



Oral and Dental Care Products with Herbal Origin: A Narrative Review

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Abstract

Introduction: Despite the fact that oral health is now understood to be a crucial factor in the overall quality of life, historically, greater focus has been placed on its mostly local therapeutic effects. A person's ability to bite, chew, smile and talk, as well as their mental state, are all affected by their oral health, according to the World Health Organization (WHO). As a result, oral disorders can impair a person's ability to grow and develop as well as their ability to be productive, creative, and social. Herbs are making a comeback since they are safer and more secure than synthetic drugs today, which encourages researchers to look into herbal medications. Since ancient times, medicinal plants have been utilized to treat a variety of illnesses. One of the key areas of study for reducing immunological problems is from natural sources. The introduction of chemical medications has led to a decline in the use of herbal medicine. A complementary or alternative therapy that works well for many disorders is herbal medicine. Despite the creation of numerous modern medications, the use of herbal medicine is still very popular. The goal of this evaluation was to investigate herbal-based oral and dental care products. Between 2015 and 2022, published papers were searched in two databases: PubMed and Google Scholar, using the phrases "oral and dental care products having herbal origin." According to this study, several herbs are used to heal ailments, and many of them have no negative side effects.

Keywords: Herbal Origin, Oral Care, Dental Care, Herbal medicine, mouthwash

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Introduction

The utilization of medicinal herbs has been a significant contributing factor in the evolution of human culture. Medicinal plants have historically been a major source of medicine for almost all cultures and civilizations. Traditional medicines are said to be abundant in medicinal plants, and many modern medications are made from these plants.¹ For millennia, medicinal herbs have been utilized to cure ailments, add flavour and preserve food, and prevent outbreaks of diseases. Compared to synthetic antioxidants that have side effects and have been shown to be carcinogenic, these medicinal plant species have much higher phenolic content and a considerable amount of flavonoids and flavonols as well as antioxidant activity.² In the current world, it has been discovered that

herbal medications specifically and selectively boost the bodily systems without causing negative effects. In affluent nations, the value of traditional herbal medicine has recently increased significantly. Therefore, on the basis of this, medicinal plants with high antioxidant capacity are the best supplements for treating disorders brought on by oxidative stress.³ [Figure 1](#) depicts a mechanism for how it helps to prevent illness attacks and other disorders.

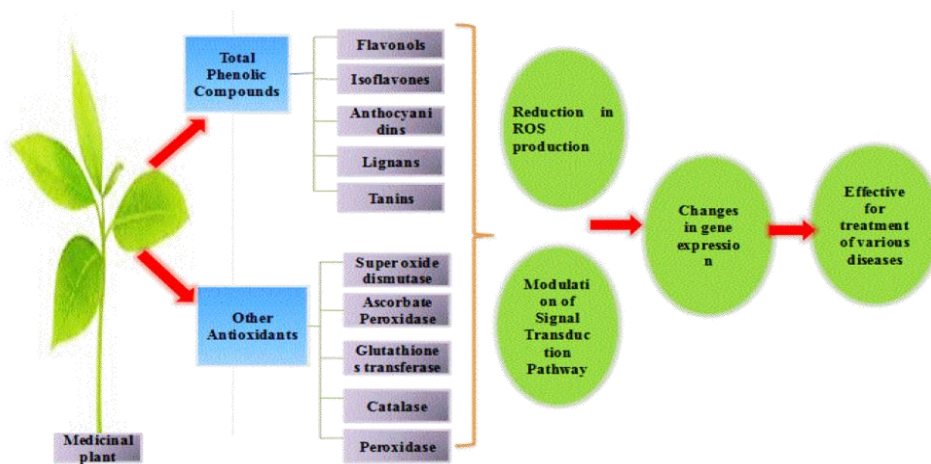


Figure 1. Mechanism behind beneficial aspects of medicinal plant.⁴

The biological properties of plant species used around the world are typically due to the secondary metabolites that plants generate (Figure 2). Plant-derived compounds regulate the microbial growth in a variety of environments. Between 1950 and 1970, almost 100 novel plant-based medications were introduced to the American drug market, among them the various plant-derived medications vincristine, reseinnamine, vinblastin, deseridine, and reserpine.⁵ Even now, plants are not only essential to health treatment, but they also represent the finest source for secure future drug supply. Despite the fact that we now have a variety of modern medications at our disposal, it is still extremely important to find and create novel therapeutic agents.⁶ The number of known human illnesses for which an appropriate treatment is available has been estimated to be only one-third. As a

