

Medicinal potential of some mythologically important plants of India: A Review

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Accepted 01 January 2014, Available online 25 January 2014, Vol.2 (Jan/Feb 2014 issue)

Abstract

India is full of biodiversity and has rich fauna & flora. Many plants have medicinal values. The Sacred plants are named as Kalpa-vriksha (*Adansonia Digitata*) and Chaitya-vriksha (*Ficus religiosa*) in the ancient scriptures indicating that the worship of the tree is indeed an ancient Indian practice. The Plants, trees and the other elements were always revered and several mythological rituals are connected to them. Tree worship continues to be an element of modern Indian traditions. There are many plants which are considered Sacred. For this paper, we selected the following 5 sacred plants: Sandalwood (*Santalum album*), Tulsi (*Ocimum tenuiflorum*), Amla (*Phyllanthus emblica*), Peepal (*Ficus religiosa*) and Bamboos (*Bambuseae arundinacea*). For each plant, we have listed their sacred associations, a brief description of the plant, its distribution and its medicinal values.

Keyword: Sacred plants (Sandalwood, Tulsi, Amla, Peepal and Bamboos) medicinal value, mythology

Introduction

The folklore plants reflect the real and indigenous culture of any nation. Hence folklore have been an integral part of Indian life and culture, therefore folk literature, namely folk songs, folk tales and folk proverbs of our country have profuse references to trees, shrubs, climbers and their flowers and fruits. Worship of many trees plays an important role in popular rituals and folklore. Tree worship is a very ancient practice in India. It is believed that some trees are the abodes of Gods. Some of the most commonly worshipped trees are Banyan, Peepal, Wood-apple and Neem. Many sacred species have medicinal values and are used to cure various ailments.

Many sacred species are the richest source of drugs of traditional systems of medicine and modern medicines [1] because they are very rich in secondary metabolites and oils which are of therapeutic importance. They are useful in various treatments because of their biocompatibility besides being less expensive, efficacy and availability throughout the world [2]. Rigveda says that these plants are used as a source of medicinal values is a very old concept. Then after many years, properties of plants as a source of medicine were studied in detail in Ayurveda which is considered as the foundation of all the medical sciences [3]. A detailed study shows that sacred groves have survived under a variety of ecological situations. Sacred groves are places where we find endemic species protected due to the belief that deities reside in these forests. The role of sacred groves in the conservation of biodiversity i.e. sacred plants have been described by

several scientists [4-10]. They have recorded the occurrence of sacred groves all along the Himalayas from the northeast to northwest. 'Deorali' in the Darjeeling hills, 'Lakyntang' in the Khasia and Jaintia hills in Meghalaya, 'Jankor' in Duhd and Dhelki kherias of central India, 'Jaher' in Santal tribal region, 'Sarans' in Bihar and Madhya Pradesh, 'Oran' in Rajasthan, 'Deoris' or 'Deoranis' in Maharashtra, 'Devarakadu' or 'Devaravana' in Karnataka, 'Koivalkadu' or 'Kavu' in Tamilnadu 'Sarpakavu' in Kerala are different names for sacred groves.

Several mythologically important plants are there out of which few like Sandalwood, Tulsi, Amla, Peepal and Bamboos have been described in this review.

Sandalwood (*Santalum album*)

It is a threatened species which is indigenous to South India, and grows in the Western Ghats and a few other mountain ranges like the Kalrayan and Shevaroy Hills. In Kununurra in Western Australia, Indian sandalwood (*Santalum album*) is widely grown on a large scale [11,12]. According to its morphology its drupe globose - 1.3cm diameter. Purple black, endocarp hard ribbed fruit cone lead about the size of a pea, spherical crowned by rim like the remains of perianth tube, smooth, rather flesh, nearly black, seed solitary [13]. The bark and sapwood are odorless and the roots and Heartwood contains the essential oil [14]

According to Hindu Mythology Sandalwood paste is integral to rituals and ceremonies, to mark religious

utensils and to decorate the icons of the deities. It is also distributed to the devotees, who apply it to the forehead or the neck and chest. Sandalwood essential oil was popular in medicine up to 1920-1930, mostly as a urogenital (internal) and skin (external) antiseptic. Its main component beta-santalol (~90%) has antimicrobial properties. Due to this anti-microbial activity, it can be used to clear skin from blackheads and spots, but it must always be properly diluted with carrier oil [15]. It is used in aromatherapy and to prepare soaps.

