

Folklore Usage of Meswak (*Salvadora Persica L.*) in Oral Care: A Review

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ABSTRACT

Meswak is being used as a folk medicine for a very long time for various medical condition treatments. The cultural and religious use of meswak for dental hygiene is widely spread in the geographical areas of Asia, Africa, and Middle East because of its wide distribution. The therapeutic aspects of meswak and its major role in plaque control, tooth wear, bleeding gums, and periodontal health as well as its availability and cheap cost factor could also be the important reasons for its usage. Meswak is used for oral hygiene as an alternative to various oral devices. Oral hygiene is the most remarkable factor when it involves prevention of oral diseases and oral health. Previous literature reveals that meswak has effective antimicrobial (antibacterial, antifungal, and antiviral) and pharmacological (hypoglycemic, anti-ulcer, and anti-oxidative) activities. The useful effects of meswak with respect to oral hygiene and dental health care because of its pharmacological actions. It is estimated that different natural chemical compounds that are considered good for both oral and dental hygiene are present in meswak according to several researchers. Meswak offers itself as an effective and traditional oral medicine affordable to use as oral hygiene device. The study done in this paper reveal about the usefulness of meswak for oral care.

Key words: Meswak, oral care, antimicrobial activities, pharmacological activities.

INTRODUCTION

Salvadora persica L. belonging to family Salvadoraceae is an well-branched evergreen tree or shrub, 4-6 meter tall having short trunk, white bark, aromatic roots, soft white yellowish wood leaves and smooth green leaves that are glaucous. *Salvadora persica*, or the Arak tree known in English as the "tooth brush tree" is a large, and somewhat fleshy [1, 10]. In ayurvedic system of medicines *S. persica* is reported to own potent activity for dental complaints. Meswak (also called miswak) is a chewing stick prepared from the roots or twigs of *S. persica* [19]. It is additionally referred to as Meswak tree, for the roots and twinges of this tree are used for teeth improvement since the ancient times. It is one in all the foremost unremarkably used medicative plants for oral hygiene among world Muslim community [34]. The history and therefore the use of meswak as an oral tool are used because of the biological effects of *S. persica* extracts which are reviewed by many researchers [28].

The use of meswak for oral hygiene includes a long tradition in Middle Eastern and African countries, going back many centuries [11]. Moreover, in the Middle East, the utmost common source of chewing sticks is Arak (*Salvadora persica*) [5]. Sticks of these plants are chewed usually at one end until they become frayed into a brush like appearance, which is then used to clean the teeth in a similar manner like a toothbrush. Additionally in strengthening the gums, it prevents tooth decay, eliminating toothaches and stop further increase in decay that has already set in. It creates fragrance within the mouth, eliminates bad odours, improves the sense of taste, and causes the teeth to glow and shine. The other parts of the tree have therapeutic values as corrective, liver tonic, diuretic, analgesic, anthelmintic, astringent, carminative, diuretic, and gastric [24]. Moreover, the useful effects of meswak in respect of oral hygiene and dental health are partly because of its mechanical action and pharmacological actions. It's been shown that the utilization of meswak chewing sticks might

contribute to a higher level of gingival recession [17, 18]. The study done in this paper reveal about the usefulness of meswak for oral care.

CLASSIFICATION

The term *Salvadora*, in 1749, was put forward in honour of an apothecary of Barcelona, Juan Salvadory Bosca (1598-1681), Laurent Garcin, botanist, traveller and plant collector. While as *persica* term indicates Persia and the standard author abbreviation L. is used to indicate Carl Linnaeus (1707–1778), a Swedish botanist and the father of modern taxonomy [23].

Class	: Magnoliopsida
Subclass	: Dilleniidae
Order	: Capprales
Family	: Salvadoraceae
Genus	: <i>Salvadora</i>
Species	: <i>persica</i>

Pharmacology of *S. persica*

Phytochemical constituents like alkaloids, flavonoids, tannins, phenols, saponins and various other aromatic compounds are secondary metabolites of plants that serve a defense mechanism against predation by several microorganisms, insects and other herbivores [12]. The aqueous extracts of *S. persica* contains important phytoconstituents like vitamin C, salvadorine, salvadorene, alkaloids, trimethylamine, cyanogenic glycosides, tannins, saponins, flavonoids, sterols, salts mostly as chlorides and basic alkaloids were succeeded to evaluate the chemical composition of *S. persica* [6-8, 29, 30, 33].