result, the battle against sickness must continue unabatedly. Due to their few side effects and the synergistic impact of the substances they contain, traditional plant medicines nevertheless hold a prominent position in the modern pharmaceutical industry.⁷ In recent years, there has been an increase in the usage of plants to treat illnesses. Resistant microbial isolates have emerged as a result of the indiscriminate use of chemical medications to treat illnesses, and their numbers are growing daily. Essential oils and extracts from plants have the potential to replace chemical medications, and herbal therapy is receiving more and more attention.⁸ Most of the plant essential oils that have been extracted have been discovered to have cytotoxic, antifungal, antiparasitic, antibacterial, antiviral, and antiparasitic effects.⁸

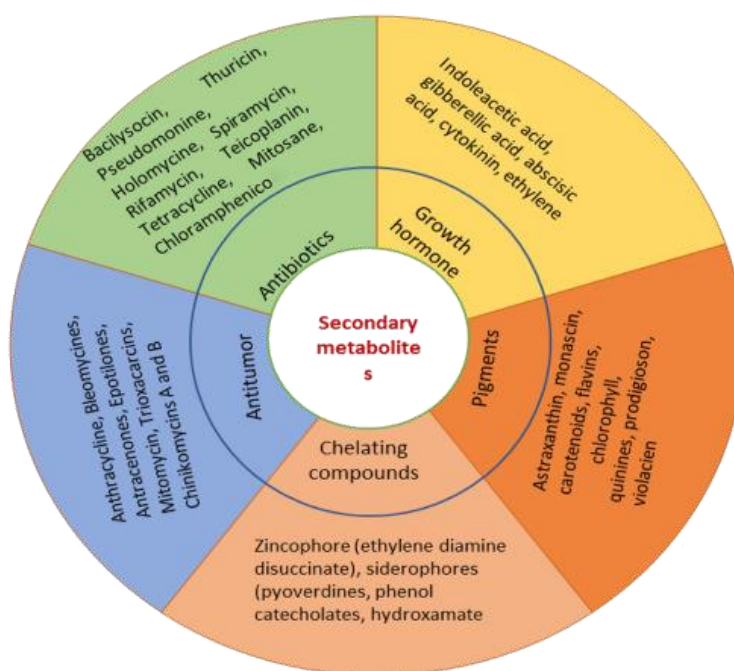


Figure 2. The secondary metabolites produced by the plants.²

The quality of life for persons with oral disorders is significantly reduced because they are among the most common diseases in the world and have substantial health and financial consequences. Dental caries (tooth decay), periodontal disease, tooth loss, and malignancies of the lips and oral cavity are the most common and serious oral disorders in the world. Indicators of general wellbeing include oral problems, which not only have functional and emotional effects on those who are affected by them.¹⁰ It is impossible to overstate how important oral disorders are for kids because they can affect not just the individual but also the home and the community as a whole. The tooth structure is susceptible to circumstances that promote demineralisation and remineralization in the oral environment. If this equilibrium is upset, demineralisation advances and causes the tooth structure to be destroyed.¹¹ Nobody can deny the significance of teeth for speaking, eating, and maintaining good health. The prevalence of tooth decay and, consequently, tooth loss has increased

with the increasing usage of soft, sticky meals that frequently contain carbohydrates. The lack of following oral and dental hygiene recommendations and the failure to promote the hygiene culture associated with the mouth and teeth as a behaviour are the causes of this, in addition to the type of nutrition.¹² The necessity to keep the teeth free from microbial plaque accumulation by brushing and using toothpaste is one of the most efficient ways to deal with many connected disorders since the environment around the mouth and the teeth is among the most contaminated areas of the body. To the teeth, such as periodontal and caries disorders.¹³ When people with the mentioned disease appear, the organisms listed in blue have been proven to be more prevalent in the oral cavity, whereas the organisms listed in red have been shown to be less prevalent.¹⁴ Depending on the circumstances or the disease's course, those in purple may be raised or lowered (Figure 3).

