



Herbs and their use in oral care: A Review

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Abstract

Traditional medicine has been used to prevent and cure diseases since thousands of years. In comparison with traditional medicines, herbal medicines have fewer side-effects. Many species of medicinal plants belong to various families which are being used traditionally for controlling and curing a variety of dental problems by the Indians. Literature was reviewed using databases like PubMed, Medline and search engines like Google Scholar. After necessary exclusions, finally 42 articles were included in this review. This paper focuses on various herbs that are used in dentistry like clove oil, aloe vera, turmeric, sesame, cranberry, miswak, sesame, red clover, evening primose etc. The paper also throws a spotlight on the safety and efficacy of this particular form of medication. Dental professionals should have adequate knowledge regarding common herbal formulations so that they safely prescribe or use them on their patients. However, there is a need for more research to justify their use as good alternatives to current preventive and curative treatments for oral health problems.

Keywords: Herbal medicine, Dentistry, Oral Care, Safety, Efficacy, Research

Introduction

Herbs have been created by nature for curing human illnesses. Herbs are defined as “crude drugs of vegetable origins utilised for the treatment of disease states, often of chronic nature, or to attain or maintain a condition of improved health”.^[1] The Food and Drug Administration (FDA) uses the term *botanical* in its legal definition of an herb. Herbal extracts have been used since olden times in traditional medicine.^[2] The earliest reported literature on the practice of Indian system of medicine was during the Vedic period. This system of medicine (Ayurveda, Unani, Siddha) is 5,000-year-old and recommends a combination of lifestyle management (which includes diet, exercise, and meditation) and treatment with specific herbs and minerals to cure various diseases.^[3]

Approximately 1250 Indian medicinal plants have been used to formulate beneficial measures according to Ayurvedic or other ethnicity.^[4] About one-fourth of drugs are manufactured from plants and many other are formulated from prototype compounds isolated from plant species.^[5] The Chinese also have a long history of using Traditional Chinese Medicines (TCM) for various disease conditions, including oral care. Traditional Chinese Medicine (TCM) offers

empirical herbal formulas for the treatment of chemotherapy-induces oral mucositis.^[6] Use of herbal and dietary supplements (HDS) is a well-documented trend among consumers of all age groups.^[7] Many useful properties like anti-inflammatory, antioxidants, antibacterial and astringent action have been found in several plants. These properties are being utilized to treat dental diseases.^[8] Every day, dental health professionals encounter patients who use herbal products on daily basis. Dental professionals often recommend herbal extracts which are successfully used as tooth cleansing and anti-microbial agents.^[9] As majority of the oral/dental diseases are due to bacterial infections, it has been well documented that medicinal plants provide significant anti-bacterial action against various micro-organisms.^[10]

In recent times, there has been an increase interest to study herbal medicines and their uses globally to prevent side effects that are often associated with the use of allopathic medicines.^[11,12] Herbal medicine is defined as product derived from plants or parts of plants that elicit a pharmacological effect.^[1] Health professionals are often challenged to explore relevant information in order to advise their patients about using these products safely. A dental health professional needs to be more

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informed regarding the use, safety and efficacy of the various herbal medicines and sale of over-the-counter products. The present review was conducted to explore and report various herbal medicines used in dentistry to provide the best from each system as a complimentary therapy with minimal side effects and report their safety, and precautions to be followed by dental professionals while prescribing or administering them to their patients.

Methods

Data search for the present review was done both electronically as well as manually. Electronic search was conducted using databases like PubMed, Medline, and articles published in peer-reviewed journals. Web-based search engines like Google Scholar were also used to extract relevant articles using various key-words and their combinations. We found 'ayurveda', 'herbal medicines', 'dentistry' as relevant key-words, these were entered into Medical Subject Headings (MeSH) controlled vocabulary. The terms like traditional, oral health, India, herbs were combined with the MeSH terms by Boolean 'AND' or 'OR' and entered in both PubMed and Google Scholar. The collected documents included original articles, reviews, editorials, guest editorials, letters to editor, interviews, short reports and short communications only in English language. Abstracts and duplicating articles were

excluded. Some data was also obtained by cross checking the reference lists of the articles accessed. A total of 58 articles were obtained during initial search which was conducted keeping in view the papers published in last few decades. However, after scrutinising all data, only 42 relevant articles were included in the final analysis. Finally included articles were categorized based on indexation.

Data extraction and Analysis

After completing the search, the selected documents were summarized and categorized based on the topic and its implications. Finally included articles were categorized based on indexation (Table 1).