Anti-microbial activity of *S. persica*

Biological activity of various parts of *S. persica* recent studies have demonstrated that there is antibacterial, anti-periodontal, anti-fungal and anti-caries properties in aqueous extract of meswak. Studies have also proven oral [14] disinfectant and anti-plaque agents present in meswak. Different antimicrobial activity was performed and an in vitro study showed that the aqueous extract of *S. persica* had an inhibitory effect on the growth of *Candida albicans* that may be attributed to its high sulfate content [4].

Antibacterial activities

The meswak exhibited stronger antibacterial activity against the Gram-negative bacteria tested within the study than the Gram-positive bacteria evaluated, as proven by the pronounced differences in inhibition zones associated with the Gram-negative species *A. actinomycetemcomitans*, *P. gingivalis*, *H. influenzae*, and the Gram-positive species *S. mutans* and *L. acidophilus*. *S. persica* roots contain compounds with potent antibacterial activity against the Gram-negative bacteria with some effect against the Gram-positive bacteria [2]. Some study recommend that gram-positive bacteria are generally more sensitive to the *Salvadora persica* extracts than gram-negative might be because of the structure of membrane that the gram-positive bacteria are simpler than gram-negative ones [13].

According to [3] aqueous extract of plant inhibited microorganisms, showing greater activity on *Streptococcus* species. Methanolic extract was resisted by *L. acidophilus* and *P. aeruginosa*. At highest concentration tested (200 mg/ml); the aq. extract of meswak was more efficient than the methanolic extract but were less efficient than the positive control streptomycin and amphotericin B. Study done by [27] reveal that ethanol extract of *S. persica* showed more effective than the aqueous extract in inhibiting the *S. mutans*, *L. acidophilus*, *E. coli*, *S. aureus*, and *P. aeruginosa* microorganisms. Inhibition zone studied by [33] showed effective results against *Staphylococcus aureus* followed by *Streptococcus mutans*, *Lactobacillus acidophilus*, *E. coli* and *Pseudomonas aeruginosa* respectively. The aqueous extract exhibited antibacterial activity on *M. bovis* study done by [20].

Role of *S. persica* in dental plaque control

The extract of meswak has found its way into the dentifrices in the recent years as anti-plaque and anti-gingivitis agents [22]. It is believed that chewing of these stems facilitate salivary secretions which possibly help in oral cleaning and control of plaque [16]. In the endodontic treatment of teeth with necrotic pulps the aq. extract (10%) of *S. persica* is an effective

antimicrobial agent when utilized clinically as an irrigant [32]. An additional study compared the oral health efficacy of persica mouthwash (containing an extract of *S. persica*) with that of a placebo. Further the study reveals that the use of persica mouthwash lower carriage rate of cariogenic bacteria and improves gingival health when compared with the pretreatment values [26].

Scientific evaluation of using meswak revealed that it is at least as effective as tooth brushing for reducing plaque and gingivitis and that the antimicrobial effect of *S. persica* is beneficial for prevention of periodontal disease [35]. A clinical study was carried using patients' saliva and measuring the effect of meswak (chewing stick), meswak extract, toothbrush, and normal saline on mutans and lactobacilli by [15]. The results showed that there was a distinct reduction in *Strep. mutans* among all groups. After comparison within the group, the reduction in *Strep. mutans* was significantly greater using meswak in comparison to tooth brushing and there was no significant difference for lactobacilli reduction. The investigators concluded that meswak has an immediate antimicrobial effect. *Strep. mutans* were more susceptible to meswak antimicrobial activity than lactobacilli [9]. Persica mouthwash significantly lowers the gingival index, plaque index, and bleeding index in case group without any reported side effects according to [25].

CONCLUSION

Oral health has gained increased attention as a considerable public health concern. In several studies, medicinal plant extracts and isolated phytochemical constituents showed highly significant antimicrobial activity. *S. persica*, commonly called Meswak or Toothbrush tree, is one of the most popular medicinal plants that has proved to be effective in the prevention of tooth decay and mouth infections [31]. From the ancient meswak to the electric toothbrush, oral hygiene practices have come into daily use throughout the world being either mechanical or manual. Meswak offers itself as an effective and affordable oral hygiene device. Many researchers recommend and encourage the use of meswak as an inexpensive and effective oral hygiene tool in areas where it is customary. Its availability, low-cost, simplicity, and use have been extensively studied in regions around the world where meswak can play a significant role in the promotion of oral hygiene. The practice of using meswak regularly proves its major properties of bactericidal effect. *S. persica* and other related plants are reported to be effective against broad spectrum microbes that are imperative for the development of dental plaque. As a result, current and upcoming public health practitioners and the dental profession should become familiar with the application of meswak within its traditional customs. There is also evidence that meswak is more effective as an oral hygiene tool in buccal than lingual tooth surfaces [21].

