

Review Article

Role and common types of herbal medicine used for oral health in the Middle-East

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ABSTRACT

Herbal therapies are used worldwide to treat health conditions. In Middle Eastern countries, since ancient generations, herbal medicine has been used for oral health because of cultural and religious norms. Antiseptic, antibacterial, antimicrobial, antifungal, antioxidant, antiviral agents, and analgesic derived from plants are of widespread interest in dentistry. The properties of herbal medicine are used to treat toothache, gum inflammation, canker sores, halitosis, gingivitis, and periodontitis, as well as tooth decay. The popular herbs and spices used in treating dental disorders in Middle Eastern countries are cloves, miswak, thyme, green tea, peppermint, rosemary, olive oil, myrrh, anise, sesame, ginger, and garlic. Based on the available evidence from research demonstrating the antibacterial, antimicrobial, analgesic, and antiplaque effects of these herbs used in Middle Eastern countries, they could still be useful as an alternative treatment for gingivitis, periodontal diseases, or antiplaque agents. However, more clinical data is required to ascertain the benefits of herbal medicine for oral tissues and the prevention of oral diseases.

Keywords: Herbal medicine, Middle east, Antibacterial, Antimicrobial, Oral

INTRODUCTION

Oral diseases were one of the top listed global burdens, and such diseases adversely affected the quality of life. In Middle Eastern countries, the prevalence of dental disease is associated with poor dental attendance in clinics and significant health risk behaviors like tobacco use and a sedentary lifestyle.¹ Past decades have witnessed a tremendous increase in the use of, and surge in acceptance and public interest in, natural therapies, both in developing and developed countries, with these herbal remedies being available not only in drug stores but now also in food stores and supermarkets. In Middle Eastern countries, traditional suqs (markets) sell varieties of

herbs, spices, and rocks for cosmetic and medicinal purposes. Those suqs in the Arabian Peninsula explain the rich heritage of folk medicine.

Due to their accessibility, affordability, and simplicity, chewing sticks made from twigs, stems, or roots of various plant species are still used in many developing and developed countries to naturally clean teeth.² Religious and cultural factors also influence the popularity of chewing sticks in these countries. The practice dates back thousands of years in Asia, Africa, the Middle East, and the Americas. According to the world health organization (WHO), as many as 80% of the world's people depend on traditional medicine (herbal)

for their primary healthcare needs. In developed countries, 25% of medical drugs are based on herbs and their derivatives. To reduce the use and side effects of synthetic drugs, there has been a recent focus on the role of natural remedies in controlling oral health problems, especially given that a substantial proportion of dental patients practice antibiotic self-medication. Many natural remedies for dry mouth and ulcerative diseases are effective.²

However, the role of natural remedies in controlling oral diseases seems to be underestimated when compared to the treatment of other diseases like skin diseases. More research is needed to explore patients' self-perceptions and patterns of use of natural remedies. Though few studies have collected scientific evidence on their effects, the goal of this paper is to review commonly used herbal medicine and its role in dental care, as well as to gather evidence about the widespread use of medicinal herbs in dentistry practiced in Middle Eastern countries. Original and previously published data are evaluated concerning usage patterns and effectiveness in the treatment, management, and prevention of dental disorders.

LITERATURE SEARCH

On November 20, 2022, a thorough literature search was undertaken in the Pubmed and Cochrane databases using the medical subject headings (MeSH) and a combination of all relevant terms that were listed in the databases. The reference lists of the previously mentioned studies were used as a starting point for a manual search for publications through Google Scholar in order to avoid missing any potential study. In publications that covered information about herbal dental treatment and its new developments in the Middle East, we sought useful information. Date, language, participant age, and publication kind were all unrestricted.

DISCUSSION

The field of dentistry has begun to use herbal properties to treat tooth pain, gum inflammation, canker sores, and other oral health conditions. Antiseptics, antibacterials, antimicrobials, antifungals, antioxidants, antiviral agents, and analgesics derived from plants are of widespread interest in dentistry.³ These properties are used to manage gingivitis, treat halitosis, and inhibit the growth and adherence of *Streptococcus* mutants, which play a vital role in tooth decay.

Traditional use of Middle Eastern herbs in dentistry

Dental or oral disease is one of the major healthcare burdens globally. Middle Easterners have used traditional methods, including herbs, to treat oral pain and clean teeth. Recently, there has been a greatly renewed interest in the reuse of various traditional drugs in therapy, particularly for oral and dental health. The primary etiological cause of gingivitis and periodontitis is plaque.