Santalum album has a variety & medicinal properties and it can be used as antiseptic, anti-inflammatory, antiphlogistic, antispasmodic, astringent, cicatrisant, carminative, bronchitis, cough, colds, sore throat, fever, liver and gallbladder problems, diarrhea, nausea, gastritis, tendency toward infection, urinary tract infections, chronic cystitis etc. [16].

It can be used as tonic for heart, stomach, liver, anti-poison, fever, memory improvement and as a blood purifier. Various uses of sandalwood was mentioned in Ayurveda system that is, in treatment of various ailments like diarrhea with bleeding intrinsic hemorrhage bleeding piles, vomiting, poisoning, coughs in the initial phase of pox, urticaria, eye infections and inflammation of umbilicus [13]. Sandalwood oil shows antifungal activity against *Microsporum canis*, *Trichophyton mentagrophytes* & *T. rubrum* in comparison to Tolnaphthate and clotrimoxazole and was not effective against *Candida albicans*, *Aspergillus niger*, *A. fumigatus* [17].

Antibacterial activities of oil & bark against gram positive bacteria like *Bacillus anthracis*, *Bacillus mycoides*, *Bacillus pumilis*, *Micrococcus glutamicus*, *Sarcina lutea*, *Staphylococcus albus*, and gram negative like *E.coli*, *Salmonella paratyphi*, *Xanthomonas campestris* and *Xanthomonas malvacearum* is reported. Moreover the aqueous extract of air dried powdered of bark in concentration of 25 to 1000 ¼ g/ml in phosphate buffer showed good inhibition against virulent species, *Staphylococcus aureus* [18,19].

Tulsi (*Osmium sanctum*)

This plants belongs to Labiate family, it is characterized by square stem and specific aroma. Two types of *Osmium sanctum* are met within cultivation: (i) Tulsi plants with green leaves known as Sri Tulsi & (ii) Tulsi plants with purple leaves known as Krishna Tulsi [20].

Ocimum sanctum L. (Tulsi) is an erect, much branched sub-shrub 30-60 cm tall, with simple opposite green or purple leaves that are strongly scented and hairy stems. Leaves have petiole and are ovate, up to 5 cm long, usually somewhat toothed. Flowers are purplish in elongate racemes in close whorls. Tulsi is native throughout the world tropics and widespread as a cultivated plant and an escaped weed. It is cultivated for religious and medicinal purposes and for its essential oil [21].

In India Tulsi is taken as the most sacred plant. Tulsi plant is most loved by Lord Vishnu and Vrinda Devi, the Goddess ruling. Tulsi is known as the personification of bhakti or devotion to the Supreme Being. The use of *Ocimum sanctum* (Tulsi) as an aromatic plant has been well documented in Ayurveda. It is found in tropical and sub tropical including India [22] i.e. from Andaman and Nicobar islands to the Himalayas up to 1800 meters above the sea level [23]. The leaves of the plant are considered to be very holy and often form a consistent part of the Hindu spiritual rituals (Tirtha or Prasada) [24]. Tulsi plant was used as demulcent, stimulant, expectorant and it is also used in the cure of upper respiratory tract infections, bronchitis, skin infections [25] and earache. It also has anti-tubercular activity and inhibits *in-vitro* growth of *Mycobacterium tuberculosis*. Leaves and seeds of Tulsi plants have been reported to reduce blood and urinary uric acid level in albino rabbits and possess diuretic property [26] where as the juice of the leaves of Tulsi leaves have been reported to show strong antifungal activities against the *Aspergillus* species [27].

Essential oil extracted from the leaves of *O. sanctum* has been found to inhibit *in-vitro* growth of *E. Coli*, *Bacillus anthracis* and *Pseudomonas aeruginosa* showing its antibacterial activity, also possess anti-fungal against *Candida species* [28] and anti-viral activity [29]. Tulsi oil is insecticidal and larvicidal in nature. The main constituents of tulsi oil are b-bisabolene (13-20%), methyl chavicol (3-19%), 1,8-cineole (9-33%), eugenol (4-9%), (E)-a-bisabolene (4-7%) and a-terpineol (1.7-7%) [30]. Urosolic acid and oleanolic acid present in the tulsi oil possess anticancer property and has the ability to protect the DNA of the body from dangerous radiations [31].

