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Brief Study Of Salvadora Persica(*Miswak*)

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ABSTRACT : The most popular traditional source of tooth or chewing sticks is Salvadora persica, also known as arak (Arabic) and peelu (Urdu). Miswak is an Arabic name that means "tooth cleaning stick," and Salvadora persica, the plant that is usually known as a "miswak" (tooth brush), is widely distributed around the world. Salvadora persica has been used for millennia to promote oral hygiene and to improve dental health. The Salvadora persica is a big, well-branched, evergreen shrub or tree that may grow up to five meters tall and is found in the desert and dry regions of India. Miswak is a pre-Islamic practice that ancient Arabs followed to whiten and polish their teeth. Fresh leaves used in miswak are also used in traditional treatments for coughs, asthma, scurvy, rheumatism, piles, and other illnesses. The favorable effects of miswak on dental health and oral hygiene are partially a result of its mechanical action and partially a result of its pharmacological action, which includes antiplaque, analgesic, anticonvulsant, antibacterial, antimycotic, cytotoxic, antifertility, carminative, deobstrunt, diuretic, astringent, as well as use in biliousness and rheumatism.

Keywords : Antimicrobial agent, Antibacterial, Toothbrushing, Dental caries, Miswak, Salvadora persica periodontal health.

INTRODUCTION : In the dry and arid areas of India, Salvadora persica, also known as Miswak, is a large, evergreen, and well-branched shrub or tree that resembles Salvadora oleoides. It has effects that are analgesic, antibacterial, antiplaque, anticovulsant, cytotoxic, antimycoctic, deobstruent, antifertility, diuretic, carminative, and astringent. It was in use for more than 7000 years. In locations with a Muslim population, it is dominant. It is utilized throughout Southeast Asia, the Indian subcontinent, the Horn of Africa, the Arabian Peninsula, North Africa, and sections of the Sahel. The miswak is a tiny tree with thin, drooping, or glabrous branches and soft, white-yellow wood. The leaves are 3.8-6.3 by 2-3.2 cm, flaucous, fleshy, elliptic-lanceolate, or oval. Petioles are 1.3–2.2 cm long and glabrous. The flowers on the axillary terminal compound loose panicles are greenish yellow.[(1)]

One of the most prevalent oral conditions in the world is tooth decay, which continues to be a problem for emerging nations' public health. These disorders are frequently a sign of inadequate oral hygiene.. Therefore, it is crucial to prevent oral pathogens and regulate them in order to maintain proper oral hygiene.Pseudomonos aeruginosa, Staphylococcus aureus, Streptococcus pneumonia, Enterobacter cloacae, Acinotobacter baumannii, Stenotrophomonas maltophilia, and Streptococcus agalactiae are some of theopportunistic infections that are frequently isolated from theoral cavity. Several traditional medicinal plants have been demonstrated for their effectiveness in the Natural products include a diverse range of chemical structures that are responsible for their pharmacological activity, which are often caused by the interactions of the active components in a medicinal plant.[(2)]

PLANT PROFILE :

Fig no 01: Miswak Stick

Fig no 02: salvadora persica Tree

Fig no 03: S. persica fruits

Fig no 04 : *S.persica* Riped fruits

SCIENTIFIC CLASSIFICATION :

Kingdom: Plantae
Division: Magnoliphyta
Class: Magnoliopsida
Order: Brassicales

Family: Salvadoraceae
Genus: Salvadora
Species: S.persica

Table no : 01

PLANT HISTORY : Throughout the Arabian Peninsula and the larger Muslim world, miswak is recognized as a common toothpick. Fresh leaves are utilized in traditional medicine as well as in salads that people eat. Flowers are a mild stimulant and mild purgative that are tiny and aromatic. Berries can be eaten both fresh and dried and are often small or hardly noticeable. Wood is used to make charcoal and firewood. The mustard shrub is utilized as drought-resistant livestock feed in Namibia. Detergent oil is extracted from seeds. [(1)]

GEOGRAPHICAL SOURCE : A little evergreen tree native to India, the Middle East, and Africa is called the toothbrush tree (salvadora persica). The World Health Organization mentions its sticks as a natural toothbrush that is traditionally used for oral hygiene. Other names for it include mustard tree, arak, jhak, and pilu. It is commonly found on saline soils and is widely distributed in India's desert regions. The dry regions of West Asia, Egypt, Baluchistan, and India are also home to significant populations of it.[(3)]

