

Review Article

## Herbs in dentistry

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### ABSTRACT

Herbs have been used for centuries to prevent and control disease. Herbal extracts are effective because they interact with specific chemical receptors within the body and are in a pharmacodynamic sense, drugs themselves. Using herbal medicines, patients have averted the many side effects that generally come with traditional medicines, but this does not mean that side effects do not occur. Only knowledgeable practitioners can prescribe the right herb and its proper dosage. Herbal medicines had been considered in every culture; however, pharmaceutical companies overturned this type of thinking. Now, pharmaceuticals are called traditional and herbs are labeled as the “alternative.” The biggest challenge and problem is lack of information about the effect of herbs in oral tissues, mechanism of effect, and side effects. Several popular conventional drugs on the market are derived from herbs. Herbal medicines have dramatically fewer side effects and are safer to use than conventional medications. The herbs described in this article are used to eliminate various dental diseases such as dental caries, gingival disease, periodontal disease, and mucosal lesions, and a summary of other herbs that are useful in dentistry. Herbs may be good alternatives to current treatments for oral health problems, but it is clear that we need more research.

**Keywords:** Oral health, Ayurveda, Herbal plant, Dental caries, Herbs

### INTRODUCTION

The term “Ayurveda” comes from the Sanskrit words “ayu” (life) and “veda” (knowledge). Herbs are a type of substitution agent provided by God. Herbs have been used in medicine and dentistry for a long time. Antibacterial activity is provided by herbal medicines against a variety of microorganisms, including bacteria that cause dental caries. They can be used to treat periodontal diseases and aid wound healing. These have been shown to have antimicrobial properties that are especially beneficial for periodontal diseases. The lack of knowledge about the impact of herbs on oral tissues, their mechanism of action, and their side effects is the most significant challenge and problem.<sup>[1]</sup> Plant extracts have become increasingly popular in Western medicine in recent years. There is a substantial body of evidence to support the use of herbs in the prevention and treatment of human diseases.<sup>[2]</sup> Dentistry is a discipline that prides itself on being at the forefront of scientific study and technological advancements.

Machiavelli said in *The Prince* “Whoever wishes to foresee the future must consult the past; for human events ever resemble those of preceding times. This arises from the fact that they are produced by men who ever have been, and ever shall be, animated by the same passions,

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and thus, they necessarily have the same results.<sup>[3]</sup> Herbal remedies, which are derived from botanical sources, have long been used in dentistry to suppress microorganisms, minimize inflammation, soothe discomfort, and alleviate pain.<sup>[4]</sup> A significant number of herbal mouthwashes have recently been confirmed to have achieved promising results in plaque and gingivitis control.<sup>[5]</sup> Herbal mouthwashes contain a combination of active agents such as catechins and tannins, made with extracts and essential oils from phytotherapeutic plants.<sup>[6]</sup> They may have additional anti-inflammatory and antioxidant properties, which may improve gingival health, in comparison to synthetic chemical antimicrobial mechanisms.<sup>[7]</sup> Traditional medicine/complementary and alternative medicine and their importance to public health have recently piqued interest in both developed and developing countries. Traditional medicine's positive characteristics include diversity, versatility, easy accessibility, strong continued acceptance in developing countries and rising popularity in developed countries, relatively low cost, low levels of technical input, relatively low side effects, and growing economic value. In this sense, mainstreaming conventional medicine into public healthcare is crucial to achieving the goal of increased access to healthcare facilities.<sup>[8]</sup> People's increasing interest in using herbal drugs is due to the anti-inflammatory, antibacterial, and antioxidant properties of plants, as well as their biocompatibility.<sup>[9]</sup> In certain parts of the world, dental caries affects more than 90% of schoolchildren and a considerable proportion of adults. This highlights the importance of better diagnostic and therapeutic procedures in dentistry, especially for children. Antibiotic abuse and overuse, on the other hand, are on the rise.<sup>[10]</sup> Synthetic drug use, especially in children, may have negative consequences such as liver problems.<sup>[11]</sup> Herbs are used to cleanse the blood, warm and stimulate the body, increase surface circulation, increase waste removal, minimize inflammation, relax and soothe discomfort, and so on. Herbs may be consumed as tablets, syrups, or infusions, or applied topically as plasters and ointments. Clove oil, for example, may be used topically to relieve toothache pain. Hot or cold moist herbal wraps may be used on various affected areas of the body. When temporomandibular joint syndrome is present, these wraps are particularly useful for sore, stressed muscles in the neck, shoulders, back, or jaw.<sup>[12]</sup> Evidence-based herbal medicine, as well as the effectiveness and protection of herbal remedies, are urgently needed. Each year, several new clinical trials of herbal remedies are conducted and released, accumulating evidence in a complex and rapid manner. As a consequence, the contribution of more recent trials on herbal products is missing from Herbal Medicine.<sup>[13]</sup>