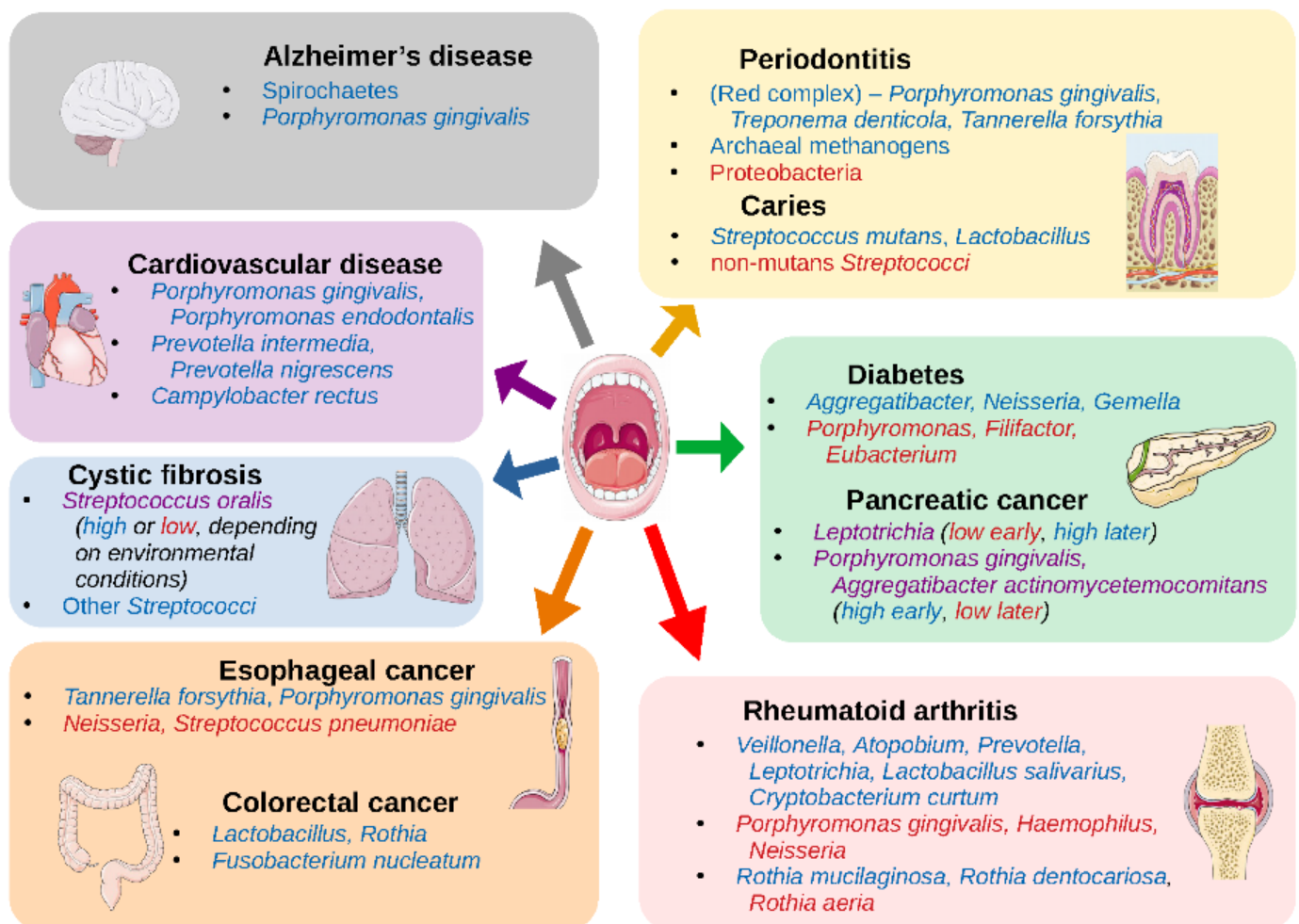


Figure 3. Disorders of the mouth and the body linked to the oral microbiota.¹⁵

The most crucial items used in the mouth for dental and cosmetic purposes are toothpaste and mouthwash. These goods are used extensively, and they are the dental products with the highest buying demand.¹⁶ In addition to being used in conjunction with the toothbrush to remove dental plaque, mature Alba, tartar, and layers built up on the teeth, toothpaste also serves to transport a specific chemical or medicinal agent to the tooth's surface for treatment or prevention.¹⁷ In addition to the mechanical methods of preventing plaque, like as brushing and flossing, mouthwashes are a significant auxiliary tool in the management of plaque above the gum line and gingivitis. The world's attention has grown to this issue in recent years due to the tendency of people to utilize herbal remedies due to side effects and overuse of chemical treatments.¹⁸ On the other hand, the World Health Organization's emphasis on the gradual substitution of natural substances for chemical ones has led various nations to invest in planning the industrial scale cultivation and mass production of medicinal plants and their use in the pharmaceutical, health, and food industries.¹⁹ Herbal medicine's ability to prevent oral and dental ailments, particularly those linked to plaque like caries, have recently come under closer examination.²⁰ Examining oral and dental care products with herbal and natural origins was the goal of this evaluation. In two databases, PubMed and Google Scholar, literature containing the terms "herbal oral care products" was searched for among published research between 2015 and 2022. We assessed all relevant review articles, original studies, case reports, and case series. The plant-based ingredients that can be found in oral and dental care products are described in the sections that follow.

1. *Syagium aromaticum*

