

Phytotherapy: a non-surgical therapeutic approach in periodontics – A review

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Abstract

Herbal medicines have been widely used all over the world since ancient times. Periodontal diseases have been considered as one of the major health problems affecting humans. There is a long history of the use of plants and their extracts to improve oral health and promote oral hygiene. Herbal extracts have wide range of properties such as anti-inflammatory, antibacterial, analgesic etc. Phytotherapy has its role in prevention and treatment of gingivitis, periodontal disease and other oral cavity problems. As they are economically feasible, safe and effective, hence these products can be used as alternatives for the treatment of gingivitis and periodontitis. Since there is an increasing use of phytotherapeutic agents in dentistry, further studies are needed to evaluate their safety and effectiveness for clinical use. The aim of the present review is to discuss the use of herbal extracts in

Periodontics and their therapeutic application and adverse effects.

Keywords: Herbal extracts, Phytotherapy, periodontal disease, Periodontics.

Introduction

The periodontal disease is a major public health problem, which affects up to 90% of the worldwide population and it is the most common cause of tooth loss in population.¹ Destruction of supporting tissue structures of the tooth is one of the main characteristic of periodontal disease. The main etiological factor is microbial oral biofilm. Periodontal diseases have been linked to anaerobic gram-negative bacteria like *Aggregatibacter actinomycetemcomitans*, *Porphyromonas gingivalis*, *Prevotella intermedia*, *Treponema denticola* etc. are commonly associated with the periodontal disease.^{2,3} Antibiotics (tetracyclines and metronidazole), antiseptics

(chlorhexidine), phenols, oils, and herbal compounds have been in use since 1980.⁴ Over the last decade, herbal therapy has become a subject of world importance, as they possess both medicinal and economic implications. Hence, the search for substitute products continues and natural phytochemicals which are being isolated from plants are used as traditional medicines which are observed as good alternatives.⁵

The Latin prefix 'phyto' stands for plant and is called phytion in Greek. Therapy comes from the Latin word 'therapia' originally from Greek therapeia, from therapeuein which suggests to treat medically. In other words 'phytotherapy' is often called as herbal medicine. It is the study of the use of extracts from natural origin as medicines or health promoting agents.⁶ Global availability is the main key to select pharmaceutical plant derivatives for use in medicinal preparations.⁷ Herbal products may vary in their effectiveness; therefore it is necessary to select herbal species carefully. Herbs and their extracts can be used as adjuvant in periodontal disease treatment.⁴ Different studies have proven to show excellent medicinal properties of different herbal products in periodontal diseases. Phytotherapy may be an alternative treatment option as it is safe, effective and more economical. This review in brief is about various herbal products their medicinal properties and phytotherapeutic uses in periodontics.

Classification⁸:

a. Phytotherapeutic substances are generally categorised into three groups based on origin:

- Plant products
- Animal products
- Mineral origin.

b. Based on their uses in dentistry

- Anti-inflammatory agents
- Anti-microbial agents

- Anxiolytics and Sedative

c. Miscellaneous endodontic irrigants and medicaments.

Herbal drugs have been known and successfully used for a long time for treating oral cavity diseases. Oral cavity lesions are mostly gingivitis, mucositis and periodontal diseases. They are also recommended for the treatment of superficial periodontitis, catarrhal tongue inflammation, oral cavity inflammation, fungal infections and difficult healing of post-operative wounds. Herbal medications are also administered to soothe oral symptoms of systemic diseases. Plant compound can be a powerful and the dominant drug when an inflammation caused by local irritating factor appears.^{9,10}

Phytotherapy for Gingivitis and Periodontitis

The herbs used for treatment of gingivitis and periodontitis are Acacia catechu wild, aloe vera, Chamomile, Azadirachta indica, Glycyrrhiza glabra, Allium sativum, Propolis, Curcuma Longa and Syzygium aromaticum. Tea tree oil (Melaleuca alternifolia) and Cordia verbenacea essential oils are some potential antimicrobial deriving agents used in the management of various periodontal diseases.¹¹

Catechu acacia (Acacia catechu)

