

## **Review Article**

### **Dentistry: Turning towards Herbal Alternatives: A Review**

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**Abstract:** Herbal medicine is an increasingly common form of alternative therapy through out the world. Consequently, herbal medicines are finding their more and more usefulness in the arena of dentistry and their armamentarium. Earlier they were limited to as an important ingredient of tooth pastes, mouthwashes and as pain reliever, but now a days they are increasingly being used in all possible treatments in dentistry like root canals, surgeries, periodontal therapies, anti plaque agents to name a few. This review article aims at discussion of some common herbs like clove oil, tea tree oil, chamomile, coconut water, cranberry, neem, papaine, morinda citrifolia along with a few others and their use in dentistry.

**Keywords:** Herbal medicines, Herbal dentistry, Essential oils.

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#### **INTRODUCTION**

A herb, botanically speaking, is any plant that lacks the woody tissue characteristic of shrubs or trees. More specifically, herbs are plants used medicinally or for their flavor or scent. Herbal and natural products of folk medicine have been used for centuries in every culture throughout the world. "Let food be your medicine and let medicine be your food" was advised by Hippocrates, over two millennia ago. It's still true today that "you are what you eat."

Herbal medicine is an increasingly common form of alternative therapy through out the world. Dental fraternity has also witnessed impact of these herbal medicines as a regular constituent of dental medicine to dental problems in the form of tooth pastes, gum paints to name a few. Also, herbal remedies have a long history of use for gum and tooth problems. In many traditional cultures, the use of herbal "chewing sticks" taken from plants, shrubs or trees with high anti-microbial activity are common. A herb may exhibit one or more following unique therapeutic properties like anti-bacterial, anti-inflammatory, astringents, anaesthetic, immune strengtheners, anticariogenic, storage media for avulsed tooth, anti plaque agents, root canal irrigants, and tooth whitener etc. [1, 2, 3].

Herbal extracts are effective because they interact with specific chemical receptors within the

body and are in a pharmacodynamic sense, drugs themselves. Any discussion the health professional has with a patient about herbal supplements should be conducted with caution. The plant extracts affecting inflammation and bleeding are of significant interest to the dental professional. Therefore, factual knowledge is essential. This article aims at a review of some common herbs which are alternatively used as important part of dental treatment with proven therapeutic benefits. This review is limited to the discussion of clove oil, tea tree oil, chamomile, coconut water, cranberry, neem, papaine, morinda citrifolia along with a few other herbal remedies.

#### **Clove (*Syzygium aromaticum*)**

Clove essential oil has a safety record a mile long with documented use as a breath freshener as early as the 3rd century B.C. by Chinese emperors. Ancient Hindu texts have described the use of clove oil in dentistry. Avicenna, teacher of Hippocrates (the Father of Medicine), treated rotting teeth and gums with pills of clove oil. Since the 19th century, the germ-killing molecules in clove oil have functioned for root canal treatment and other more serious dentistry. The molecule named eugenol in clove essential oil has analgesic and antiseptic properties and particularly inhibits growth of nearly all disease-causing bacteria while leaving the beneficial bacteria unharmed [4, 5]. It has been used in dental fillings, and dental cements for

many years for their topical analgesic properties. The eugenol and other constituents of clove, such as vanillin and iso-eugenol, have also been reported to have antimicrobial effect. [5] Clove gel can provide dentists with an alternative to benzocaine for topical anaesthesia in their daily practice, especially for use with children and in areas where cost and availability limit access to pharmaceutical topical anaesthetics [6, 7].

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

It is more commonly known Australian tea tree oil as, is a native Australian plant with many properties such as being an antiseptic, an antifungal agent and a mild solvent. Tea tree oil's major active component is terpinen-4-ol (30%–40%). This compound is responsible for its antibacterial and antifungal properties [8].

Tea tree, and in particular its essential oil, is one of the most important natural antiseptics. It is useful for treating throat irritation, stings, burns, wounds and skin infections of all kinds [8]. It stimulates the immune system and is effective against a broad range of bacterial and fungal infections. This essential oil is non-irritant. Using tea tree oil orally is not recommended as it may cause possibly serious side effects such as confusion, loss of muscle control, or coma. In dentistry, tea tree oil has been used to destroy microorganisms in the mouth before dental surgery, removal of smear layer when used as a root canal irrigant and to relieve mouth soreness caused by dental procedures [9-12]. In studies of patients who suffered from oral candidiasis mouth rinses containing tea tree oil have shown some effectiveness in reducing symptoms when taken in a dose of one table spoonful of 5% tea tree oil solution as a mouth wash that is held in the mouth and then spit out four times a day for up to 4 weeks [13, 14].