Chinese emperors have used *Syagium aromaticum* essential oil as a breath refresher for centuries. Additionally, Avicenna utilized the oil for anaesthesia, the treatment of tooth and gum root, root canal therapy, and major dental issues. The antibacterial and analgesic effects of the eugenol compound in *Syagium aromaticum* essential oil prevent the growth of harmful bacteria without hurting healthy microorganisms.²¹ Typically, *Syagium aromaticum* are used to treat toothaches. Researchers have established that the methanolic extract of *Syagium aromaticum* inhibits the growth of gram-negative anaerobic bacteria that cause periodontal diseases. Subsequent research revealed that the extract contains compounds called kaempferol and myristin that also inhibit the growth of periodontal pathogens. Numerous studies have demonstrated the value of the antibacterial component *Syagium aromaticum* and eucalyptus extract in the treatment of periodontal disorders.²²

2. *Glycyrrhiza glabra*

In conventional medicine, *Glycyrrhiza glabra* is used to treat cancer, infections, oedema, wounds, and more. The Streptococcus mutations that cause tooth decay are inhibited by the chemicals found in *Glycyrrhiza glabra* root, which can also be found in mouthwash and toothpaste.²³

3. *Ocimum tenuiflorum*

This plant's leaves can be dried and ground into powder to be used as toothpaste because they are effective against mouth infections and ulcers. Additionally, it works well for massaging the gums and eradicating foul breath. This plant is excellent for treating gum disorders since it has an anti-inflammatory and antibacterial impact.²⁴

4. *Cyanopsis tetragonoloba*

Chewing the wood of this shrub was a common method of teeth cleaning in southern Nigeria. Tannins, flavonoids, alkaloids, and saponins are all present in these woods. According to studies, chewing sticks without toothpaste was quite effective, and those who used them typically had healthy, robust teeth that were free of dental plaque and damage. The leaves of this plant were used to treat toothaches in Nigeria and Ghana. This plant leaf extract is useful for swelling, mouth sores, and bleeding gums, and its root extract is effective for gum swelling.²⁵

5. *Aloe barbadensis miller* (Aloe Vera)