Acacia catechu Wild belongs to Fabaceae. Main constituents of this plant are catechin, eocatechin, epigallocatechin, epicatechin gallate, and aldobionic acid, afzelchin gum, mineral taxifolin etc. Acacia catechu heartwood extract is highly active on oral pathogens.¹² This plant extract is used as mouthwash for gingival and throat infection like gingivitis stomatitis. It has antioxidant and antimicrobial activities.¹³

Aloe vera (Aloe barbadensis miller)

It belongs to the family Asphodelaceae (Liliaceae). It contains vitamins, enzymes, minerals, sugars, fatty acids, amino and salicylic acids.¹⁴ Aloe vera has beneficial actions such as anti-inflammatory, antibacterial,

antioxidant, antiviral and antifungal actions, as well as producing hypoglycemic effects.¹⁵ It is helpful for the treatment of gingivitis and periodontitis as it reduces bleeding, inflammation and gingival swelling.¹⁶ Aloe vera gel applications directly to the site of periodontal surgery or to gingiva when it has been traumatized with a tooth brush dentifrice abrasion, sharp foods, dental floss and toothpick injuries have shown improved healing properties.¹⁷ Aloe vera gel at optimum concentrations in toothpastes or mouthwashes could be useful for prevention of periodontal diseases.¹⁸ Subgingival administration of aloe vera gel results in improvement of periodontal condition. Aloe vera can be used as a local drug delivery system because of its various benefits.¹⁵

Chamomile (Matricaria chamomilla)

Chamomile (*Matricaria recutita*) belongs to Asteraceae family. It is one of the most popular herbs and used as ingredient of mouth rinse. It helps in prevention and treatment of gingivitis and also periodontal disease. It is available in the form of capsules, tablets, or tinctures.⁴

Neem (Azadirachta indica)

Neem belongs to Meliaceae family. It is one of the ancient medicinal plant with many beneficial effects. The main ingredients are nimbin, nimbinin and nimbidin.¹⁹ A neem-extract dental gel reduced microbial species present in plaque i.e. *Streptococcus mutans* and *Lactobacilli* significantly.²⁰ The twigs as a toothbrush, the bark for healing gum disease, the oil for soap, and the leaves for medicine. It is used in many preparations to improve health but is generally known for its amazing powers of preventing and healing gum diseases and other dental problems.²¹

Liquorice (Glycyrrhiza glabra)

Liquorice root has active ingredients like glycyrrhizin, flavonoids. It has anti-inflammatory and anti-oxidant properties. Glycyrrhizin and glabridin have a potential to

inhibit generation of reactive oxygen species by neutrophils at site of inflammation. Significant antibacterial activities against *Bacillus subtilis*, *Staphylococcus aureus*, *E. coli* and *Pseudomonas aeruginosa* and *S.mutans*.¹²

Garlic (Allium sativum)

Garlic belongs to Amaryllidaceae family. Active ingredient of garlic is allicin, sulphur containing compound. The antifungal, antiparasitic, antiviral, antimicrobial, antihypertensive, blood glucose lowering, antithrombotic, antimutagenic and antiplatelet properties of garlic have been reported.²² It has strong antibacterial activity. Fresh garlic juice kills *Streptococcus pyogenes* and *Orynbacterium diphteriae* in 2-3 minutes time.^{12,23}

Propolis

Propolis is a complex mixture made from bee released and plant-derived compounds. It has got a wide range of properties such as antioxidant, anesthetic, antibacterial, antifungal, antiviral (including anti- HIV-1 activity), anticarcinogenic, antimutagenic, antithrombotic and immunomodulatory. It has been used in treating dental caries, gingivitis, pericoronitis, dentinal hypersensitivity, periodontal pocket/abscess, relief from denture ulceration, stomatitis, halitosis, mouth freshener, lichen planus, candidal infections, angular cheilitis, xerostomia, traumatic ulcers. It may be used as pulp capping material, for temporary restorations and dressings, as a storage medium, intracanal medicament, covering tooth preparations, dry socket, pre-anesthetic agent.²⁴

Turmeric (Curcuma Longa)

