



Salvadora persica (tooth brush tree) – A Important Tree with Multidimensional Uses

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The genus *Salvadora* belongs to family *Salvadoraceae*. This family comprises of mainly 3 genera (*Azima*, *Dobera* and *Salvadora*) with 10 species distributed in tropical and subtropical regions of Africa and Asia (Mabberley *et al.*, 2008). Among these only one genus *Salvadora* with two species *Salvadora persica* and *Salvadora oleoides* are found in Indian sub-continent (Parveen *et.al.*, 1996; Quereshi *et al.*, 1972 and Stewart *et al.*, 1972). *Salvadora persica* is known as kharajal where as *Salvadora oleoides* is commonly called as meetajal. Recently a new species *Salvadora alii* has been described from Sindh, Pakistan (Tahir *et al.*, 2010).

Salvadora persica is a drought and heat resistant tree. *Salvadora persica* can be utilized for forestry purpose as well as in horticulture plantation due to its useful fruits. It is commonly found in some districts of Rajasthan region viz. Jodhpur, Barmer, Jalore and Jaisalmer beside other parts of Indian sub-continent (Mathur *et al.*, 2002 a).

Vernacular Names- *Salvadora persica* commonly known as Miswak tress (tooth brush) and it is Arabic word which means toot cleaning stick whereas locally called as Kharajal. It is known by different names in different languages across different parts of India. In Bengali it is called as Jhal; in Marathi as Khakhin, Kickni, Miaraj, Pelu, Pilva etc.; in Gujarati as Kharijal, Piludi; in Malayalam as Uka, Ukamaram; in Telugu as Ghunia, Varagogu; and in Kannada as Goni-mara; in orriya as Kotungo, pilu etc. In Sanskrit it is known as Gudaphaa, Lakhupeelu, and Pilukaa where

as in Unani it is known by the name of Miswaak, Araak etc. It is widely named as Miswak tree which is an Arabic word meaning tooth cleaning stick. It is a popular chewing stick and is one of the most popular medicinal plants throughout the Indian sub-continent as well as in Islamic countries (Almas 2002; Al-Otaibi *et al.*, 2003; Al-Otaibi *et.al.*, 2004; Bhandari 1990; Ezmirly St *et al.*, 1979 and Softrate *et al.*, 2007).

Propagation- Conventionally *Salvadora persica* or kharajal is propagated through seeds and coppice well. Flowering in *Salvadora persica* occurs from January – April and yellow ripen fruits are available from May-June. However, seed viability in it is about 30 percent (Mathur *et al.*, 2002, a, b, 2008). Seeds exhibit no dormancy but its fruit contains inhibitors that reduce germination so it should be removed before sowing for getting better results. Normally there are about 3400 seeds per kilograms. Seeds starts germination after imbibing in water at about 30-35°C for 24-72 hours. The tree coppices fairly well and its branches are cut repeatedly to produce short stem harvested for tooth brushes (Darmani *et al.*, 2006). It regenerates freely by root suckers and natural layering. It is slow growing but in it, dense growth around plant can be seen due to root sucker's growth. It is often lopped for camel and goat fodder also.

Its seeds are orthodox therefore they should be stored with low moisture content. As its seeds contain oil therefore it cannot be stored for long time and further,

they can be infected by various insects and pathogens. It is a cross pollinated species and seeds do not produce true to mother plants and hence through tissue culture plants can be produced to get the desired characters or genotypes (**Burley 1989; Chelick and Rogers, 1990 and Mathur et.al., 2002 b**).

Micro propagation – *In-vitro* propagation of plants in an aseptic, controlled and artificial environment by using auxiliary buds, induction of adventitious buds and somatic embryogenesis is done by various workers. This technique is the result from work of **Haberlandt (1969)** and it is a better alternative for raising seedlings by vegetative propagation with conservation of space and time (**Nehra 1994**). For multiplying woody biomass and conservation of elite and rare germplasm, it is fastest method (**Bajaj 1986 and Karp 1994**). Micro propagation by nodal segments of fresh shoots sprouts originated from auxiliary buds of 35-40 years was used for invite culture of *Salvadora persica* (**Phulwaria et al., 2011**).

Cultural and Historical uses- It has a long history for its use as teeth cleaning twig and also features predominantly in Islamic hygienically jurisprudence. Its stick's use has spread from the Middle East to South and South east to Asia where it is known as Kayu sugi (Malay for chewing stick). It is also mentioned that the Islamic prophet Mohammed recommended its use in his teaching. He quoted in various Hadith extolling the twigs virtue as – Make a regular practice of Miswak for verily, it is the purification for the mouth and a means of the pleasure of the mouth and a means of pleasure of the Lord (**Al Sadhan 1999 and Louis Ronse De Craene et al., 2009**).