Fig no 05 : Miswak plant

PHYTOCHEMISTRY OF S.PERSICA : The profile of S. persica's root, leaf, fruit, twig, and stem has been completed. The aqueous extract of S. persica leaves underwent phytochemical screening, which identified the presence of tannins, sterols/terpenes, flavonoids, flavone aglycone, saponins, and flavonoids.[(3)]

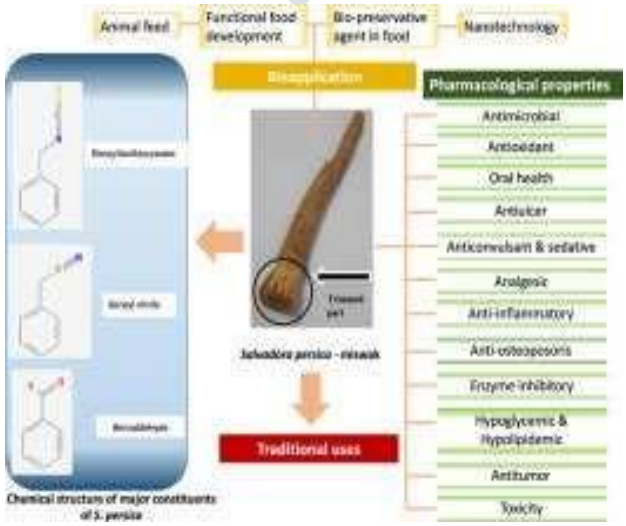


Fig no 06: Major Constituents and their Pharmacological properties

MORPHOLOGICAL CHARECTERS : *Salvadora persica* is a large shrub or small tree of Thar Deser The branches are drooping, terete and glabrous. A typical desert plant grows as a mangrove perennial tree as well as under extreme saline (salt stress) and drought conditions. Thus the seeds are dispersed by the birds. The root bark of the tree is similar to sand, and the inner surfaces are an even lighter shade of brown. It has a pleasant fragrance, of cress or mustard, as well as a warm and pungent taste. The plant produces three types of fruits, pink, purple and white. [(4)]

DISTRIBUTION : It survives under both saline and drought conditions throughout the Indian arid zone. It has high tolerance for salty soils and can tolerate as little as 200 millimetres (7.9 in) or less of mean annual rainfall, but it prefers ready access to groundwater.

Chemical Profile of *salvadora persica* :

