

## Herbal Products in Oral Hygiene Maintenance –A Review

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**ABSTRACT:** 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, and ginger, and licorice 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. Bloodroot extract, a derivative of *Sanguinaria Canadensis* has previously been included in oral rinse and toothpaste products with evidence of safety and effectiveness. This review is about all the studies that have been made to evaluate the efficacy of various herbal products for maintenance of oral hygiene.

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### I. INTRODUCTION

Dental caries, inflammation or gingivitis, thrush, bad breath, soreness, and tooth aches are conditions that plague the mouth. Herbs will improve, soothe and eliminate these problems. Herbs have a variety of uses including culinary, medicinal and in some cases of spiritual usage.

### II. HERBAL REMEDIES FOR DENTAL DISEASES

Calendula and Echinacea soothe sore gums and reduce inflammation. They are an excellent treatment for *Candida albicans*, opportunistic yeast that cause thrush in mouth. A couple of drops of lavender oil is also good at clearing up *Candida albicans*, as well as reducing inflammation and healing sores infected gums are successfully treated with Goldenseal or Oregon grape. Rosemary helps heal canker sores and has antiseptic properties. Parsley is a natural breath sweetener. Oil of cloves, help in relieving tooth ache.

The objective of this review is to evaluate the efficacy of herbal products in maintenance of oral hygiene. The following are herbs used in the treatment of dental diseases.

**NEEM** elaborates a vast array of biologically active compounds which are chemically diverse and structurally complex.

**CHEMISTRY:** In the year 1880-90, the chemistry of neem was influenced for its medicinal values; the chemist took up the isolation of active principle from its seed and other parts. Siddiqui was the first to report the isolation of three products viz. nimbin, nimbidin and nimbinin from its oil. The neem constituent belonging to chemically diverse classes have been divided in to two major sections viz.

- 1) Isoprenoids and 2) non- isoprenoids.

**Thilla S.Vinothkumar**, in his study to evaluate the anti-microbial efficacy of various herbal extracts Curcuma longa, Azadiracta indica, Aloe barbadensis, Myristica fragrans and Terminalia chebula as endodontic irrigant against *Enterococcus faecalis* and *Candida albicans* using real-time quantitative polymerase chain reaction (qPCR) showed AZADIRACHTA INDICA(Neem) WAS HIGHLY EFFICIENT TO 5.25 % NaOCl in reducing *Enterococcus faecalis* and *Candida albicans* within the root canals when compared with other extracts.

**Anirban chatterjee**, did a study based on 45 subjects with plaque induced gingivitis to evaluate the anti-gingivitis and anti-plaque effect of AZADIRACHTA INDICA(Neem) mouth rinse. This study showed that Neem mouth rinse was effective in reducing periodontal indices. It was found that 0.19 % Neem has significant anti-inflammatory property. The results demonstrated a significant reduction of gingival bleeding and plaque indices over a period of 21 day. This study also created an effective and inexpensive oral health intervention for low socio-economic communities.

**Estafan D**, did a clinical study for 3 months using double blind, parallel design to compare the efficacy of herbal tooth paste and gum therapy and Colgate total in controlling gingival bleeding, gingivitis, plaque and stains. The result showed both products helped in reducing gingivitis and plaque but herbal tooth paste containing neem as a major constituent maintained reduction of plaque as well as stains.

**GREEN TEA** is made from the leaves from *Camellia sinensis* that have undergone minimal oxidation during processing. Green tea originates in China. Green tea extract is approximately twice more antioxidant-active than Vitamin C.

**CHEMISTRY:** The cardinal antioxidative ingredient in the green tea extract is green tea catechins (GTC), which comprise four major epicatechin derivatives; namely, epicatechin (EC), *epigallocatechin* (EGC), *epicatechin gallate* (ECG), and *epigallocatechin gallate* (EGCG).

**Narotzki B**, in his review about effect of Green tea on oral health showed that Green tea protects against bacterial induced dental caries. Green tea polyphenols can abolish halitosis through modification of odorant sulphur components. Oral cavity oxidative stress and inflammation, consequent to cigarette smoking and cigarettes deleterious compounds nicotine and acrolein, may be reduced in the presence of Green tea polyphenols. It also defends healthy cells from malignant transformation and locally has the ability to induce apoptosis in oral cancer cells.

**Sanguinaria canadensis**, bloodroot, is a perennial, herbaceous flowering plant native to eastern North America. *Sanguinaria canadensis* is also known as bloodwort, red puccoon root, and sometimes pauson.

**CHEMISTRY:** Bloodroot produces benzylisoquinoline alkaloids, primarily the toxin sanguinarine. The alkaloids are transported to and stored in the rhizome. Comparing the biosynthesis of morphine and sanguinarine, the final intermediate in common is (S)-reticuline.