The commonly used herbs in dentistry are as follows: Pomegranate/Jurenka, Garlic, Neem, Tulsi, Turmeric,

Miswak, Ginger, *Aloe vera*, Amla, Licorice, Triphala, Propolis, Clove, Tea.

## HERBS USED TO TREAT DENTAL CARIES

*Streptococcus mutans* is the most prominent bacterial group implicated in the formation of dental caries among the various kinds of microorganisms ordinarily present in the oral cavity.<sup>[14]</sup> As a result, lowering the bacterial burden is an effective preventative measure. Miswak inhibits *S. mutans*' growth and acid generation.<sup>[15]</sup> Miswak's strong flavor and chewing effects may enhance saliva output, enhancing the mouth's buffering capacity. Tea (*Camellia sinensis*), the fluoride in tea, has a role in the prevention of caries – Tea includes a significant amount of fluorides. Chewing gum with fluoride extracted from green tea (50 g fluoride) produced a higher level of remineralization and acid resistance than placebo gum.<sup>[16]</sup> *Spilanthes acmella*, traditionally known in India as the toothache plant, eyeball plant, paracress/Akarkara, and *spilanthes*, has been widely used in traditional medical practice for relieving toothache due to the numbness produced by chewing the flower heads, as a loop diuretic, improving digestion, as an anti-malarial, muscle relaxant, treating sore throat, flu, headache, fever, and skin wrinkles.<sup>[17]</sup> *Prosopis spicigera*, the ethanolic fraction of *P. spicigera* leaf extract, which includes the piperidine alkaloid, is active against *Streptococcus* species such as *S. mutans* and *Streptococcus bovis*. *Curcuma longa* (Turmeric) Curcumin, a phytochemical derived from the roots of the turmeric plant, has been shown to inhibit purified *S. mutans* sortase.<sup>[18]</sup> *Piper cubeba* various portions of this perennial plant with a climbing stem have been used as mouthwash to heal halitosis, as an expectorant for cough, loss of voice, and fever by major contributors to the art and science of traditional Ayurvedic medicine since ancient times.<sup>[19]</sup> *Azadirachta indica* (Neem) has anti-inflammatory, antipyretic, and analgesic properties, as well as immunostimulant, hypoglycemic, antiulcer, and antimalarial properties.<sup>[20]</sup> Propolis anti-caries and antiplaque qualities have been linked to two methods of action: Inhibition of glucosyltransferase enzyme activity and antimicrobial action against cariogenic bacteria. Propolis chewing gum can be utilized as an anticariogenic agent in children.<sup>[21]</sup> Triphala – dental cavities, spongy and bleeding gums, gingivitis, and stomatitis are all disorders of the mouth that *Terminalia chebula* can help prevent and treat. Tandon *et al.*, found that a 0.6% Triphala mouthwash has anti-caries activity comparable to chlorhexidine, but without the disadvantages of tooth discoloration and at a far lower cost [Figure 1].<sup>[22]</sup>

## HERBS USED TO TREAT PERIODONTAL DISEASE

Since periodontal disease is considered a complex illness, various etiological variables have been proposed. The