Aloe vera is a plant that thrives in a warm, arid climate and is a member of the Liliacea family, which includes roughly 360 species. Products for cosmetic and medical use are made from the jelly-like portion of the leaf. *Aloe vera* has pharmacological properties that reduce blood sugar and are anti-inflammatory, anti-arthritic, and antibacterial. 75 potentially active substances, including vitamins, enzymes, minerals, lignin sugar, salicylic acid, and amino acids, are found in *Aloe vera*. *Aloe Vera's* primary components, polysaccharides, have immunostimulatory and anti-inflammatory actions.²⁶ Numerous studies have demonstrated that an *Aloe vera* significantly reduces inflammation and can be used in conjunction with other therapies to treat gum inflammation brought on by plaque. Estrone and anthraquinones components, as well as Lupeol, salicylic acid, phenol, and Sulfur compounds, are responsible for *Aloe vera's* anti-inflammatory and antiseptic effects, respectively. *Aloe vera* gel is shown more growth-inhibitory properties than two commercial toothpastes, Colgate® and Pepsodent®, for the bacteria *Streptococcus mutans*, *Candida albicans*, *Lactobacilli*, *Enterococcus*, *Prevotella intermedia*, and *Peptostreptococcus anaerobius*.²⁷ Numerous studies have demonstrated that *Aloe vera* gel has a greater impact on Gram-positive bacteria than it does on Gram-negative bacteria. *Aloe vera* gel, silicon dioxide, and allantoin have been demonstrated

in studies to be useful in treating mouth sores and ulcers, and using this gel for three to four months reduces the quantity, length, and intensity of discomfort.²⁸ As a calming dressing during root canal therapy, *Aloe vera* gel is also utilized. *Aloe vera* gel is more effective than toothpaste at reducing oral cavity bacteria, according to research. *Aloe vera* gel is also suitable for persons with sensitive teeth because it doesn't include abrasives. *Aloe vera* gel helps treat acute mouth lesions, herpes virus lesions, and aphthous ulcers on the corner of the lips. Additionally, *Aloe vera* gel, which is highly effective and safe to ingest, can be used to clean the denture.²⁹

6. *Curcuma longa*

Turmeric can be used as mouthwash because of its anti-inflammatory, antioxidant, and antibacterial characteristics. It also protects the liver and is a disinfectant and antimutagenic. There hasn't been much of a difference in how well turmeric mouthwash performs in eliminating gingivitis compared to chlorhexidine, a well-known standard. Additionally, this mouthwash has a more tolerable flavor than chlorhexidine mouthwash, and it doesn't have any negative side effects other than a temporary yellowing of the tongue.³⁰

7. *Salvadora Persia*

Literally meaning "tooth cleaning stick," the miswak plant is one of at least 182 plant species that can be used to clean teeth. It is widely utilized and has a wide geographic distribution in the countries of India, Pakistan, Iran, Iraq, Saudi Arabia, and other places. The stem of the *Salvadora Persia* plant serves as the toothbrush stick. This plant has been used medicinally in a variety of ways, and its use has been linked to reduced microbial plaque and bleeding gums.³¹ The toothbrush plant contains vitamin C, beta-sitosterol, and gamma monoclinic Sulfur, all of which are crucial for strengthening the capillaries in the gums and have antibacterial qualities. Additionally, the toothbrush plant's calcium and fluoride salts are successful in reducing tooth decay. *Streptococcus mutans* is prevented from growing and producing acid by glucosinolates that were extracted from the toothbrush plant's stem and leaves.³² Additionally, the Herpes sepimilex virus is susceptible to the virucidal effects of the benzyl isothiocyanate found in this plant. Inflammation is reduced when this plant's mouthwash is combined with mint and yarrow. Because of the delayed effect of herbal mouthwashes, the effect of this mouthwash only becomes noticeable after five weeks.³³

8. *Matricaria chamomilla*

There are chemicals in chamomile extract that are helpful against Staphylococci and *Candida*. Chamomile extract possesses antibacterial, antiviral, and antifungal activities. Alphanisabol, one of the fundamental components of chamomile extract, has the strongest efficacy against both

gram-positive and gram-negative bacteria. Additionally, chamazoline possesses potent antibacterial properties. *Trichophyton mentagrophytis*, *T. robrum*, and *Candida albicans* are susceptible to the antifungal effects of camazolin, alphanisabol flavonoids, and ambiliferon. German chamomile's ethanol extract inhibits the growth of the polio virus and herpes virus.³⁴