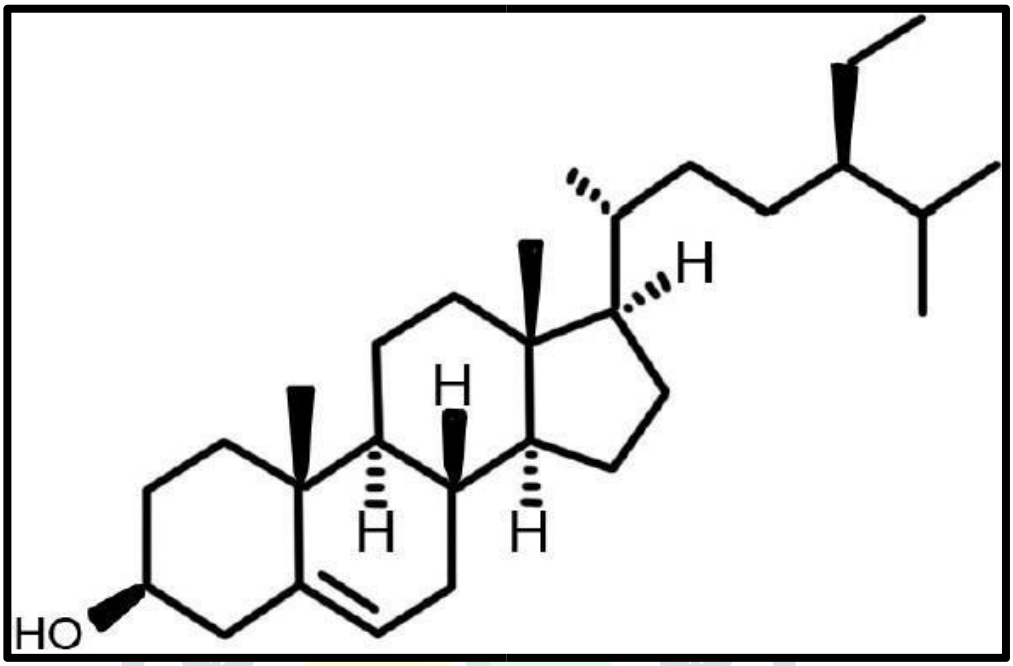


Fig no 07 : Structure of β sitosterol

When its stem was subjected to phytochemical analysis, it produced octacosanol, 1-triacantanol, -sitosterol, and -sitosterol-3-O-D-glucopyranoside. It was discovered to be a mixture of 2 chemicals after being examined using thin layer chromatography and then being separated using column chromatography. Compound A's chemical formula was C 29 H 50 O (C = 83.75%, H = 12.25%) and its melting point (m.p.) was -136-7oC and m/z = 414 (mass). Positive results were obtained for the Salkowski, Liebermann, Burchard, Noller, Brieskron, Tschagajew, and yellow color with tetranitro methane reactions. The chemical -sitosterol in white needle was identified by peaks in the infrared spectra at V max KBr 3500, 1450, 1470, and 1145 cm 1. Molecule B was identified as a white crystalline compound with the chemical formula C 35 H 60 O 6 and m.p. 265- 68 °C. m/z [α] D 29 -36.2 gave positive test for This substance was recognized as -sitosterol-3-O-D-glucopyransoside when saponin was hydrolyzed and produced -sitosterol and the sugar glucose.

The nonvolatile portion of the essential oil contains humulene, caryophyllene, - santatol, and farnesol, while the volatile fraction contained thujones, cineole, camphor, limonene, myrcene, borneol, and linalool. There were also isolated benzylamides. Butanediamide, N1, N4-bis(phenylmethyl)-2(S)-hydroxy-butanediamine, N-benzylbenzamide, N-benzyl-2-phenylacetamide, and benzyl urea were recognized as the isolated chemicals. Compound 3 demonstrated a moderate antibacterial activity against Escherichia coli and a considerable inhibitory effect on human collagen-induced platelet aggregation.[(5)]

PHARMACOLOGICAL USES :