For healthy gingival tissue, plaque clearance is necessary every day. Plaque can be mechanically removed from the tooth surface by brushing often. To remove it, toothpaste only has a very minor impact. Since gingivitis, periodontitis, and dental caries are all prevented by removing the microbiological dental plaque biofilm, a range of substances, principally antimicrobial agents, have been added to dentifrices and mouthwashes.

Numerous herbal medicines have been used in tooth cleaning by chewing sticks selected and prepared from twigs, stems, or roots of a diversity of plant species that have been used since ancient times in the Arab world. Increased sugar consumption, inadequate oral hygiene practices, and a high prevalence of smoking, all of which have a significant influence on the development of the most common oral diseases, such as dental caries, periodontal diseases, oral precancerous lesions, and cancer,⁴ are contributing factors for the burden of oral or dental disorders.

Ethnopharmacological uses of herbal species could vary due to cultural and traditional differences. Even though Middle Eastern countries share traditional factors. A study of the Jordanian elder population revealed that they mainly use traditional plants because they believe they help reduce the symptoms of many diseases and health problems, including dental care and pain. Cloves (64.5%), rosemary (37.5%), cardamom (20.5%), thyme (16.7%), and ginger (15.6%) were the most commonly used herbs and spices in dental care.⁵ A recent study from Saudi Arabia reports that patients cite 15 types of herbal remedies for the treatment of various dental diseases, with the most frequently used herbal remedies being cloves, miswak, olive oil, myrrh, and garlic.⁶ Another investigation from Saudi Arabia reported 61.8% of all participants to use herbs to relieve toothache; 82% of them use clove or clove oil, and 36% use thyme.⁷ According to Ismail et al., more than half (54%) of Saudi participants believed that medicinal herbs could help with oral and dental problems.⁸ The use of herbal medicine in Arab countries may be related to the traditional cultures present and the knowledge passed from one generation to the next that encourages the use of such medicinal herbs. Other contributing factors are the availability and simplicity of herbs, which also contributed to the increase in their use because the cost of using herbal medicine is cheaper than professional oral health care. In the Ismail et al. study, participants most frequently used cloves (41.50%), followed by miswak, myrrh, tahini, honey, mint, black coal, lemon cinnamon, and olive oil.⁸

A study reported from Iraq documented 15 medicinal species belonging to 8 families. The major reported families are *Myrtaceae*, *Fagaceae*, *Fabaceae*, *Zingiberaceae*, *Theaceae*, and *Salicaceae*, which were also recorded. As per their findings, *Syzygium aromaticum* was used by the locals for the treatment of toothache, and *Camellia sinensis* (green tea) was used for the treatment of canker sores and oral ulcers. Also, they

used *Camellia sinensis* (green tea) as a homemade mouthwash, used to treat toothache.

Miswak is predominant in Middle Eastern countries due to religious norms. It is used five times a day before every Namaz (prayer) as a religious practice. Multiple biological effects of Miswak or *S. persica* have been reported, including antibacterial, antiviral, antifungal, antibiofilm, antioxidant, and even antiulcer effects.⁹ Miswak appears to be more effective than tooth brushing at removing plaque from embrasures and effective in gingivitis, thereby improving interproximal oral health.¹⁰

The other frequently used spice for dental care is cloves. Oil of clove has antibacterial properties and is also a folk remedy for toothaches. Eugenol, an extract from the clove bud, is a natural analgesic, and after its initial sting, users claim relief from pain. Since the 19th century, eugenol has been one of many essential oil components to be used in root canal therapy, periodontal therapy, and to treat abscesses. Some evidence suggests that clove gel may reduce the pain of needle insertion in dentistry.

The antiseptic properties are found in oleoresin myrrh (*Commiphora myrrha*), which was used for healing the mouth by ancient Chinese, Egyptian, Arab, and African people. In traditional Arabic medicine, myrrh (a mixture of volatile oil, gum, and resin) is a popular herbal compound that has been commonly used to treat a variety of inflammatory conditions for centuries.¹¹ Myrrh's astringent properties help with inflammation and aphthous sore mouth, and a rinse can also help with bacteria reduction. The antimicrobial activity of myrrh against pathogens in the oral cavity has also been demonstrated.

Thyme (*Thymus spp*, *T. citriodorus*, *T. Vulgaris-Labiatae/Lamiaceae*) is another home remedy used since ancient times. It has powerful antibacterial and antioxidant properties that help to treat toothaches.¹² Additionally, it can fight bacteria that contribute to dental caries. Thymol, an essential oil component of thyme, appears to inhibit the growth of oral pathogens in the mouth and, when combined with other essential oils, may reduce dental caries.