**Mary P.Cullinan**, in his study investigated the efficacy of a *Sanguinaria* containing oral rinse and dentifrice as an adjunct to self performed plaque control during the initial therapy phase of periodontal treatment. The initial therapy is to reduce marginal inflammation so as to allow residual disease to be assessed and treated.

As supragingival plaque control, in conjunction with supragingival and subgingival scaling, is necessary to reduce marginal inflammation, an effective anti-plaque agent may be a beneficial adjunct in early stages of therapy whilst a patient is developing effective plaque control skills. Chlorhexidine has been shown to be an effective anti plaque agent. But on prolonged use, it has produced side effects of impaired taste sensation and staining of teeth fillings and tongue. On other side *Sanguinaria*, does not seem to produce any side effects and has been shown to exhibit anti microbial activity against plaque microorganisms. Thus, it has been shown to have an inhibitory effect on new plaque formation both in experimental gingivitis model and as a supplement to normal oral hygiene practices. This study showed that use of a *Sanguinaria* containing dentifrice and oral rinse led to a more rapid resolution of the marginal inflammation in conjunction with initial therapy phase of periodontal treatment.

**MESWAK**, *Salvadora persica* (Arak, Galenia asiatica, Meswak, Peelu, Pīlu, *Salvadora indica*, or toothbrush tree, mustard tree), is a species of Salvadora. Research suggests that it contains a number of medically beneficial properties including abrasives, antiseptics, astringent, detergents, enzyme inhibitors, and fluoride.

**CHEMISTRY:** According to chemical and phytochemical analysis of *Salvadora persica*, there was an occurrence of carbohydrates and/or trimethylamine; an alkaloid which may effectively be salvadorine; chlorides; sulfur; terpenes; vitamin C; glycosides; large amounts of fluoride and silica; small amounts of tannins, saponins, flavonoids and sterols.

**Puneet gupta** conducted a study to evaluate the anti-plaque efficacy of Meswak (*Salvadora persica*) containing dentifrice. The result showed that there were significant differences in the reduction of plaque by it. The study was done using a randomized, triple blind parallel design method. Meswak, mainly grows in Saudi Arabia but also in other parts of Middle East. Meswak is a chewing stick used by many people in different cultures and in many developing countries as a traditional tooth brush for oral hygiene. These results were consistent with those reported by **Batwa et al**. Thus, through this study it was seen that Meswak extracts have both anti-plaque and anti-gingivitis action.

**Khalessi AM** did an in vivo study of plaque control efficacy of persica mouthwash (containing an extract of *Salvadora persica*). The use of persica resulted in significant reduction in carriage rate of cariogenic bacteria mutants *Streptococci* (MS) in saliva and reduced gingival bleeding ( $p < 0.01$ ). There was gingival health improvement but reduction in accumulation of dental plaque was not observed in this study.

**Berberis vulgaris**, aka European barberry or simply Barberry, is a shrub in the genus Berberis. It produces edible but sharply acidic berries, which are sometimes used culinarily as a tartly spicy currant.

**CHEMISTRY:** The plant is both poisonous and medicinal. Except for its fruits and seeds, the plant is mildly poisonous. Its most potent agent is berberine, which is also known to have a number of therapeutic effects. Makarem et al have shown the efficacy of Barberry extract dental gel to be more effective in reducing dental plaque compared to a fluoride dentifrice.

**TURMERIC**, Turmeric (*Curcuma longa*) is a rhizomatous herbaceous perennial plant of the ginger family, Zingiberaceae. Its active ingredient is Curcumin and it has a distinctly earthy, slightly bitter, slightly hot peppery flavor and a mustardy smell. Curcumin has been a centre of attraction for potential treatment

of an array of diseases, including cancer, Alzheimer's disease, diabetes, allergies, arthritis and other chronic illness.

**CHEMISTRY:** The most important chemical components of turmeric are a group of compounds called curcuminoids, which include curcumin (diferuloylmethane), demethoxycurcumin, and bisdemethoxycurcumin. The best studied compound is Curcumin, which comprises 0.3-5.4% of raw turmeric.

**K.Hastak** did a study to evaluate the effect of turmeric oil and turmeric oleoresin on cytogenetic damage in patients suffering from Oral Sub mucous Fibrosis .In this study, patients suffering from Sub mucous Fibrosis were given a total dose of turmeric oil (600mg with 3 g turmeric/day),turmeric oleoresin(600mg+3g turmeric/day)and 3 g turmeric /day as a control for 3 months. It was observed that all 3 treatment modalities decreased the number of micro nucleated cells both in exfoliated oral mucosal cells and in circulating lymphocytes. Turmeric oleoresin was found to be more effective in reducing the number of micronuclei in oral mucous cells (p<0.001), but in circulating lymphocytes the decrease in micronuclei was comparable in all 3 groups. This also caused reduction in oral ulceration, burning sensation ,blanching and trismus.