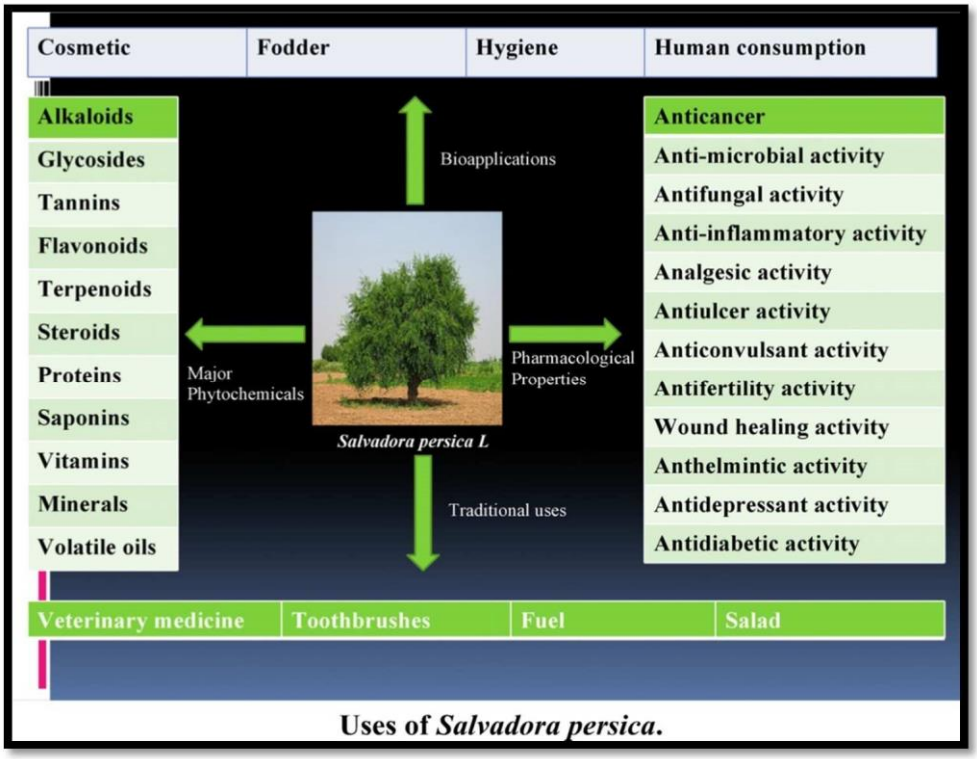


Fig no 08 : Uses and their Activity

HYPOLIPIDEMIC : In Arabic nations, Salvadora persica stems are frequently used as toothpicks, and decoctions of the plant have hypocholesterolemic effects.In diet-induced hypercholesterolemic rats, the effects of extended administration of a lyophilized stem decoction of Salvadora persica were assessed. Plasma concentrations of cholesterol, HDL, LDL, and triglycerides were measured after the medication was taken for 15 and 30 days. The Salvadora persica decoction considerably reduced the plasma levels of cholesterol and LDL in the rats, according to the data, and proved to be more effective after 30 days of treatment. Plasma cholesterol and triglyceride levels increased as a result of Triton treatment throughout the body. Results showed that Salvadora persica decoction was inert at 18 hours after treatment, but at 27 hours it was able to lower plasma levels of cholesterol and LDL; HDL and triglycerides remained unaltered in all studies.[(6),(7)]

ANTIBIOFILM PROPERTIES : Although S. persica has been shown to be effective against bacteria in a planktonic state, bacteria typically exist in a complex structure known as a biofilm. It depicts bacterial populations that are joined by a self-produced polymer network made primarily of polysaccharides, secreted proteins, and extracellular DNA that is bonded to a surface. Such intricacy is essential to the development of chronic diseases and aids in bacterial protection. Spersica has demonstrated positive antibiofilm outcomes.

ANTIFUNGAL ACTIVITY : In dentistry, fungus infections are a major concern. Fungal infections that patients have may be symptoms of a more serious systemic condition. The biological effects of S. persica extracts on various fungi infections were assessed in a number of research. Al-Bayati and Sulaiman used two distinct techniques to investigate the antibacterial properties of the S.persica chewing stick's aqueous and methanol extracts against seven isolated oral pathogens (S. aureus, Strept mutans, Strept pyogenes, E. faecalis, L acidophilus, P aeruginosa, and C albicans). Both antimicrobial assays showed that the aqueous extract was more effective than the methanol extract, which was resisted by L. acidophilus and P. aeruginosa, and inhibited all isolate bacteria. The aqueous extract demonstrated the most significant and potent antibacterial action against E. faecalis. Both extracts displayed equivalent antifungal efficacy against C. albicans, according to turbidity tests. The antimycotic and antifungal properties of miswak require more study.[(8)]

ANTIBACTERIAL ACTIVITIES : Staphylococcus aureus, Streptococcus mutans, Strept. faecalis, Strept. pyogenes, Lactobacillus acidophilus, Pseudomonas aeruginosa, Aggregatibacter actinomycetemcomitans, and Porphyromonas gingivalis are among the periodontal pathogens and cariogenic bacteria that Miswak inhibits. Staphylococcus aureus, Staphylococcus mutans, Lactobacillus acifophilus, and Pseudomonas aeruginosa were evaluated using aqueous and alcoholic extracts of S. persica, and Sher et al. observed that the aqueous extract significantly inhibited the growth of all pathogens tested with a strong inhibitory activity.