9. *Echinacea angustifolia*

The Echinacea plant is used as medicine to treat conditions such as colds, coughs, gum and mouth disorders, and snake bites. Although the specific mechanism of action of this plant is unknown, consumption of it has been associated with an increase in phagocytic activity. Lipophilic portions (such as alkamides and polyesthylenes), water-soluble polysaccharides, caffeic acid derivatives (like echinacoside, chicory acid, and caffeic acid), and flavonoids are among the chemical components of Echinacea species. The immune system is stimulated by Echinacea polysaccharides, and its polyethylenes have an anti-inflammatory impact.³⁵

10. *Terminalia chebula*

Chlorhexidine cannot compare to the powerful antibacterial properties of the *Terminalia chebula* plant. The antioxidant found in this plant reduces excessive oxidation and guards against free radical damage to cells. Modern medicine and the treatment of illnesses linked to oxidative stress benefit greatly from this shown antioxidant potential. According to scientific research, these antioxidants are a safe and effective treatment for a number of oral and dental health issues, including the prevention of tooth decay and the treatment of mouth ulcers and bleeding gums. To date, no adverse effects have been observed.³⁶

Conclusion

A complementary or alternative therapy that works well for many disorders is herbal medicine. The usage of herbal medicine is very popular despite the emergence of many chemical medications. Despite some documented allergic responses and unfavorable side effects, they can still be utilized to treat illnesses. Herbal medicines can be utilized as adjuvant or alternative treatments for serious illnesses, including cancer, if there is evidence of their therapeutic effects. Some herbal remedies and natural products may function as an alternative management option to current treatments for oral conditions like caries prevention, gingivitis, periodontitis, oral burn, ulcers, and inflammation, after extraction, dry mouth, pain relief, anesthesia, intracanal medications, poorly fitting dentures, peri-implant mucositis, and peri-implantitis. It is available in a variety of forms, including toothpaste, topical treatments, mouthwashes, and local medication delivery systems. To fully comprehend their mechanisms and potential negative effects, more research is necessary.

Highlights

What Is Already Known?

Medicinal herbs have been used for centuries in various cultures for their health benefits, including oral health. Aloe vera gel is known for its soothing effects and has been traditionally used to treat mouth sores and ulcers. Turmeric has been recognized for its anti-inflammatory and antioxidant properties, commonly used as a mouthwash. Miswak (*Salvadora persica*) has been traditionally utilized for oral hygiene in many cultures, showing benefits in reducing plaque and gum bleeding. Chamomile (*Matricaria chamomilla*) has demonstrated antibacterial and antifungal activities against common oral pathogens. Echinacea is known for its immune-boosting properties and has been used to treat various ailments, including gum disorders.

What Does This Study Add?

This study highlights the efficacy of various herbal ingredients in oral care products, focusing on their antibacterial and anti-inflammatory properties. It demonstrates that aloe vera gel is more effective than commercial toothpastes in reducing oral bacteria and is safe for sensitive teeth. Turmeric mouthwash is shown to be a tolerable alternative to chlorhexidine, with fewer side effects. The study confirms miswak's effectiveness in preventing *Streptococcus mutans* growth and extends knowledge on chamomile's action against both Gram-positive and Gram-negative bacteria. Additionally, it explores Echinacea's role in enhancing phagocytic activity, suggesting its potential in improving oral health. Overall, these findings support the use of herbal ingredients in dental care.

Authors' Contributions

ESS and SHB conceived and designed the study, conducted research, and collected and organized data. ESS, SHB, SKA, MAH, and SF wrote the initial and final draft of the article and provided logistic support. All authors have critically reviewed and approved the final draft.

Consent For Publication

All authors declare their consent to publish this manuscript.

Ethics approval

not applicable

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Conflict of interests

The authors declare that they have no conflict of interest.

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