Traditional uses- Leaves of *Salvadora persica* are eaten as vegetable in the eastern tropical Africa and other parts. They are also used in preparation of a sauce while its tender shoots and leaves are eaten as salad. Leaves are bitter in taste, astringent to the bowels, and tonic to liver, antihelminthic, diuretic, analgesic in character and useful in treatment of nose troubles, piles, scabies, leucoderma, lessening inflammation and strengthening the teeth traditionally in various ayurvedic and other systems. In Punjab its leaves are considered as antidote to poison of all sorts and in south of Mumbai it is used as an external applicator in Rheumatism. Its leaves juice is used in scurvy treatment traditionally.

Its fruits are edible and posses deobstruent, carminative, diuretic, lithontriptic and stomachic properties and therefore used in biliousness and rheumatism. In Sind provinces of Pakistan, it is believed that its fruits are useful in snake bite treatment. Use of fermented drink made from its fruit is also reported.

Its root bark is used as a vesicant and is employed as an ingredient of snuff. Paste of its root is applied as a substitute for mustard plaster and their decoction is used against gonorrhea. It is also useful as a stimulant in low fever and as an emmenagogue. Stem bark of *Salvadora persica* is used as an ascarifuge and in gastric troubles. Its seeds have bitter and sharp taste and used as purgative, diuretic and as tonic. Its seed oil is applied on skin in rheumatism (**Atassi 2002 and Buker et al., 2004**).

Chemical Constituents- In different plant parts of *Salvadora persica* various chemicals are present which can be used for different diseases. Its leaves have trimethyl amine useful for diuretic, Analgesic, Anthelminic, Anti bacterial and antifertility activities (**Almas, 2002; Darmani et al., 2006 and Mohammed 1983**). Its stem have octacosanol, triacantanol, β sitosterol, Gluco pyranoside and Trimethylamine that may be used for hypo cholesterolemic, anti-convulsant, anti-bacterial, antimycotic, analgesic, antifertility, anti-ulcer and sedative properties (**Eid, M.A. and Selim, H.A., 1994; Galati et al., 1999; Monforte et al., 2002 and Sanogo et al., 1999**).

Its roots have chemicals like gamma monoclinic, sulphur, benzyl glucosinolate, salvadourea, M-anisic acid; sitosterol, benzyl isothio cyanate and tri methylamine etc., which may be used for antiviral, antibacterial, antimycotic, antifungal and anti-parasitic activity (**Ali et al., 2002; Al-Quran 2008; Hamza et al., 2006 and Sofrata et al., 2008**), whereas its flower have β -sitosterol and gluco pyranoside and useful as stimulant, laxative and for application in painful rheumatic conditions (**Darmani et al., 2006; Khatak et al., 2010**).

Fruits of *Salvadora persica* have N,NG-bis (Phenyl methyl)-2(s) Hydroxy butane diamine, N-Benzyl, 2-Phenyl acetamide chemicals that are useful as deobstruent, carminative, diuretic, emollient, purgative, lithon triptic and stomachic properties (**Almas 2002; Al-Mohaya et al., 2002 and Darmani et al., 2006**).

Its seed contain lauric acid, myristic and palmitic acids which have purgative, diuretic and tonic property. Even oil of *Salvadora persica* contain many chemicals viz. thujones, camphor, β -cymene, Limocene, β -myrcene, Bomeol, Linalool, Bomyl acetate and caryophyllene. These chemicals are useful for chronic arthritis and rheumatic swellings (Duhan *et al.*, 1992 and Pandey 2004).

Miswak or *Salvadora persica* showed immediate and medium-term effect on the composition of mixed saliva (Darout *et al.*, 2000). It is reported that it produces 22 folds increase in calcium and 6 folds increase in chloride along with decrease in phosphate and pH level (Almas, 2002).

It is proved scientifically that twigs of *Salvadora persica* sticks soften bristles on either end can be used to clean the teeth. A scientific study comparing use of Miswak with ordinary tooth brushed proved that proper use of Miswak twigs is better. The world health organization (WHO) recommended the use of the Miswak in 1986 and in 2000 an international consensus report on oral hygiene concludes that more research on its effect is needed.

Research is required in the field of its utility for the environment and documentation of existing *Salvadora* genus, protecting very old trees and creating general awareness so as to let grow the naturally germinated species and not to uproot them considering as weeds.

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