Table 1: Distribution of articles based on indexation

Indexation	No. of articles
Pubmed	37
Non-pubmed	4
Non-indexed	1

Various herbs and their uses in dentistry

A large majority of naturally occurring herbs are being studied for their potential uses in dentistry but only few have been approved for their commendable medicinal properties

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due to the lack of clinical trials in this field. Some of the important herbs and their use in dentistry and oral care as follows:

- **Clove oil (*Syzygium aromaticum*)**

Ancient Hindu texts have described the use of clove oil in dentistry. The main components of this herb is eugenol and β -caryophyllene. It has got excellent analgesic and antiseptic properties which inhibit growth of all disease causing bacteria while leaving the beneficial bacteria unharmed.^[13,14] It is frequently used by dentists to relieve toothache, patients having periodontitis and also in treating bleeding gums. Due to its topical analgesic action, it is being incorporated in dental cements and restorative materials. The formulations of clove oil are available as tincture, lozenges and mouthwash.^[15] It can provide dental professionals with an alternative to other anaesthetic materials for topical anaesthesia in their routine practice especially in treating children and in areas where it is not economically feasible to use other costly topical anaesthetics.^[16]

- **Aloe vera**

It is a tropical plant which is grown in North Africa and most parts of Asia. The chemical constituents in Aloe vera are Anthraquinones, Saccharides, Prostaglandins and fatty acids.^[17] It is analgesic, antibacterial, antiviral,

antifungal and antiseptic in nature. Gel from the aloe leaf has been used for centuries as a topical remedy for minor burns, cuts, and other skin infections. It is mainly used on the sites of periodontal surgery, toothpick injuries, chemical burns, aphthous ulcers, gum abscesses, dry socket, lichen planus, benign pemphigus and gingival problems associated with AIDS, leukemia, migratory glossitis, geographic tongue and burning mouth syndrome. Xerostomia cases are also benefitted by using aloe vera.^[18]

- **Tea Tree Oil (*Melaleuca alternifolia*)**

This particular plant is a native of Australia having antiseptic and antifungal properties and a mild solvent.^[19] It is useful for treating throat irritation, stings, burns, wounds and skin infections of all kinds. Rub the tree tea oil directly on sore, inflamed gum for temporary relief. Use tree tea mouthwash to soothe oral inflammation. It also has mild solvent action, and hence could hold potential applications in root canal treatment for dissolving the necrotic pulp tissue. Mouth wash containing tea tree oil has proved effective for patients suffering from oral candidiasis.^[20]

- **Chamomile (*Matricaria recutita*)**

Chamomile or German Chamomile is a plant which is native to Europe and Western Asia, and is used in most parts of the world

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as table tea. It has got a significant anti-inflammatory, anti-spasmodic, smooth muscle relaxation, anti-bacterial and anti-viral property.^[21] Major uses of chamomile are in gingivitis, periodontal disease and in oral ulcers when used as a mouthwash. However some allergic skin reactions with topical use and bronchial constriction with systemic use have been noted in persons who are allergic to Asteraceae family.^[22] Therefore it should be used cautiously.

- **Garlic (*Allium sativum*)**

It is one of the most extensively researched medicinal plants with a typical odour. Its antibacterial activity depends on allicin produced by enzymatic activity of allinase (a cysteine sulfoxide lyase) on allicinafter crushing or cutting garlic clove.^[23] Garlic extract significantly inhibits the growth of *S. mutans* and therefore can be used as an effective remedy for the prevention of dental caries as a constituent in toothpaste or mouthwash.^[24]

- **Evening Primrose (*Oleum oenothera biennis*)**

The main constituent of primrose is linoleic acid (65-80%). It has anti-allergic and anti-ulcer activity. Combination of primrose oil with vitamin-B complex was found to have a positive effect on Sjogren syndrome after 8 weeks of treatment.^[25] It is also used during orthodontic tooth movement and

dental caries. Some adverse effects were noted like headaches, nausea, loose stools and diarrhoea in some individuals.^[15]

- **Myrrh (*Commiphora molm*)**

Myrrh is best known as one of the gifts the Wise Men brought to the Infant Jesus. The main constituents of this herb are the resin, the gum and the volatile oil.^[26] It helps promote healing in cases of pyorrhoea. It can be applied topically for the treatment of and for local application as an anodyne to treat infections of the oral cavity. Rinse the mouth with myrrh tea and brush with the powder when gum disease exists.^[27]

