
AYURVEDIC PREPARATIONS FOR THE MANAGEMENT OF THE RAS - A REVIEW

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Abstract

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Oral ulcers are the most common condition in the general population and are caused by a variety of etiological factors. It often causes pain and discomfort. So, there are different treatments including herbal medicines that have been used for oral ulcers. Nowadays, there has been a sudden increase in the use of herbal extracts as an alternative approach to modern-day medicines. So, this review focuses on the ayurvedic preparations for the treatment of RAS.

Introduction

Oral ulcers are common and (also termed as mouth ulcers or mucosal ulcers) is an ulcer that occurs on the mucous membrane of the oral cavity.^{1, 2} They occur in association with many diseases and by different mechanisms, but usually, there is no serious underlying cause.³ Common causes of mouth ulcers include nutritional deficiencies like iron, vitamins C and B12, poor oral hygiene, infections, stress, indigestion, mechanical injury, food allergies, hormonal imbalance, skin disease etc.⁴ Ulcers are painful, shallow, round shape which has a pseudomembranous center surrounded by an erythematous margin.⁵

Types of ulcer

Based on ulcer size and number, mouth ulcer can be classified as-

Minor ulcers - 2-8mm in diameter and usually clear up in 10 days to 2 weeks.

Major ulcers – These ulcers are bigger and deeper, often with a raised or irregular border, and can take several weeks to heal and leave the scar in the mouth.^{6, 7}

Herpetiform ulcers – These ulcers are in a cluster of dozens of smaller sores about the size of pinheads.

The fundamental goals of treatment are to shorten the duration of ulcer, provide relief from pain, and increase disease-free periods while the secondary goals would lessen the frequency and severity recurrences.^{8, 9}

The most common treatments, after oral hygiene, are:

- 1- Use of local or oral steroids that affect T- lymphocytes and reduce inflammation.
- 2- Use of local antibiotics, for example, chlorohexidine, benzydamine.
- 3- Solving vitamin and mineral deficiency, such as B12, iron, folic acid, and avoidance of food allergens.
- 4- Other treatments such as amlexanox, a potent inhibitor of inflammation due to mast cells and neutrophils. Levamisole, thalidomide is also effective.^{10,11}

Ayurveda was considered to be the world's oldest medical system and was originated over 5000 years ago. The term "Ayurveda" combines the Sanskrit word "Ayur" (life) and "Vedas" (Science of knowledge). It is considered as one of the complementary and effective medicine because the herbal extracts showed the interaction with the specific receptors within the body.¹² Herbal medications are used in the treatment of ulcers as an alternative approach to modern-day medicines due to minimal or no side effects.¹³

Advantages of the Ayurvedic medications

- Ayurvedic medications have better patience and public acceptance.
- In developing countries like India availability of medicinal plants is not a problem.

- These herbal medications are eco-friendly in cultivating and processing.
- These herbal medications are safe and efficacious.⁶

Ayurvedic remedies for oral ulcers

This article reviews the most commonly used ayurvedic preparations that are used in the treatment of oral ulcers and shows the anti-ulcer properties with their identified active constituents that include flavonoids (i.e. quercetin, naringin, silymarin, anthocyanosides, sophoradin derivatives) saponins (i.e. from *Panax japonicus* and *Kochia scoparia*), tannins (i.e. from *Linderaeumbellatae*), gums and mucilages (i.e. gum guar and myrrh). Among herbal drugs, liquorice, aloe gel, and capsicum (chili) have been used extensively. An Ethno medical system employs several plant extracts for the treatment of ulcer.¹⁴

Many of the studies related to herbal medicines have shown favorable results in reducing the time of healing without any adverse effects and decreasing the size and pain of the ulcer. The majority of the evaluated studies have reported favorable results related to herbal medicine such as decreasing the pain and size of the ulcers and reducing the healing time without any adverse effects. So, people tend to change their lifestyle and use herbal medicine due to the safety of medicinal plants.¹⁵

1. Aloe vera:

The botanical name of Aloe vera is *Aloe barbadensis* and it belongs to the family of Xanthorrhoeaceae. The chemical constituents of aloe vera are- amino acids, anthraquinones, enzymes, hormones, lignin, minerals, salicylic acid, saponins, sterols, sugars, vitamins and the portion of the plant used are -Leaves, flowers, stems, roots, fruits, seed.⁴ The production of antiulcer activity in aloe vera is due to its anti-bacterial, anti-inflammatory, cytoprotective or healing activities.