ANTIMYCOTIC ACTIVITY : Miswak aqueous extracts may be utilized to inhibit the spread of Candida albicans.When present at quantities of 15% or higher, this inhibition can last up to 36 hours.The composition of mixed saliva was examined for the short- and long-term effects of miswak using the release of calcium and chloride into saliva. They state that miswak induced considerable increases in calcium (22-fold) and chloride (6-fold), as well as significant decreases in phosphate and pH. They also state that calcium saturation of saliva inhibits calculus formation while high chloride concentrations promote demineralization of dental enamel. [(9)]

ANTIOXIDANT PROPERTIES : Bioactive components of S.persica miswak, particularly antioxidant components, are gaining popularity. Antioxidants are chemicals that, when present in foods or the body in small amounts compared to an oxidizable substrate, significantly slow down or stop that substrate from oxidizing. Ascorbic acid (vitamin C), a-tocopherol (vitamin E), glutathione, carotenoids, and flavonoids are some examples of nonenzymatic antioxidants. Enzymatic antioxidants include superoxide dismutase, peroxidase, polyphenoloxidase, and catalase. Reactive oxygen species (ROS) are thought to produce many types of oxidative damage that the body is unable to repair on its own. ROS are associated to a number of disorders, including Alzheimer's disease, cancer, cardiovascular disease, and neurological diseases. the addition of antioxidants to the diet (or other purposes) One answer to this issue that is preserved in natural plant sources is compounds. According to certain research, the anti-plaque effect of S.persica and the subsequent decrease in gingival inflammation were equally substantial in both users10 when compared to chlorhexidine. The buildup of bacterial plaque is the primary cause of gingivitis and other periodontal problems, so it is crucial to prevent plaque buildup and practice excellent oral hygiene. If a plas brush devoid of chemical components can prevent cavities, miswak has a similar effect, except that it also contains active chemicals and bitter oil. The fact that miswak is a natural product and works is crucial.[(10)]

ANTIPLAQUE, GINGIVAL AND PERIODONTAL HEATLH EFFECT :

Both clinically and experimentally, it has been found that using a S. persica chewing stick to remove plaque from buccal tooth surfaces is just as useful and effective as using a toothbrush. It was confirmed that the chewing stick looked to be at least as effective as the toothbrush at removing plaque in youngsters from Ethiopia. Additionally, when chewing sticks are utilized correctly as an oral hygiene assistance, plaque levels are much lower than when conventional toothbrushes are used. According to a recent report on oral hygiene practices, bacterial plaque plays a significant part in the etiology of dental caries, gingivitis, and periodontitis, and its proper removal can prevent or lessen the development of these diseases. Chewing sticks can help reduce gingival inflammation because they reduce plaque, which also reduces gingival inflammation. However, if used incorrectly or extensively, chewing sticks can lead to gingival irritation and occlusal tooth damage. A miswak chewed stick may also turn out to be harmful rather than helpful if it is used repeatedly in the same area of the mouth over an extended length of time. Comparing the usage of S. persica chewing sticks to a regularly used conventional toothbrush without toothpaste, gingival indices were shown to be considerably lower.[(11)]

Fig No 09 : Oral Hygiene Miswak stick

STIMULATE THE PRODUCTION OF CALCIUM AND CHLORIDE IN SALIVA:

According to a study on the effects of siwak on salivary contents over time, siwak caused considerable increases in calcium and chloride (6 times) and significant decreases in phosphate and pH. While high chloride concentrations will prevent calculus from forming, the saturation of calcium in saliva prevents demineralization and encourages remineralization of dental enamel. As a result, the teeth will be healthier, last longer, and not quickly deteriorate. Another investigation was conducted by on the impact of miswak chewing on entire saliva flow rate, pH, and levels of calcium phosphate, chloride, and thiocyanate.

The findings indicated that chewing miswak will result in higher mean flow rates of stimulated whole saliva in all groups than chewing cotton roll. This situation suggests inexorably that plants used as chewing sticks may have the capacity to release chemicals into saliva that may affect the condition of oral health (iv). Effect of dental antiplaque therapy One of the most common oral health issues is dental caries. A person's mouth develops dental plaque bacteria, which is the primary cause of the majority of these issues.