REFERENCES

- [1]. Abhary. M, Al-Hazmi (2016). A. Antibacterial activity of Miswak (*Salvadora Persica* L.) extracts on oral hygiene. *Journal of Talibah University of Science*, 10, 513-520.
- [2]. Abier H. Sofrata, Rolf L.K. Claesson, Peter K. Lingstrom and Anders K. Gustafsson (2008). Strong Antibacterial Effect of Miswak Against Oral Microorganisms Associated With Periodontitis and Caries *Journal of Periodontology*, Volume (79)8, 1474-1479.
- [3]. Al-Bayati, F.A., Sulaiman, K.D. (2008). In vitro antimicrobial activity of *Salvadora persica* L. extracts against some isolated oral pathogens in Iraq. *Turk. J. Biol.* 32 (1), 57–62.
- [4]. Al-Bagieh, N., Idowu, A., Salako, N.O. (1994). Effect of aqueous extract of miswak on the in vitro growth of *Candida albicans*. *Microbios* 80 (323), 107–113.
- [5]. Al-lafi T, Ababneh H (1995). The effect of the extract of the Miswak (chewing sticks) used in Jordan and the Middle East on oral bacteria. *Int. Dent. J.* 45:218-222.
- [6]. Alali F, Al-Lafi T (2003). GC-MS analysis and bioactivity testing of the volatile oil from the leaves of the toothbrush tree *Salvadora persica* L. *Nat Prod Res* 17: 189-194.
- [7]. Almas K (2002). The effect of *Salvadora persica* extract (miswak) and chlorhexidine gluconate on human dentin: A SEM study. *J Contemp Dent Prac* 3: 27-35.
- [8]. Almas K, Skaug N, Ahmad I (2005). An in vitro antimicrobial comparison of miswak extract with commercially available non-alcohol mouthrinses. *Int J Dent Hyg* 3: 18-24.
- [9]. Almas K, Al-Zeid Z (2004). The immediate antimicrobial effect of a toothbrush and Miswak on cariogenic bacteria: A clinical study. *J Contemp Dent Pract*;155:105-14.37.
- [10]. Al-sohaibani. S, Murungan. K (2012). Anti-biofilm activity of *Salvadora persica* on cariogenic isolates of *Streptococcus mutans*: in vitro and molecular docking studies, *Biofouling*, 28(1), 29-38.
- [11]. Bos G (1993). The Miswak, an aspect of dental care in Islam. *Med. Hist.* 37:68-79.
- [12]. Bonjar, G.H.S., S. Aghighi and A.K. Nik, (2004). Antibacterial and antifungal survey in plants used in indigenous herbal-medicine of south east regions of Iran. *J. Biol. Sci.*, 4: 405-412.