When aloe vera is applied topically, it reaches the deeper layers of the dermis due to its penetrating capacity and it is a potent anti-inflammatory agent, as it inhibits the COX pathways and reduces prostaglandin E2 production from arachidonic acid.¹⁶ Some authors have found that aloe vera is effective in decreasing pain, size, erythema, and exudation of ulcers.

Mansour et al¹⁷, reported that mucoadhesive gel containing aloe vera as an active ingredient when used over the minor RAS, reduced the ulcer size, erythema, and exudation. Babae et al¹⁸, also found the therapeutic effects of the 2% alovera oral gel on minor RAS and concluded that aloe vera 2% oral gel is effective in decreasing the RAS patient's pain score, wound size, and ulcer wound healing period to less than 7 days.

So, in the treatment of the Oral ulcers, 1-3 tablespoons of aloe vera juice are used as a mouthwash, three times daily¹⁹ or can be used as an oral mucoadhesive gel form by applying topically four times a day.¹⁵

2. Chamomile:

Chamomile is known as *Matricaria recutita* and belongs to the family of Asteraceae. The Chemical constituents of chamomile are, 1-2% volatile oils, essential oil (0.4-1.5%), camazolene. Other major constituents include alpha-bisabolol and related sesquiterpenes, flavonoids, apigenin, luteolin, and quercetin.²⁰ Leaves of the chamomile flowers are used as herbal medicine. The effective agents that are responsible for the medicinal properties are Camazolene, Azulene distillates, and flavonoids.²¹ Camazolene has a dose-dependent anti-inflammatory and anti-spasm effects, it inhibits leukotriene B4 [LTB4] synthesis, and peroxidation of arachidonic acid in neutrophils, Azolene has analgesic, and anti-inflammatory effects and Flavenoids are also known to have anti-inflammatory characteristics.²² Chamomile is commonly for its antioxidant, antimicrobial, antidepressant, anti-inflammatory, ulcer-protective, and antipyretic activities.

Ramos-e-Silva et al. evaluated the safety, and effectiveness of a fluid extract of chamomile on pain relief in RAS. They evaluated two parameters, analgesic effect and tolerance. The analgesic effect was considered excellent by 82% and good by 18% of patients. Tolerance was excellent according to 97% and good by 3% of the participants.²² Tadbir AA et al conducted a study to find the effect of chamomile extract in Orabase on minor aphthous stomatitis.

He reported that chamomile extract caused satisfaction in the patients for their treatment and diminished the pain intensity of the ulcers.²³

Chamomile tincture is used as a mouthwash -10 drops, each time for 3 minutes three times a day¹⁵, and it can also be used as a diluted tincture or strong tea that can be swished in the mouth three to four times per day.²⁴

3. Capsicum:

Capsicum is known as *Capsicum annum* and it belongs to the family of Solanaceae. The chemical constituents are capsaicin, paprika, oleoresin, and Dihydrocapsaicin.⁴ It possesses antiulcer activity, antioxidant activity, and radical scavenging properties in its fruit and vegetable peel extracts.²⁵ It can also be used in GI disorders like Intestinal gas, upset stomach, cramps, stomach pain, diarrhea, etc. Topical application of capsicum extract used to treat herpes zoster, recurrent aphthous stomatitis.²⁶

4. Honey:

Honey is known as *Apis Mellifera* and belongs to the family of Apidae. Honey contains low amounts of various substances such as organic acids, proteins, amino acids, vitamins, enzymes, minerals, and various other molecules (pigments, flavonoids, antibacterial factors).

Mohamed SS conducted a study to know the effect of honey on the healing of the oral ulcers in comparison with the use of Kenalog in orabase. He reported that ulcerations have almost completely disappeared after 3 days of treatment with the honey dressing with no adverse effects.²⁷

Honey can be used as an apitherapeutic agent in the various oral ulcerative conditions.²⁸ It also possesses an antibacterial action, due to its chemical pH, and osmotic effects.²⁹ Honey protects the underlying tissues, and shows the anti-inflammatory actions, as it can adsorb the toxins from the mucous membrane and precipitate the proteins, and thus protecting the underlying tissues and enhanced the normal healing and the re-epithelization process.³⁰ Honey facilitates the viscous properties in coating the ulcer. No toxic effects have been seen with the usage of honey and topical application of the honey for five days over the ulcer can heal the ulcer.