Moreover, research from his scientific team demonstrates that siwak extracts are 13.63% more efficient at preventing plaque growth than a placebo at halting some bacteria that might cause it. Moreover, a researcher from Sweden who investigated a siwak antiplaque feature discovered a 52% Plaque Index level for seasoned users. This suggests that miswak has a major impact on reducing plaque buildup on teeth.[12]

ANTICARIOGENIC EFFECTS :

According to exploration,s.persica miswak possessesanti-decay parcels, and in colorful communities in African and Arabian nations, miswak druggies have lower caries frequence than toothbrush druggies. The prevalence of caries in academy-aged children was significantly lower than it was for those who used tooth skirmishes, according to data gathered from several studies conducted across theworld.By causing the mouth to cache further slaver, the strong odour and biting impacts ameliorate its capability to cushion.[13,14]

SALVADORA PERSICA AS ORAL HYGIENE :

One's whole quality of life and well-being are significantly influenced by their oral health. Poor dental health has been linked to a number of chronic and systemic disorders.1 The prevalence of dental caries has grown globally as a result of poor oral hygiene and inadequate dental understanding. The quality of life that goes beyond the capabilities of the craniofacial complex is correlated with oral health, which is essential to overall health. However, some people have neglected oral health. The mouth is a crucial organ for digestion as well as for eating, drinking, and communicating. Teeth are crucial for breaking down food into tiny pieces so that the digestion process can be improved.[15,16]

TRADITIONAL USES :

S. persica has historically been used for a variety of things, including food, fuel, cosmetics, oral hygiene products, and not to mention medications. For instance, the leaves are prepared as a sauce and consumed as green vegetables or in salads. You may consume the fruits fresh, cooked, or dried.The wood is occasionally used to make charcoal and fuel. Additionally, it is said that the tree's resin drips may be used to make varnish. There are also reports of crushed S. persica leaves dipped in cow urine.[17]

Leaves : In eastern tropical Africa, the leaves are used as a vegetable and used to make a sauce. Tender shoots and leaves are also consumed as a salad. The bitter flavour of leaves makes them corrective, deobstruent, astringent to the intestines, tonic to the liver, diuretic, analgesic, and anthelmintic. They are also helpful for piles, scabies, leukoderma, reducing inflammation, and strengthening the teeth. They are also helpful for ozoena and other nasal problems. Given their strong flavour, leaves are used externally to treat rheumatism in the south of Bombay and Punjab as an antidote to poison of all kinds. The leaf juice is also used to treat scurvy.[18]

Fig No 10: salvadora persica leaves

Root Bark : Root bark is applied as a vesicant and as a component of snuff. The roots' decoction is used to treat gonorrhoea and vesical catarrh, and their paste is used as a replacement for mustard plaster. A half-teacupful of the bark decoction is used twice daily as a tonic for amenorrhea, as a stimulant for mild fevers, and as an emmenagogue.[19]

Fig no 11: salvadora persica fruits

Fruits: Fruits are palatable and delicious. The fruits are reportedly used to make a fermented beverage. Fruit is used to treat biliousness and rheumatism because it has deobstruent, carminative, diuretic, lithontriptic, and stomachic characteristics. Fruits are said to be effective against snake bite in Sind.[20]

Fig no 12: salvadora persica seeds

Seeds : Seeds have a bitter and pungent taste. They are applied to the skin as laxatives, diuretics and fortified seed oils for rheumatism.[20]

How to use Miswak Sick:

Cleaning your Teeth with Miswak :

- **Chew the bark off of one end of the twig :** Brushing your teeth with miswak twigs is easy and fun! If you have a "fresh" twig that is not being used, start by chewing the bark on both ends of the twig.Stop when about an inch of underlying wood is exposed. Spit it out and discard the skin.

- **Chew the center until it becomes soft and forms bristles :** Once the wood is exposed under the bark at the tip of the branch, start chewing on it. They aim to soften this wood and break it down into fine, fibrous bristles, which he takes only a minute or two. When the tip of the wood softens and spreads easily like a small brush, you're good to go. Ideally, the bristles should offer very little resistance (similar to a soft-bristle toothbrush).

- **Soak the tip in water :** Traditionally, miswak is done without toothpaste or other oral hygiene products, but they can be used if desired. Just dip the end of the toothbrush in water (just like you did before applying toothpaste to your toothbrush). Alternatively, many traditional miswak practitioners use rose water in place of regular water because of its pleasant aroma.