- **Neem (*Azadirachta indica*)**

This tree occupies a special place in the Indian community as far as its medicinal value is concerned. The leaves of this special tree are high in fibres, carbohydrates, calcium, fluoride and many amino acid proteins.^[28] Neem is widely known for its marvellous powers of preventing and healing gum diseases and other dental problems.^[29] According to a study reports, significant reduction of gingival, bleeding, and plaque indices was found after using neem based mouth rinse for 21 days.^[30]

- **Thyme (*Thymus vulgaris*)**

It is mainly composed of volatile oils namely phenol, thymol and carvacrol. A salve made of thyme, myrrh and goldenseal

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is used to treat oral herpes, it contains fluoride used in toothpaste. Thymus Vulgaris extract is effective against *Streptococcus Mutans*. [31] However, it should be used with caution in young children, pregnant and lactating mothers and anyone allergic to thyme oil.

- **Turmeric (*Curcuma longa*)**

Turmeric has been used for over 2500 years in India. It is used historically as an antiseptic, antibacterial, anti-inflammatory, pain killer, and hepato-protector. [32] According to a recent research, turmeric extract and turmeric oil have shown to reverse precancerous changes in oral submucous fibrosis in humans.^[33] Rinsing the mouth with turmeric water (5g of turmeric powder, two cloves and two dried leaves of guava in 200 gm of water) gives an instant relief from pain. Applying the powder of burnt turmeric pieces and Bishop's weed seed on teeth and cleaning them makes teeth and gums strong.^[34] Massaging the aching teeth with roasted, ground turmeric eliminates pain and swelling. It is also used as a colorant in pit and fissure sealant.

- **Cranberry (*Vaccinium macrocarpon*)**

It is composed of various biologically active compounds like antioxidant flavonoid and phenolic acids having anti-microbial property. [35] Some researchers found that many of these substances can not only inhibit

the enzymes associated with the formation of the dental plaque polysaccharide matrix film, but can stop the bacteria sticking to surfaces thereby inhibiting plaque formation. They also have anti-caries properties as they prevent acid formation. However, since cranberry juice is acidic in nature and can lead to erosion of teeth, the above finding should be treated with caution.^[36]

- **Meswak (*Salvadora persica*)**

Chewing sticks have been widely used in the Indian subcontinent, the Middle East and Africa since ancient times. Meswak, a derivative from Arak tree, is used by many people in different cultures and in many developing nations as a traditional toothbrush for oral hygiene.^[37] It is suitable for cleansing teeth, comparatively cheap, possesses various medicinal properties and is easily available in rural areas of developing countries. The Meswak extract has also found its way into the dentifrices in the recent years as anti-plaque and antigingivitis agents.^[38] Chewing sticks should be obtained from fresh stems of medicinal plants. It is believed that chewing on these stems facilitate salivary secretions which possibly help in oral cleaning and control of plaque.

- **Red Clover (*Trifolium pretense*)**

Red clover is a very versatile herb with uses in blood health, hormone health, digestive health and even protecting against certain types of cancer. Red clover mouthwash is

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healing for irritated and diseased gums. After making red clover tea, prepare an ointment from the strained blossoms and leaves. Rub the ointment, which has antibiotic properties, on gums that are abscessed from disease or sore and inflamed from root canal therapy or other dental procedures.^[39]

- **Propolis**

Propolis is a resinous mixture that honey bees produce by mixing saliva and beeswax with exudate gathered from tree buds, sap flows, or other botanical sources. It has got wide range of activities like antibacterial, aesthetic and anti-fungal. It has been used in dental caries, gingivitis, storage medium, intracanal medicament, dentinal hypersensitivity, relief from denture ulceration, stomatitis, halitosis, mouth freshener, periodontal pocket/abscess, dentinal sensitivity, lichen planus, candidal infections, angular cheilitis and xerostomia.^[40]

- **Sesame (*Sesamum indicum*)**

This sesame plant (*Sesamum indicum*) has been considered a gift of nature to mankind for its nutritional qualities and desirable health effects. Oil pulling is an ayurvedic practice that involves swishing of oil in the mouth for oral and systemic health benefits.^[41] Sesame seed oil is used most commonly because of several medicinal properties and desirable health benefits. Oil pulling therapy with sesame oil has many

advantages over chlorhexidine, like no staining, no prolonged after-taste and no allergy. Sesame oil is 5 to 6 times more cost effective than chlorhexidine and is readily available in most households.^[42]