Green tea, an important source of polyphenol antioxidants, can protect against a variety of oral diseases, including dental caries, gingivitis, periodontitis, halitosis, and oral cancer (protection and regression). Furthermore, it can reduce dentin erosion and abrasion as well as prevent oral oxidative stress and inflammation caused by cigarette smoke.¹³

Mentha piperita Linn, commonly known as peppermint, is the most commonly used medication for oral and dental health. They are used in the manufacture of oral dentifrices because they can provide overall freshness of breath while also keeping bad breath at bay. *Mentha* is used in preparations used as mouthwashes to remove

dental plaque. The aqueous extract of *Mentha piperita* L. has inhibited the initiation and promotion of oral dysplastic lesions and has been used for the treatment of inflammation of the oral mucosa.¹⁴

One of the first known medicinal plants in the Apiaceae family is anise (*Pimpinella anisum* L.). The Egyptians employed anise seeds in a variety of ways. They drank anise tea for better digestion, coughing, and headache relief, and chewed anise seeds to aid with toothaches. Anise extracts can potentially be used to treat infectious disorders and fight free radicals due to their strong antioxidant and antibacterial properties.¹⁵

Marjoram, a common Italian cooking spice, was also used to treat toothaches. Theophrastus, an Aristotelian student, noted that the Egyptians had been using marjoram to treat toothaches for hundreds of years, as early as 372-287 BC. Jews in Palestine used to immediately fill tooth cavities with marjoram oil up to 75 years ago.

According to theories, lipophilic elements of edible oils regulate the bio-adhesion procedure to the teeth and the ultrastructure of the initial oral biofilm. Sesame oil pulling is investigated in scientific studies to determine how well it treats tooth cavities, dental plaque, and bad breath. Chlorosessamone, found in sesame roots, is what gives them their antifungal properties.¹⁶ Polyunsaturated fatty acids found in sesame oil help reduce the amount of free radical damage that occurs in the oral mucosa. Sesamin, sesamol, and sesamolol are abundant in sesame oil and are essential for the detoxification process. It inhibits lipid peroxidation and has antibacterial and antioxidant properties.¹⁷

Due to their abundance of minerals and phytochemical components that are biologically active, common spices like ginger and garlic play an essential role in Arabic medicine. In Arabian medicine, ginger is regarded as an aphrodisiac.¹⁸ For generations, people have utilized garlic paste to treat their severe toothaches.

However, there was no supporting scientific data on the therapeutic efficacy and safety profile of several herbal therapies.⁶

Evidence from research studies on the use of herbs and herbal extracts in dentistry

Miswak, a chewing stick very popular in Arab culture, is obtained from the Arak tree (*Salvadora persica*) for teeth cleaning. For religious and cultural reasons, miswak use is firmly established and widespread in Saudi Arabia and most other Middle Eastern countries. The miswak extract is also commonly used in several commercially available dentifrices for its strong antiplaque and antimicrobial action.¹⁹ The miswak has been shown to have antibacterial, antifungal, antiviral, anti-cariogenic, and anti-plaque activities.²⁰⁻²² Miswak sticks' antibacterial action against oral aerobic and anaerobic bacteria was

documented by Al Lafi et al who also came to the conclusion that the extracts from miswak sticks had a growth-inhibiting impact on *Staphylococcus aureus*.²³ Miswak has also been linked in many Middle Eastern research investigations to anti-inflammatory, analgesic, and antioxidant properties. The use of a miswak immediately changes the content of saliva. The mechanical and chemical cleansing effectiveness of miswak chewing sticks has been demonstrated in numerous clinical investigations to be comparable to, and occasionally even superior to, that of the toothbrush. A study conducted in the Saudi population compared the effects of the chewing stick (miswak) and tooth brushing on plaque removal and gingival health and found that the use of the miswak resulted in significant reductions in the plaque ($p < 0.001$) and gingival ($p < 0.01$) indices.²² According to Guile et al findings from a survey of Saudi schoolchildren, the usage of miswak for teeth cleaning resulted in a low incidence of periodontal disease.²⁴ Furthermore, miswak can be employed to protect the dentin collagen matrix against the collagenase enzyme, according to a recent Saudi Arabian study. This might be because of the organic substances that have been documented in the literature, such as flavonoids, saponins, alkaloids, tannins, and others. The current finding implies that miswak might have a beneficial impact on preventing dentin caries.²⁵ Niazi et al reported that miswak mouthwash reduced plaque scores the most among orthodontic patients in a randomized controlled trial.²⁶