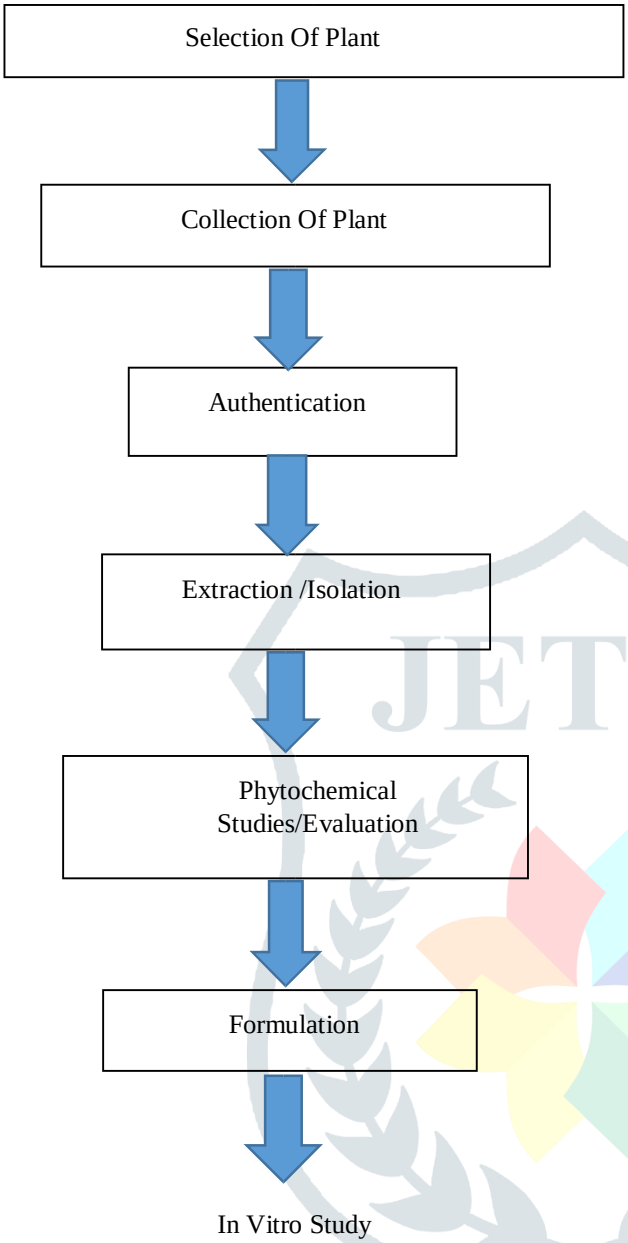
- **Hold the miswak twig with one thumb underneath :** Now you can clean it. You can grab the wand, but feel comfortable. Remember that you are brushing with the tip of the wand, not the sides like a toothbrush. Traditionally, Miswak his stick is held by placing his right thumb just below and behind the tip of the bristles, his little finger behind the stick, and his remaining three fingers wrapped around it.

- **Brush your teeth with the bristled end :** Start cleaning now! Press the bristle tip of the stick into your teeth and gently move up and down to scrub your face. Gently move it around your mouth, taking your time and tapping the bristles on each side of your teeth. Do not use too much force. The goal is to gently rub the teeth instead of scratching or grinding them. For those used to toothbrushes, the Miswak may feel a little strange at first, but after a few tries it quickly becomes intuitive. Remember to brush the back of your teeth like you would a toothbrush.

- **Cutoff old bristles every few days :** Once the old bristles have worn off, use a knife (or your bare hands) to trim or snap them off to keep your miswak sticks fresh. The average lifespan of bristles varies depending on how often you brush your teeth and the type of chopsticks you use. In general, any time the hair on the stick starts to look like an old, ragged broom, it should be trimmed. There are some notable exceptions to this rule. Some types of processed commercial miswax sticks have a shelf life of 6 months or more due to the addition of preservatives.

- **Store the twig in a dry place :** After brushing your teeth, quickly remove debris from the Miswak and rinse. Store miswak in a clean, open area, not in bags or containers that trap moisture next to the stick and can promote mold growth. Keep Miswak sticks away from sinks and toilets. [21,22]

FUTURE ASPECTS :



CONCLUSION :

Miswak is a natural toothbrush and one of the best ways to brush your teeth for oral health. Besides being valuable for a healthy body, Miswak has some unique properties such as: B. Easy to apply without expert knowledge, affordable and cost-effective. However, miswak's optimal effectiveness ultimately depends on its application method and technique.Toothbrush use is still considered expensive, so miswak is an ideal oral hygiene alternative.

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