- **Peppermint (*Mentha piperita*)**

This particular mint grows in moist, green leaves and has dark green, lance-shaped leaves and purple flowers. Peppermint leaves yield approximately 0.1-1.0% volatile oil. Peppermint contains menthol, methyl acetate, tannic acid, and vitamin C. Peppermint oil is used to relieve toothache by soaking a cotton ball in the oil and placing it in the cavity or rubbing it on the tooth. Peppermint mouthwash can be used to relieve gum inflammation.^[43]

- **Lavender oil (*Lavandula latifolia*)**

It is obtained from the flowers of *Lavandula angustifolia*. It is reported to reduce stress, anxiety, and improve mood when inhaled or orally administered but is not very effective in cases of high anxiety. It can be used in dental clinics to reduce patients' anxiety. It is found to be useful as an anxiolytic agent when used in waiting area. It is also helpful during surgical procedures, as it has been shown to reduce the pain of needle insertion.^[44,45]

- **Coconut (*Cocos nucifera*)**Coconut products have held a respected and valuable place in Indian folk medicine since thousands of years. It is believed to be antibleorrhagic,

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antibronchitis, febrifugal, and antigingivitic. The glycolipid compound, sucrose monolaurate, present in coconut has anticaries effect due to reduced glycolysis and sucrose oxidation in a noncompetitive manner caused by *Streptococcus mutans* and thus prevents *in-vitro* dental plaque. In a clinical trial association of coconut soap and 0.05% sodium hypochlorite was used as a disinfecting agent in the reduction of denture biofilm and stomatitis.^[46] Decoction obtained from coconut tree roots are used as mouthwash and gargle. *In vivo* assays demonstrated that *C. nucifera* extract had low toxicity and did not induce dermic or ocular reactions.^[47] Thus, considering its low toxicity, husk fiber extracts of *C. nucifera* have potential in the treatment of oral diseases.^[48] Coconut flour has antimicrobial properties due to its high lauric acid content that has been used as medicaments for some oral infections such as mouth sores.^[48]

Discussion

Safety and efficacy of herbal remedies -

Herbal medicines are believed to be benign and to not cause severe toxicity. Nowadays there is large industrial mass production of herbal medicines. Moreover, the lower costs as compared to those of conventional medications is the major attraction of these

treatments. However, some of the herbal medicines can cause severe toxicity and even death.^[49] Therefore, there is a need to ensure the public safety and effective quality control of these preparations. This can be done by ensuring the standardization of the several aspects such as nomenclature of common medicinal plants and other resources, their collection practices, semi processes and final processing, packaging, preservation, storage, product life, labelling and modes of distribution including clinical application to ensure quality, safety and efficacy.^[50]

Role of dental professionals in improving safety-

Patients should be asked about their use of Herbal and Dietary Supplements (HDS) as a component of the pharmacologic history review at every appointment about consuming these as a substitute to their traditional medications, frequency of usage, side-effects, and sudden stoppage of any herbal product recently. Patients should be encouraged to discuss their supplement use to prevent lack of disclosure in the dental setting. Reported HDS use must be documented in the treatment chart. Dental professionals should consult a drug database to check for compatibility prior to administering, dispensing or issuing a prescription for another medication to

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patients who are using supplements. It is important to remember that synergistic adverse bleeding effects may occur with aspirin, HDSs and NSAIDS (Non-steroidal anti-inflammatory drugs). [51] Caution should be used with sedation in patients using herbal supplements that produce central nervous system effects. Herbs that alter liver function have the potential to alter the metabolism of drugs used in dentistry. As different HDS possess specific safety windows that range anywhere from 24 hours to 7 to 14 days, it is recommended that all patients discontinue the use of herbal and dietary supplements for 14 days prior to undergoing surgery, including dental surgery.[52]

Conclusion-

The use of herbal extracts in various forms is entirely consistent with the primary health care principles. These are effective in controlling microbial plaque in gingivitis and periodontitis and help in healing. Studies for assessment of safety and efficacy of herbal remedies are in its infancy. Herbal remedies are expected to be widely used in future. Researchers should be encouraged to conduct controlled studies to prove the effectiveness and safety of natural dental products. The low toxicity and low cost of these herbs should encourage further investigation leading to a better understanding on traditional Asian medicine and their application to oral health. Moreover, health educators must consider the

challenge to ensure that people participate in making decisions about the herbal medicine to protect the public health.

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