**ACACIA ARABICA**, Acacia Arabica (gum Arabic tree, Babul/Kikar, Egyptian thorn, Sant tree, Al-sant or prickly acacia; called thorn mimosa or prickly acacia in Australia; lekkerruikpeul or scented thorn in South Africa) is a species of Acacia native to Africa, the Middle East and the Indian subcontinent. It is also currently an invasive species of significant concern in Australia. The uses of this plant are: Internal use: Useful in diarrhoea, dysentery, piles, helminthiasis, bleeding disorders, cough and urinary disorders. Gum is used in dysuria and loss of libido. In premature ejaculation. Powder of raw legume and sugar is found useful. External use: A blood purifier, haemostatic, vasoconstricting and healing property. Its powder is sprinkled on burnt injuries and bleeds.

**CHEMISTRY:** Acacia Arabica contains gallic acid, m-digallic acid, (+)-catechin, chlorogenic acid, gallolyated flavan-3, 4-diol and robidandiol (7, 3', 4'5',-tetrahydroxyflavan-3, 4-diol) 1.

**Pradeep AR** did a study to evaluate the short term clinical effects of commercially available gel containing Acacia arabica in the reduction of plaque and gingival inflammation in subjects with gingivitis .The study was based on 90 subjects diagnosed with chronic generalized gingivitis .The result showed that gumtone gel (containing Acacia arabica) was not associated with any discolouration of teeth or unpleasant taste and it may be useful herbal formulation for chemical plaque control agent and in improvement of plaque and gingival status.

**GARCINIA MANGOSTANA L**, the purple mangosteen (*Garcinia mangostana*), colloquially known simply as mangosteen, is a tropical evergreen tree believed to have originated in the Sunda Islands and the Moluccas of Indonesia.

**CHEMISTRY:** Mangosteen peel contains xanthonoids, such as mangostin, and other phytochemicals having antioxidant properties in vitro.

**Rassameemasmaung S** did a study based on 60 subjects who were diagnosed as having mild or moderate chronic gingivitis to determine the effects of herbal mouthwash containing the pericarp extract of *Garcinia mangostana L* on halitosis and plaque. The result showed that herbal mouthwash containing pericarp extract of *Garcinia mangostana L* was useful in improvement of plaque index and it may be used as an adjunct in treating oral malodor.

**POMEGRANATE EXTRACT** the pomegranate, botanical name *Punica granatum*, is a fruit-bearing deciduous shrub or small tree. The pomegranate is widely considered to have originated in the vicinity of Iran and has been cultivated since ancient times.

**CHEMISTRY:**

Active ingredient: Ellagic Acid Total Polyphenols

**C.Ashwini Somu** did a clinical study to evaluate the anti-gingivitis effect of a gel containing Pomegranate extract using 21 – day trial in patients with chronic gingivitis. The result showed that the Pomegranate gel when used as an adjunct with mechanical debridement was efficient in treating gingivitis. This study showed significant reduction in plaque score and gingivitis. These results are consistent with those reported by Pereira and Sampanio who showed a significant reduction in gingivitis using the dentifrice containing pomegranate extract.

**ALOE VERA** is a succulent plant species that probably originated in northern Africa. The species is frequently cited as being used in herbal medicine since the beginning of the first century AD. Extracts from *A. Vera* are widely used in the cosmetics and alternative medicine industries, being marketed as variously having rejuvenating, healing, or soothing properties.

**CHEMISTRY:** Aloe Vera leaves contain phytochemicals under study for possible bioactivity, such as acetylated mannans, polymannans, anthraquinone C-glycosides, anthrones, anthraquinones, such as emodin, and various lectins.

**Bathini Chandrahas** did a study based on 148 healthy subjects (68 males and 80 females) age group (18-25 years) to assess the anti-plaque and anti-gingivitis efficacy of Aloe vera mouth rinse. The Plaque accumulation was assessed by Plaque Index (PI) and Gingivitis was assessed by Modified Gingival Index (MGI) and bleeding index (BI). The result showed that there was significant decrease in PI, MGI, BI score after rinse regimen began. There was significant reduction of Plaque and Gingivitis. Aloe vera has anti-inflammatory properties, anti-ulcer activity, astringent effect and possibility of reducing scars and enhancing wound healing. The above properties along with the ease of availability, with no known adverse effects and cost effectiveness, make Aloe vera an ideal candidate for Plaque control and thereby reduce Gingivitis and probably later Periodontitis.

### **III. CONCLUSION**

This review is about all the studies that have been made to evaluate the efficacy of various herbal products for maintenance of oral hygiene. It is important to know the therapeutic effects of these herbal products and their role in improving oral health. But still further research is required to know the dental benefits of herbal products being incorporated in to the commercially available dentifrices and other oral hygiene aids.