5. Tulsi:

It is known as *Ocimum sanctum Linn* and belongs to the family of Lamiaceae (mint). Tulsi consist of Tannins(4.6%) and essential oil(up to 2%), eugenol (up to 62%), methyl eugenol (up to 82%), and alpha and beta-caryophyllene(up to 42%), methyl chavicol, linalool and 1,8-cineole.²⁶ leaves of the tulsi plant is used as the herbal medicine. Tulsi has got the antihelminthic, antipyretic, immune-stimulatory, antiulcer, antimicrobial, anti-inflammatory property.³¹ The anti-ulcer effect of tulsi is due to its cytoprotective effect rather than antisecretory activity. It possesses the potent anti-ulcerogenic as well as ulcer healing properties and could act as a potent therapeutic agent against peptic ulcer.

A study was conducted to evaluate the anti-ulcerogenic and ulcer healing properties of *Ocimum sanctum*. It was found that a dose of 100mg/kg was effective as an antiulcer agent.³² Simply, chewing fresh leaves will cure mouth ulcers and give instant relief from the pain or boil some basil leaves in water and use the water to gargle 2-3 times a day will give effective results.

6. Turmeric:

It is known as *Curcuma longa* and it belongs to the family of Zingiberaceae. The chemical constituents of turmeric include volatile oil (6%) composed of several monoterpenes and sesquiterpenes, including zingiberene, curcumin, alpha and beta-turmerone.³³ It is a dry rhizomatous plant that shows the antioxidant, and anti-inflammatory effects that prevent and suppresses the inflammatory process.³⁴ In *Curcuma longa*, volatile oil possesses anti-inflammatory activity. Water and fat-soluble extracts of curcumin exhibit strong antioxidant activity.

In a randomized, double-blind, and placebo-controlled trial of patients with minor RAS efficacy of curcumin gel containing 2%, curcumin was studied.³⁵ Curcumin gel significantly reduced pain intensity and size of aphthous ulcer compared to the placebo. Significant group differences were also observed at the end of the trial regarding the overall

satisfaction of the patients. A study focusing on the therapeutic effects of curcumin in RAS in comparison to conventional antiseptic gel found that curcumin could produce a remarkable reduction in recurrence of RAS (follow-up for 1 year).³⁶ In addition, ulcers treated with curcumin healed faster and were associated with early relief in pain. Turmeric is used in a powder form and topical application is done, four times a day over the aphthous ulcer.¹⁵

7. Ginger:

Ginger is known as *Zingiber officinale* and it belongs to the family of Zingiberaceae. The chemical constituents of ginger are- gingerol, shogaol, and zingerone. Ginger may have anticancer, anti-inflammatory, and antioxidative effects.

Haghpanah et al. (2015) conducted a study of mucoadhesives containing ginger extract in the treatment of RAS and a significant reduction in the intensity of pain was observed in the treatment group, based on the visual analog scale.³⁷ Ginger is used in the treatment of the RAS and helps in reducing the ulcer size, and erythema. It is used in the mucoadhesive gel form with the topical application four times a day.¹⁵

8. Myrrh:

The botanical name of myrrh is *Commiphora molmol* and it belongs to the family of Burseraceae. The myrrh contains Resin, gum, and volatile oil. The gum consists of 20% proteins and 65% carbohydrates made up of galactose, 4-O-methyl glucuronic acid, and arabinose.²⁰ Its leaves are used as a medicinal herb. Myrrh is the thorny species used as an antiseptic, analgesic, and anti-infective agent for wound healing.³⁸ It is also used in the treatment of pharyngitis, tonsillitis, stomatitis, and ulcers. It is used for healing the mouth sores because of the presence of tannins. It can be used in the form of a mucoadhesive gel as a topical application four times a day. Its mucoadhesive gel form contains furanoeudesma-1,3-diene, which is an anti-inflammatory agent and is considered to have a mucous membrane protection activity³⁸ or 4ml of myrrh tincture or mix 200-300 mg of herbal extract with warm water and swish it in mouth two-three times per day.³⁹

9. Liquorice:

Liquorice is known as *Glycyrrhiza glabra* L. which belongs to the family of Fabaceae. Liquorice constituent of triterpene, saponins, glycyrrhizin (2-9%). Glycyrrhizin occurs as a mixture of potassium and calcium salts. Flavonoid constituents include liquiritigenin and isoliquiritigenin. The isoflavones glabridin and hispaglabridins A and B have the antioxidant activity.⁴⁰ *Glycyrrhiza glabra* possess antioxidant, anti-inflammatory, antimalarial, and antispasmodic properties. It is also used in various other activities like anti-ulcer, antiviral, antifungal, and in herpes simplex treatment.