main causes are biofilm accumulation and infections; however, other risk factors include modifiable factors such as smoking, obesity, stress, diabetes mellitus, osteoporosis, and vitamin D and calcium deficiencies, as well as non-modifiable variables like genetic polymorphisms. There is a negative correlation between gingivitis and oral health-related quality of life, according to research. Periodontitis is a disease that affects one or more of the periodontal tissues, such as the alveolar bone, periodontal ligament, cementum, and gingiva. When bacteria in plaque infect the gums and the bones that support the teeth, periodontal disorders develop. Aggressive periodontal disease is hypothesized to be caused by *Actinobacillus actinomycetemcomitans* and *Porphyromonas gingivalis*, as well as many deep pockets in the gums.<sup>[23]</sup> *A. vera* (*Aloe barbadensis* miller), Chamomile, aids in the reduction of periodontal inflammation as well as the reduction of harmful germs in the mouth. The herbal composition, which contains active components from *A. indica*, *Citrullus colocynthis*, and *Cucumis sativus*, is effective in avoiding dental plaque and gingivitis in humans, as well as acting as an antibacterial agent. *Glycyrrhiza glabra* (Licorice root) the water-insoluble covering crumbled quickly in the oral cavity, releasing the active components. The mixture could be used as a toothpaste, oral cleaner, or oral purifier, among other things. Green tea catechins have been shown to have a significant antimicrobial effect on periodontal infections. The principal etiological agents in periodontitis are anaerobic bacteria such as *P. gingivalis* and *Prevotella* spp. Gingivitis and periodontitis can be treated with a paste composed of 1 teaspoon of turmeric, 12 teaspoons of salt, and 12 teaspoons of mustard oil. This paste should be rubbed on the teeth and gums twice a day. Cleaning teeth with a powder made from burnt turmeric bits and Bishop's weed seed strengthens the gums and teeth.<sup>[24]</sup>

Herbal medicines apply their effect on oral cancer through different mechanisms of action including antioxidant, analgesic, anti-inflammatory, antifungal, antiseptic, and anticarcinogenic activity. In recent years, various natural agents in plants have been studied in mucositis, which can improve oral mucositis symptoms through different interventions, for example, their antioxidant and anti-inflammatory properties.

Also known as *A. indica*, neem has antibacterial, antifungal, anti-helminthic, anti-cancer, anti-inflammatory, and neuroprotective properties, used in managing oral aphthous ulcers as mouthwashes. Phenolic compounds in plants are responsible for exhibiting antioxidant activity by inactivating lipid free radicals or preventing decomposition of hydroperoxides into free radicals.

The anti-fungal activity of essential oil of *Ocimum sanctum* and its two main components, that is, eugenol and linalool has been investigated against two species, that

is, *Candida albicans* and *Candida tropicalis* in a study and concluded that linalool is more promising and effective against candida.<sup>[24]</sup> *O. sanctum* has the unique property of acting on the skin and blood tissue and bringing about the desired immunomodulation and, thus, is one of the treatment options in Ayurveda for treating lichen planus.<sup>[25]</sup> Polyphenol *Rosmarinus* acid present in Tulsi can act as powerful antioxidant which can be therapeutically utilized in treating common oral precancerous lesions and conditions. The seed oil of *O. sanctum* has been suggested to have chemo preventive activity which may be attributed to its antioxidant properties. *A. vera* – The two fractions from Aloes that are claimed to have anticancer effects include glycoproteins (lectins) and polysaccharides. Different studies indicated antitumor activity for *A. vera* gel in terms of reduced tumor burden, tumor shrinkage, tumor necrosis, and prolonged survival rates. The efficiency of *A. vera* in treatment of oral lichen planus has been measured by many researchers. In one study, a patient of lichen planus with systemic involvement was placed on *A. vera* therapy. The patient's treatment involved drinking 2.0 ounces of stabilized *A. vera* juice daily for 3 months, topical application using *A. vera* lip balm and Aloe cream for itching hands. The oral lesions cleared up within 4 weeks, although the systemic lesions took longer.<sup>[26]</sup>

The potential of topical *A. vera* gel in combination with tongue protector (glycerine) showed an improvement in burning mouth symptoms. Curcumin has been found to possess anticancer activities due to its effect on a variety of biological pathways involved in mutagenesis, oncogene expression, cell cycle regulation, apoptosis, tumorigenesis, and metastasis. Curcumin has demonstrated ability to inhibit carcinogenesis at three stages: Tumor promotion, angiogenesis and tumor growth. The anticarcinogenic effects of turmeric and curcumin are due to: Direct antioxidant and free-radical scavenging effects.