The miswak, mint, and yarrow extract used to make Persica are obtained from the Iranian manufacturer Poursina. Both miswak and persica have demonstrated the capacity to enhance periodontal health, lessen the build-up of pathogenic plaque, and lessen bleeding when brushing. Another Middle Eastern study revealed that one of these sticks' antibacterial activity had been tested against some oral aerobic and anaerobic bacteria, with a significant impact on *Staphylococcus aureus* growth. They recommended chewing sticks twice a day to potentially reduce the incidence of gingivitis and dental caries.²³ This was in agreement with studies that evaluated the effectiveness of Persica in reducing plaque and gingivitis.²⁷ It is advised that patients use Jaftex, a herbal mouthwash, for the chemical inhabitation of plaques, as it was the subject of another Iranian study that looked at periodontal indices.²⁸

Aloe vera green tea mouthwashes significantly decreased plaque index, gingival index, and bleeding on probing index when compared to chlorhexidine mouthwashes in a clinical investigation comparing the two herbal types of mouthwash with matrica and chlorhexidine. However, matrica mouthwash had much less of an impact on plaque index and gingival index compared to aloe vera-green tea and a chlorhexidine mouthwash ($p < 0.05$). From their findings, it has been evident that aloe vera-green tea mouthwash may be an effective mouthwash owing to its antiplaque and anti-inflammatory properties and may be

an ideal substitute for chlorhexidine.²⁹ Another RCT from Iran confirms that green tea mouthwash may be a safe and feasible adjunct treatment for inflammatory periodontal diseases and plaque control.^{30,31} In addition to that, another trial from Iran revealed that the use of peppermint mouthwash was significantly more effective than a placebo.³²

The effect of Myrrh has been investigated in some comparative studies. Al Mobireeriek et al investigated the effect of myrrh compared with chlorhexidine gluconate- and tetracycline-containing mouthwashes.³³ Myrrh suspension promotes healing and the repair of damaged tissue when used over a short period (less than 2 weeks) and in a low-concentration suspension; however, it can have harmful effects if used in excess or over a long period. In Saudi Arabia, individuals frequently utilize myrrh as an alternative medication for a variety of ailments and purposes.³⁴ Several herbal mouthwash varieties include a mouthwash blend that contains myrrh tincture among other herbal extracts that have been successfully used to treat gingivitis.^{35,36}

The effectiveness of ginger-honey mixture and rosemary on remineralization and prevention of enamel white spot lesions investigated by Shaker et al. found that ginger-honey mixture enhances remineralization of WSL and can be used for acid resistance (preventive dentistry). While rosemary oil has a low remineralizing and preventive effect.³⁷ Abdullah et al conducted a randomized control trial on sesame oil application that showed a 36.2% reduction in sensitivity compared to desensitizing toothpaste (30.5%).³⁸ It indicates that sesame oil is effective, and it can be utilized as a suitable, affordable alternative treatment option that is easily accessible in homes. Thyme oil, like other essential oils, is the most commonly used essential oil in Middle Eastern countries for oil pulling. Thyme oil, an essential oil, was employed in another study by Al Hayaza et al to treat dentinal hypersensitivity. They discovered that thyme oil and desensitizing toothpaste were both useful for treating dental hypersensitivity. Compared to desensitizing dental paste, thyme oil was found to be more efficient at reducing mild discomfort and hypersensitivity ($p < 0.001$).³⁹

Herbal agents are generally shown to have significant advantages compared to synthetic agents, which can cause long-standing complications with their chronic usage. Side effects such as taste alteration, dry mouth, and burning sensations are not considered serious in terms of health, but they may represent an aesthetic disadvantage, possibly decreasing compliance. The other interesting aspect that needs to be concentrated on in future studies is dispensing the extract as a local drug targeting the lesion, especially in the case of endodontic infections that usually remain localized. Further experimental research should be carried out to explore the extract's chemical compounds and exact nature to delineate its effectiveness in dental disorders.

Additionally, clinical trials on human subjects should be conducted to affirm the efficacy of various herbs, herbal extracts, and essential oils. Toxicological tests, however, are usually insufficient for traditional medications. Therefore, additional clinical studies are required to reduce the possibility of negative effects.

CONCLUSION

Middle East countries have various medicinal herbs with antibacterial, antimicrobial, antiplaque, and analgesic properties, according to ancestral medicinal books and healers. Based on the available evidence from research demonstrating the antibacterial, antimicrobial, analgesic, and antiplaque effects of these herbs used in Middle Eastern countries, they could still be useful as an alternative treatment for gingivitis, periodontal diseases, or antiplaque agents. However, more clinical data is required to ascertain the benefits of herbal medicine for oral tissues and the prevention of oral diseases.

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