Hassan K conducted a study on liquorice mouthwash as a treatment for mouth ulcers. In most of the cases, he reported that patients felt better since the first day of treatment and complete healing was achieved by the end of the third day. So, liquorice mouthwash is effective in the treatment of mouth ulcers.⁴¹ Licorice helps in relieving the pain and also reduce the inflammatory halo and necrotic center of the aphthous ulcers.⁴² Patients with mouth ulcers can use 200mg of DGL (Deglycyrrhizinated liquorice) powdered in 200ml of warm water swished in the mouth and then spit out; continue each morning and evening for one week.⁴¹ Licorice root delivered in a small, oral patch which helps in relieving the pain and also accelerates the healing of the oral ulcers.⁴³

10. Pomegranate:

Pomegranate is known as *Punica granatum* (PG) and it belongs to the family of Punicaceae. It consists of flavonoids, ellagitannins and proanthocyanidin compounds, and minerals such as calcium, magnesium, phosphorus, potassium and sodium.⁴⁴ Flavonoids of PG shows the antimicrobial, antioxidant, immune system activation, and free radical scavenging activity.⁴⁵ Tannins form the protecting layer by precipitating proteins and prevent the ulcer from getting infected or exacerbated and accelerates the healing process.⁴⁶ Pomegranate (*Punica granatum*) flowers have been used as a medicinal herb that is due to its antimicrobial, antioxidant, anti-inflammatory, analgesic, and healing effects, has been useful in the treatment of oral aphthous.

Studies on effect of the pomegranate flower extract on wound healing demonstrated positive effects on shortening the healing period.⁴⁷ Pomegranate flower may also act as an analgesic to ameliorate aphthous symptoms.⁴⁸ The topical application of pomegranate preparations is effective for controlling the oral inflammation.

11. Damask rose:

Damask rose is known as *Rosa damascene* and belongs to the family of Rosaceae. The chemical constituents of rose are Citronellol, geraniol, nerol, phenyl, ethyl alcohol, nonadecane, eicosane, heneicosane, geranyl acetate, and eugenol.

Damask rose shows the antibacterial, anti-inflammatory, analgesic, antinociceptive properties and reduces the duration of the aphthous ulcer. The active ingredient tannic acid is present in its mouthwash, which helps in wound healing and ulcer protection.⁴⁹ It is used as a mouthwash, 5ml each time for 30 seconds four times a day.¹⁵ It can also be used as gulkand, which is prepared with rose petals and advised 1-2 teaspoons once or two times a day before food. This heals ulcer quickly and reduced the burning sensation.

12. Olive leaf extract:

The botanical name of an Olive leaf is *Olea europaea* and it belongs to the family of Oleaceae. The chemical constituents of Olive leaf extract are polyphenol compounds particularly oleuropein, and hydroxytyrosol, flavonoids, including luteolin, rutin, caffeic acid, catechin and apigenin. Olive leaf extract can be used as an antioxidant, antiviral and antimicrobial properties. Oleuropein is an active compound present in the olive extract which is an antioxidant compound and helps in treating the RAS.⁵⁰ It is used as a mouthwash 10 drops, each time for 1 minute, five times in a day.

13. Triphala:

Triphala is known as *Emblica Officinalis*. There are major four phenolic chemical constituents such as gallic acid, tannic acid, syringic acid, and epicatechin along with ascorbic acid.⁵¹

Triphala (Sanskrit; tri = three and phala = fruits) consist of dried fruits of the three plant species *Emblica Officinalis* (Family Euphorbiaceae), *Terminalia bellerica* (Family Combretaceae), and *Terminalia chebula* (Family Combretaceae) that are native to the Indian subcontinent.⁵² Triphala is rich in tannins and phenolic compounds which are responsible for antioxidant properties. Triphala is used in the bleeding and ulcerated gums. Triphala is having free radical scavenging property thus aiding in the protection of gum cells.⁵³ Mix half teaspoon of triphala with 1 cup of water and then gargle with it for 1-2 minutes, once a day, and then spit it out or mix the triphala powder with the honey and then applied in the oral ulcers, this will help in healing the ulcers.⁵⁴

Conclusion

From this review, it is clear that various herbal extracts have significant antiulcer activity. Herbs are used to reduce inflammation and provide calm and soothing effect. These extracts are non-toxic, affordable and can be used in everyday life. So, the herbal extract should be incorporated into modern oral health care practices and the dentist should be encouraged to use the natural remedies in various oral health treatments. In the future, studies on efficacy of ayurvedic herbs in mouth ulcers should be carried out to establish their benefits.

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