In a study conducted to determine the effect of German Chamomile extract and tea tree oil as irrigants in the removal of smear layer, the most effective removal of smear layer occurred with the use of sodium hypochlorite with a final rinse of 17% EDTA (negative control) followed by the use of a chamomile extract. 4 Chamomile extract was found to be significantly more effective in the removal of smear layer than distilled water and tea tree oil. However, further research is needed to determine the effects of chamomile extract on restorative materials and the effects of these extracts on the long-term prognosis of endodontic treatment [15].

#### **German Chamomile**

It has been used for centuries as a medicinal plant mostly for its anti-inflammatory, analgesic, antimicrobial, antispasmodic and sedative properties. German chamomile is a plant, native to Europe and Western Asia, and is used in parts of the world as a table tea. Chamomile was found to be effective when used as a mouthwash to treat irritations and minor

infections of the mouth and gingiva and is also used in some toothpaste [15, 16].

Chamomile is also thought to have a soothing effect on the tissues inside the mouth, nose, and throat. A chamomile mouthwash has been tested for the relief of mucositis, cancer patients. It helped to prevent, delay, or lessen the occurrence of mucositis [17]. Chamomile extract was found to be significantly more effective in the removal of smear layer than distilled water and tea tree oil. However, further research is needed to determine the effects of chamomile extract on restorative materials and the effects of these extracts on the long-term prognosis of endodontic treatment [15]. Chamomile is usually taken as a tea or a liquid extract. The common dose of chamomile extract is 1 ml to 4 ml in water three times a day. However, certain risks and adverse effects have been advocated like vomiting at high doses and multiple skin rashes and anti platelet action resulting in uncontrolled bleeding with the use of this herb [17, 18].

#### **Coconut Water (*Cocos Nucifera*)**

The name coconut comes from Spanish and Portuguese word coco, which means "monkey face." Coconuts are the fruit of the coconut palm, botanically known as *Cocos Nucifera*, with *nucifera* meaning "Nut-bearing." In Sanskrit, the coconut palm is known as *Kalpa Vriksha*, meaning "tree which gives all that is necessary for living," since nearly all parts of the tree can be used in some manner or another.

Health benefit of coconut water includes low in carbohydrates, 99% fat free and low in sugar. Coconut water is very stuff of nature; biologically pure and full of natural sugars salts vitamins. Coconut water is a powerhouse of nutrition containing a complex blend of vitamins, minerals, amino acids, carbohydrates, antioxidants, enzymes, health enhancing growth hormones and other phyto-nutrients. Because its electrolyte (ionic mineral) content is similar to human plasma, it has gained international acclaim as natural sports drink for oral dehydration [19]. Unlike other beverages, it is completely compatible with the human body, in so much that it can be infused directly into the bloodstream [20, 21].

Coconut water's unique nutritional profile makes an excellent oral rehydration, enhances immune function, possesses anti-aging properties, decreased swelling, relieve spasm, root canal irrigant (antiviral, antifungal and antimicrobial properties) and storage media for avulsed tooth [22]. A new storage media, coconut water, in maintaining viable periodontal ligament (PDL) cells on avulsed teeth, may be better alternative to Hank's Balanced Salt Solution or milk in terms of maintaining PDL cell viability after avulsion and storage [23, 24]. Coconut water is easily available in most of countries, and more importantly, it is a natural transport medium that is sterile and inexpensive.

### **Cranberry**

Could a cranberry a day keeps the dentist away? Cranberries contain numerous biologically active compounds including flavonoids, phenolic acids, anthocyanins, condensed tannins, and other components presence of antioxidants flavonoids thought to have antimicrobial activity [25]. Researchers from the University of Rochester School of Medicine and Dentistry, and Rutgers University, New York, 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, ensuring that plaque is never given the chance to form. The compounds also prevent acid formation and reduce the acid tolerance of the bacteria that cause decay hence preventing prevent tooth decay and gum disease. However, these findings should be treated with a degree of caution because Cranberry juice is naturally very acidic and can cause erosion of teeth if taken too often. This can lead to pain and sensitivity in the teeth [26-28].

### **Licorice**

Licorice has been an important herb in Chinese medicine for many years In addition to being used as flavoring and sweetening agents in candy, tobaccos and beverages, compounds derived from licorice root have been shown to help fight inflammation, viruses, ulcers and even cancer, according to the researchers [29, 30]. Compounds isolated from licorice root may help prevent cavities. Studies have shown that liquorice contains at least two compounds that appear to be potent inhibitors of *Streptococcus mutans*, a major culprit for dental caries. If further studies show promise, the licorice compounds could eventually be used as cavity-fighting components in mouthwash or toothpaste [29, 30].