- [13]. Ceylan, E. and D.Y.C. Fung, (2004). Antimicrobial activity of spices. J. Rap. Meth Auto Microbiol., 12: 1-55.
- [14]. Chaurasia A, Patil. R, Nagar A. (2013). Miswak in oral cavity – An update. J of oral biology & craniofacial research: 3, 98-101.
- [15]. Cushnie TP, Lamb AJ (2005). Antimicrobial activity of flavonoids. Int J Antimicrob Agents; 26:343-356.
- [16]. DrJagjit Singh Dhaliwal , DrRamandeep Singh Gambhir , DrSachinjeetKaurSodhi , DrGursanjyotShaheed , DK DrNurolainiBintiPg Haji Muhammad Kifli (2017). Herbs and their use in oral care: A Review Brunei Darussalam Journal of Health, 7(1): 5-17.
- [17]. Eid MA, Selim HA, Al-Shammery AR (1991). The relationship between chewing sticks (Miswak) and periodontal health. III. Relationship to gingival recession. Quintessence Int. 22:61-64.
- [18]. Eid MA, Selim HA (1994). A retrospective study of the relationship between miswak chewing stick and periodontal health. Egypt Dent. J. 40:589-592.
- [19]. Elvin-Lewis M (1980). Plants used for teeth cleaning throughout the world. Am. J. Preven. Med. 6:61-70.
- [20]. Fallah, M., Fallah, F., Kamalinejad, M., Malekan, M.A., Akhlaghi, Z., Esmaeili, M., (2015). The antimicrobial effect of aquatic extract of *Salvadora persica* on *Mycobacterium bovis* in vitro. Int. J. Mycobacteriology 4, 167–168.
- [21]. Gazi M, Saini T, Ashri N, Lambourne A, (1990). Meswak chewing stick versus conventional toothbrush as an oral hygiene aid. Clin. Prev. Dent. 12:19-23.
- [22]. Gupta P, Agarwal N, Anup N, Manujunath BC and Bhalla A (2012). Evaluating the anti-plaque efficacy of meswak (*Salvadora persica*) containing dentifrice: A triple blind controlled trial. J Pharm BioalliedSci; 4:282-5.
- [23]. Hilal Ahmad* and Rajagopal Ahmad and Rajagopal (2013). Biological Activities of *Salvadora persica* L. (Miswak) Med Aromat Plants, 2:4 1-5.
- [24]. Jamal Akhtar, Khalid M. Siddique, Salma Bi, Mohd Mujeeb (2011). A Review on Phytochemical and Pharmacological Investigations of Miswak (*Salvadora persica* Linn), Journal of Pharmacy And Bioallied Sciences 3(1):113-7.
- [25]. Kaur S, Abdul Jalil R, Akmar SL (2004). The immediate Term effect of chewing commercially available Meswak (*Salvadora persica*) on levels of Calcium, Chloride, Phosphate and Thiocyanate in whole saliva. Ann Dent;11:51-9.
- [26]. Khalessi AM, Pack AR, Thomson WM, Tompkins GR (2004). An in vivo study of the plaque control efficacy of Persica a commercially available herbal mouthwash containing extracts of *Salvadora persica*, Int Dent J;54:279-83.35.
- [27]. Mohammed, S.G., (2013). Comparative study of in vitro antibacterial activity of miswak extracts and different toothpastes. Am. J. Agric. Biol. Sci. 8 (1), 82–88.
- [28]. Noumi E, Snoussi M, Hajlaoui H, Valentin E, Bakhrouf A (2010). Antifungal properties of *Salvadora persica* and *Juglansregia* L. extracts against oral *Candida* strains. Eur J ClinMicrobiol Infect Dis 29: 81-88.
- [29]. Noumi E, Snoussi M, Trabelsi N, Hajlaoui H, Ksouri R, et al. (2011). Antibacterial, anticandidal and antioxidant activities of *Salvadora persica* and *Juglansregia* L. extracts. J Med Plant Res 5: 4138-4146.
- [30]. Rajesh V, Suresh P, Anil B, Brijesh K, Priyanka P (2009). *Salvadora persica* L (Tooth Brush Tree): A Review. J PR 2: 1809-1812.
- [31]. Salehi P, MomeniDanaie SH (2006). Comparison of the antibacterial effects of persica mouthwash with chlorhexidine on *Streptococcus mutans* in orthodontic patients. DARU J PharmaSci 14: 178-182.
- [32]. Salman THA, Moataz G, Shaekh AA, Osama M (2005). The antimicrobial effect of water extraction of *Salvadora persica* (Miswak) as a root canal irrigant. Dent J; 5:33-6.34.
- [33]. Sarmad Ghazi Mohammed (2013).Comparative Study of In Vitro Antibacterial Activity of Miswak Extracts and Different Toothpastes, American Journal of Agricultural and Biological Sciences 8 (1)) 82-88.
- [34]. Sher H, Al-Yemeni MN, Yahya SM, Arif HS (2010). Ethnomedicinal and ecological evaluation of *Salvadora persica* L: A threatened medicinal plant in Arabian Peninsula. J Med Plants Res 4: 1209-1215.
- [35]. Otaibi AL (2004). The Miswak (chewing stick) and oral health. Studies on oral hygiene practices of urban Saudi Arabians. Swed Dent J Suppl; 167:2-75.36.
- [36]. Almas K, Al-Zeid Z. The immediate antimicrobial effect of a toothbrush and Miswak on cariogenic bacteria: A clinical study. J Contemp Dent Pract 2004;155:105-14.
- [37]. Kaur S, Abdul Jalil R, Akmar SL. The immediate Term effect of chewing commercially available Meswak (*Salvadora persica*) on levels of Calcium, Chloride, Phosphate and Thiocyanate in whole saliva. Ann Dent 2004;11:51-9.