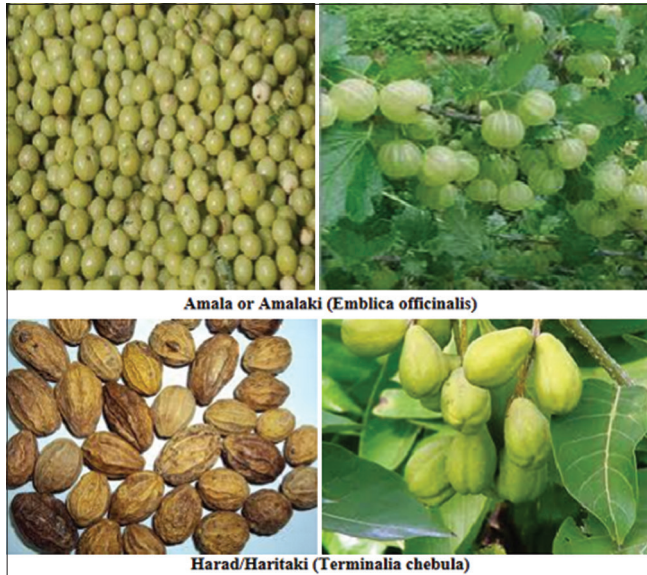
## HERBS USED IN PEDIATRIC PATIENTS TO TREAT ORAL DISEASES

### *Allium sativum* (Garlic)

A study was done to compare between the clinical and radiographic effects of *A. sativum* (Garlic) oil and those of form cresol in vital pulpotomy in primary teeth.

### *C. longa* (turmeric) and *C. sinensis* (green tea)

A study was done to evaluate the antibacterial effectiveness of sodium hypochlorite, ethanolic extracts of *C. longa* (turmeric), and *C. sinensis* (green tea) as irrigating solutions against the anaerobic bacteria isolated from the root canals of infected primary teeth.<sup>[27]</sup> Propolis is effective against endodontic aerobic and anaerobic microbes. Propolis is able



**Figure 1:** *Emblica officinalis* and *Terminalia chebula*.

to diffuse through dentin and this property may allow its use as a vehicle for calcium hydroxide. *A. vera* gel was found to be effective when it was applied to the remaining pulp stumps followed by non-eugenol cements and permanent restoration. There was no evidence of abscess, mobility, pain, or swelling found. The decalcified sections of the extracted teeth showed intact radicular pulp with features of vitality such as delicate fibrocellular connective tissue stroma, blood vessels, intact odontoblastic layer, few chronic inflammatory cells, and extravasated red blood cells.<sup>[28]</sup>

## HERBS USE IN GERIATRIC PATIENTS

### Denture care and adhesive

*A. vera* prevents denture stomatitis due to its antifungal action. *A. vera* gel can be smoothed onto the denture once or twice a day. It can be used along with soft liners. It is available commercially in form of toothpaste: -K. P Namboodiri's *A. vera* Herbal Toothpaste, Aloe Fresh Toothpaste. It can be used by all patients twice daily. It is safe during pregnancy. Mouthwash: Aloe Fresh Mouthwash

Use: Fill in half measuring cup and rinse your mouth for about 30 s, before or after brushing your teeth. Spit it and rinse with water.

Gel: Sali Cept. Triphala and denture cleansing tablets have shown similar results in reduction of candida colonies. Gallic acid component in Triphala is accountable for the anticandidal effect.<sup>[29]</sup>

### Herbs used in dental products

Herbal products use herbal extracts to yield an active ingredient. Few of these compounds have had their

therapeutic effect demonstrated in toothpaste formulations, although some dentifrices contain polyphenols found in green tea due to the alleged antimicrobial effects. Herbal components such as chamomile, clove oil, echinacea, eucalyptus, fennel, ginger, liquorice root, tincture of myrrh, nettle leaves, and tea tree oil are included in herbal dental products. Neem is shown highly efficient in reducing *Enterococcus faecalis* and *Candida albicans* within the root canals. Herbal products have also been marketed for the management of halitosis. Glass-ionomer cement (GIC) containing propolis is antibacterial against *S. mutans*. A study found the distinct antibacterial and antibiofilm efficacy of propolis containing GIC and concluded that GIC containing propolis would be a promising material for restoration. Propolis effectively limits the quantity of *E. faecalis* in root canals and can be used as intracanal medicament. Since propolis has good diffusion abilities and adds to the antimicrobial action of calcium hydroxide, it can be used as a vehicle for calcium hydroxide.<sup>[30]</sup> Dental materials containing eugenol are frequently used in clinical dentistry. When zinc oxide-eugenol is applied to a dentinal cavity, small quantities of eugenol diffuse through the dentin to the pulp.

## CONCLUSION

Herbs are used to soothe and calm inflammation as well as reduce inflammation. Herbs can be used topically as liniments or consumed internally as tablets, syrups, and infusions. By implementing this, dentistry will be much safer, more economical, and more accessible for people in lower socioeconomic groups.

### Ethical approval

Institutional Review Board approval is not required.

### Declaration of patient consent

Patient's consent not required as there are no patients in this study.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

### Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the

writing or editing of the manuscript and no images were manipulated using AI.

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