### **Morinda Citrifolia (Noni)**

Noni is the common name for *Morinda citrifolia* and is also called Indian Mulberry, Nono or Nonu, in various cultures throughout the world. It has been reported to have a broad range of therapeutic effect including antibacterial, antiviral, antifungal, analgesic, anti-inflammatory and immune enhancing effect [31]. The fruit juice is in high demand in alternative medicine for different kinds of illnesses such as arthritis, diabetes, high blood pressure, muscle aches and pains, heart diseases, cancers, gastric ulcers, sprains, poor digestion, atherosclerosis etc. The analgesic efficacy of the Noni extract is 75% as strong as morphine, yet non-addictive and side effect free. Major components in the Noni plant are potassium, vitamin C alkaloids, carotene, vitamin A, linoleic acid, Alizarin and L-asperuloside [31].

It appears to be the first fruit juice to be identified as a possible alternative to the use of sodium hypochlorite (NaOCl) as an intracanal irrigant, because it is a biocompatible antioxidant and not likely to cause

the severe injuries to patients that might occur through NaOCl accidents. In a study conducted to evaluate *Morinda citrifolia* as an endodontic irrigant, it was concluded that *Morinda Citrifolia* Juice was more effective than CHX for removing smear layer and was similar in efficacy to NaOCl in conjunction with EDTA as an intra-canal irrigant. The present findings are revolutionary because they suggest that intracanal irrigants and dental disinfecting solutions can be formulated from a fruit juice [32, 33].

### **Neem (Azadirachta Indica)**

In India the neem tree has been reserved as the village pharmacy for centuries, with every part of this miracle tree being used. The twigs as a toothbrush, the bark for healing gum disease, the oil for soap, and the leaves for medicine. The Neem tree is a true panacea. Neem is used in many preparations to improve health but is generally known for its marvelous powers of preventing and healing gum diseases and other dental problems [34]. The inhibitory effects of neem upon bacterial, growth, adhesion to hydroxyapatite on tooth surfaces, and production of insoluble glucan, which may affect in vitro plaque formation, suggests that Neem stick extract can reduce the ability of some streptococci to colonize tooth surfaces, and may be useful as anti caries products [35, 36].

### **Arctium Lappa**

This plant has been brought from Japan and acclimated in Brazil, which is widely used in popular medicine all over the world for its well-known therapeutic applications. It has anti-bacterial and antifungal activity, diuretic, anti-oxidant and anxiolytic action, anti platelet effect and HIV-inhibitory action [37]. In dentistry, *Arctium lappa* has been investigated due to its antimicrobial potential against oral microorganisms, specifically those associated with endodontic infections. It has been demonstrated that *A. lappa* exhibits antimicrobial activity against oral microorganisms and can be used as intra-canal medication for 5 days in teeth infected with *C. albicans*, *E. coli*, *L. acidophilus*, *P. aeruginosa* and *S. mutans* inhibited microbial growth after 14 days. The microbial inhibition potential of *Arctium lappa* observed in this study opens perspectives for its use as an intra-canal medication [37].

### **Evening Primrose Oil**

It is an interesting and known modulator of inflammation. It has been tested as a possible means of controlling inflammatory conditions such as arthritis and Sjögren syndrome. Gamma Linolenic acid levels are depressed in patients with Sjögren syndrome [38]. Early studies showed evening primrose oil, combined with B-complex vitamin supplementation, had a positive effect on Sjögren syndrome after 8 weeks of treatment as measured by tear production. [38] However, larger studies have not been done to investigate these findings further. No further

information is available on the efficacy of evening primrose oil in treating Sjögren's syndrome. Nutritional modulation of inflammatory response could be a useful strategy against Sjögren syndrome and other inflammatory related conditions [4, 38].

### Grape Seed Extract

Grape seed extract contains proanthocyanidins (PA) which are potent antioxidants and are known to possess anti-inflammatory, antibacterial and immune-stimulating effects. It has been reported to strengthen collagen based tissues by increasing collagen cross-links [39]. In a study conducted to determine remineralizing effects of grape seed extract on artificial root caries, results showed that is a promising natural agent for non-invasive root caries therapy [39, 40].

### Papaine

Papaine is a proteolytic enzyme that comes from the latex of the leaves and fruits of the green adult papaya. It has an anti-inflammatory, bacteriostatic, bactericidal characteristic and is effective against gram positive and gram negative organisms.

Similar to human pepsin, papaine acts as a chemical debridement anti-inflammatory agent, which does not damage healthy tissues and accelerates cicatrization process. Papaine acts only in infected tissue as it lacks a plasmatic antiprotease called a-1-anti-trypsin. The absence of this enzyme in infected tissues allows papaine to break the partially degraded collagen molecules only, contributing to the degradation and elimination of fibrin "mantle" formed by carious process. The principle that an active ingredient acts on the predegraded collagen of the lesion, promoting it's softening, without acting on healthy adjacent tissue and without causing pain, has made this technique an effective alternative for treatment of carious injuries [41-43].

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