vera leaf. Apply a small amount directly to the mouth ulcer. leave it for 15-20 minutes before rinsing with lukewarm water

**Benefits:** aloe vera cooling effect reduces inflammation and promotes faster healing (33)

#### **Papaya:**

**Common name:** papaya

**Scientific name:** Carica papaya

**Biological source:** papain is the dried and purified latex of the green and yellow fruits and leaves of carica papaya

**Family:** caricaceae

**Chemical constituent:** vitamin A, B, C, E, and folate, pantothonic acid, magnesium, copper calcium, and potassium.



**Figure 9:** papaya

**Plant part used:** bark, seed, fruit

**Biological activities:** it is used of digestant for protein because it as an action much likes that of pepsin. It is used to relive the symptoms of episiotomy that acts on the casein of milk (34).

Traditional uses of papaya:

**Ingredient:** fresh papaya fruit juice

**Methods:** extract juice from fresh papaya by blending the fruit. Use the juice as a mouth rinse 2-3 times a day.

**Benefit:** the juice soothes the ulcer, reduces bacterial growth, and promotes faster healing (35).

### Ginger

**Common name:** Ginger

**Scientific name:** Zingiber officinale

**Biological source:** Ginger consists of the rhizomes of Zingiber officinale.

**Family:** Zingiberaceae

**Chemical Constituents:** Gingerol, shigaol, sesquiterpene, hydrocarbons, oleoresin.



**Figure 10:** ginger

**Plant of part:** Root

**Biological activities:** Anticancer, Antiulcer, Anti-inflammatory, Antioxidant, Ginger is used in the treatment of Aphthous ulcers (36).

**Traditional uses of ginger:**

**Ingredient:** fresh ginger

**Methods:** cut a small piece of fresh ginger and gently chew on it near the ulcer. Spit out the juice if it's too strong.

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DOI: 10.48175/568



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**Benefits:** provides pain relief and helps combat bacteria in the mouth (37)

**Jasmine:**

**Common name:** Chameli

**Scientific name:** Jasminum

**Biological source:** Jasminum Officinale

**Family:** Oleaceae

**Chemical constituents:** Benzyl Alcohol, Benzyl acetate, Linolool, Indol, Benzyl Benzoate, Cis jasmine, Geraniol, Methyl antrolinate.



**Figure 11:** jasmine

**Plant part used:** leaves

**Biological activities:** it is used of anti oxidant and anti –ulcer treatment of mouth ulcer (38).

**Traditional uses of jasmine :**

**Ingredient:** jasmine leaves

**Method:** take a few fresh jasmine leaves, wash them thoroughly, and chew them gently. The juice from the leaves helps to reduce inflammation and promotes healing.

**Benefit:** jasmine leaves have antibacterial and anti-inflammatory properties, which help reduce pain and heal ulcers (39)

**Guava:**

**Common name:** Guava (Amrood)

**Scientific name:** Psidium guajava

**Biological source:** the guava is the Psidium guajava

**Family:** Myrtaceae

**Chemical constituents:** Flavonoids, (Quercetin and its glycosides), tannis, saponin, oleanolic acid.

**Plant part used:** fruit

**Fruit:** Vitamins, iron, phosphorus & calcium.



**Figure 12:** Guava fruits

**Biological activities:** it is used of guava are extensively used to make candies, preserves, jellies, jams. Red guavas can be used as the base of salted products such as sauces, a guava tree fruits considered medicinal (40).

**Traditional uses of guava :**

**Ingredient:** fresh guava fruit

**Method:** mash a ripe guava fruit in to a paste. Apply a small amount directly onto the mouth ulcer

**Benefit:** the high vitamin c content helps in faster tissue repair and reduces oxidative stress (41).

**Tulsi**

**Common name:** tulsi

**Scientific name:** Ocimum sanctum.

**Biological source:** It consists of fresh and dried leaves of Ocimum sanctum Linn.

**Family:** Lamiaceae

**Chemical Constituents:** Fixed oil: Linoleic acid, Linolenic acid, oleic acid, Palmitic acid. Essential oil: eugenol, cubenol, Linalial, carinene Minerals: Vitamin C, Vitamin A, calcium Zink.

**Part of used:** leaves



**Figure 13:** Tulsi

**Biological activities:** it is used of expectorant, bronchitis, stomachic, carminative, stimulant anti-bacterial of mouth ulcer (42).

**Traditional uses of tulsi:**

**Ingredient:** fresh tulsi leaves

**Method:** chew 4-5 fresh tulsi leaves daily and drink a glass of lukewarm water afterward.

**Benefit:** this helps reduce inflammation, promotes healing, and prevents bacterial infections causing ulcer (43).

**II. CONCLUSION**

From this review article, it can be understood that the anti-ulcer properties of some herbal medicines which can be used as an alternative for allopathic medicine as they are cost efficient, easily available and does not have much of adverse effects. Some of the herbal medicines can be used for ulcer treatment. In the near future herbal medicines can be used in combination with allopathic medicine for synergistic effects with greater treatment success rates

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