Turmeric belongs to family Zingiberaceae. The active ingredients of turmeric are the flavonoid curcumin (diferuloylmethane) and volatile oils such as tumerone, atlantone, and zingiberone.²⁵ It is antimutagenic, anticarcinogenic, antioxidant, antibacterial and used in dental caries, oral lichen planus, gingivitis, halitosis, pit

and fissure sealant, dental plaque detection system. Massaging the aching teeth with roasted, ground turmeric eliminates pain and swelling.²⁶ It is reported that the local drug delivery system containing 2% whole turmeric gel can be used as an adjunct to scaling and root planing. It was observed that there was a significant reduction in the trypsin-like enzyme activity of red complex species²⁷.

Tulsi (*Ocimum sanctum*)

Tulsi consists of tannins (4.6%) and essential oil (up to 2%), eugenol (up to 62%), methyleugenol (up to 86%), and α - and β -caryophyllene (up to 42%), methylchavicol, linalool and 1,8-cineole. It has anti-helminthic, antipyretic, antiulcer, antimicrobial, anti – inflammatory, analgesic and immunostimulatory property. Contraindicated in pregnant and lactating women, used with caution in children⁸. 2% tulsi gel can be used as useful adjunct to enhance the results of conventional periodontal therapy.²⁸

Triphala

Triphala is a well known powdered preparation. It is a combination of active constituents such as amalaki, haritaki and bibhitaki. Amalaki is made up of ascorbic acid, thiamin, riboflavin and niacin. Haritaki contains chebulagic, chebulinic acid and corilagin. It has antioxidant and antimicrobial functions. Triphala used in treatment of bleeding and ulcerated gums. It has free radical scavenging property which aids in the protection of gum cells effectively from free radicals produced by the microorganisms²⁹.

Tea tree oil

Tea tree or *Melaleuca alternifolia* belongs to the family of Myrtaceae. It can be applied directly on the inflamed gums, for instant relief and mouth rinse reduces inflammation.⁴ It has shown good effectiveness in control of microbial biofilm, with a significant reduction of gingival bleeding index³⁰. Santamaria et al. evaluated the antimicrobial effects of tea tree essential oil gel in controlling the

formation of oral microbial biofilm and they concluded that it is effective against bacteria³¹. Tea tree oil has demonstrated the ability to suppress the in vitro production of inflammatory cytokines, suggesting its potential as a therapeutic agent for inflammatory diseases, such as periodontal disease, via modulation of the host response³².

Sage (*Salvia officinalis*)

Sage belongs to Lamiaceae family. Sage grows in the fields and along roadsides. It can be used as mouth rinse and it has been recommended for treatment of sore throat, stomatitis, gingivitis and periodontal disease. Sage essential oils have antibiotic, antifungal and antiviral properties and it has been used to reduce inflammatory process in stomatitis and pharyngitis.³³

Septilin

Septilin is an ayurvedic preparation which comprises various herbs and minerals. It possesses immunomodulatory and anti-inflammatory properties which aids in strengthening the immune system and potentiating the nonspecific immune responses of the body. It has been shown to have antibacterial, anti-inflammatory, antiexudative, and immunostimulatory effects. It is also effective in respiratory tract infections, tonsillitis, and other infections.³⁴

Adverse effects

Though herbal products are safe to use, there are some adverse effects also associated with it. Certain herbs or herbal products may cause direct effects on oral tissues like burning sensation of tongue, numbness and throat/oral irritations³⁵. Toxicity is usually seen only when excessive amounts of phytochemicals are ingested than required. This is rarely encountered because phytotherapy for gingival inflammation usually involves only topical application and systemic administration is not required.³⁶

Conclusion

Phytotherapy could be considered as an alternate option for treating gum and periodontal diseases as herbal extracts are safe, economically feasible and effective. Natural remedies are acceptable by the people from ancient times and they are used as traditional medicines. Herbs and herbal extracts can be used as an adjuvant for periodontal therapy because of their anti-inflammatory and anti-oxidant properties. Further studies are required to evaluate efficacy of herbal extracts to increase their usage in periodontal therapy.

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