Amla (*Emblica officinalis*)

It is a small to medium sized deciduous tree which belongs to the family Euphorbiaceae and 8-18 meters height with thin light grey bark exfoliating in small thin irregular flakes, leaves are simple, light green having the appearance of pinnate leaves, flowers are greenish yellow, fruits globose, fleshy, pale yellow. It is found throughout India along the sea-coast districts and on hill slopes up to 200 meters, also cultivated in plains. Fruit contain ascorbic (65%), citric acid and vitamin C (120 mg/100 g). Also used in softening and strengthening the hair [32].

It has its beneficial role in cancer, diabetes, liver treatment, heart trouble, ulcer, anemia and various other diseases. Similarly, it has application as antioxidant, immunomodulatory, antipyretic, analgesic, cytoprotective, antitussive and gastroprotective. Additionally, it is useful in memory enhancing, ophthalmic disorders and lowering cholesterol level. It is also helpful in neutralizing snake venom and as an antimicrobial. It is often used in the form of Triphla which is an herbal formulation containing the fruits of *Emblica officinalis*, *Terminalia chebula* and *Terminalia belerica* in equal proportions [33,34,35].

Emblica officinalis polyphenols (EOP) help in induction of apoptosis in mouse and human carcinoma cell lines, inhibit DNA topoisomerase I in *Saccharomyces cerevisiae*, mutant cell cultures and the activity of cdc-25 tyrosine phosphatase [36]. *E. officinalis* has the potential to be useful in ameliorating the carcinogen induced response in rat [37]. The protection afforded by *E. officinalis* may be associated with its antioxidant capacity and through its modulatory effect on hepatic activation and detoxifying enzymes [38]. An aqueous extract of *E. officinalis* fruit protected mice against the chromosome damaging effects of the well known carcinogen 3, 4 benzopyrene [39]. The anti-mutagenic potential of water, acetone and chloroform extracts of *E. officinalis* has been evaluated on sodium azide and 4 nitro o-phenylenediamine induced his revertants in TA100 and TA97 tester strains of *Salmonella typhimurium*. The study revealed that chloroform extract was less active compared with water and acetone extracts [40].

Peepal (*Ficus religiosa*):

It is commonly known as Peepal tree and it belongs to family Moraceae. It is abundantly distributed throughout India. It is regarded as the dwelling place of the Hindu Trinity-Brahma, Vishnu and Mahesh. It has been described as the tree of creation with its roots going higher up in the sky and its branches reaching the earth down-wards. It has got mythological, religious, and medicinal importance in Indian culture since ancient times [41,42,43]. The genus Ficus, commonly known as figs, [44] and out of 600 species of Ficus, four species, viz. *Ficus racemosa* (Cluster fig), *Ficus microcarpa* (Chinese or Malayan banyan), *Ficus religiosa* (Peepal tree or sacred fig) and *Ficus benghalensis* (Banyan tree) are medicinally important [45].

Ficus religiosa is an evergreen or deciduous tree, 20 m tall and 1.5-2 m irregularly-shaped, with wide spreading branches and without aerial roots from the branches. The trunk is regularly shaped, often with low buttresses. Bark is grey with brownish specks, smooth, exfoliating in irregular rounded flakes. Leaves alternate, spirally arranged and broadly ovate, glossy, coriaceous (leathery), dark green leaves, 10-18 by 7.5-10 cm, with unusual tail-like tips, pink when young, stipulate, base-cordate. Petioles slender and 7.5- 10 cm long. Galls on leaves. Flowers axillary sessile, unisexual. Figs in pairs, rounded, flat-topped green, to 1.5 cm across, axillary, sessile, smooth, ripening to purple with red dots, basal bracts 3 and broad [46].

The plant is used locally to relieve inflammation of skin wounds, lymphadenitis, sprains, and fibrosis. It is used in the treatment of mumps, small pox, haematuria, uterine disorders, inflammatory conditions, hepatoprotective and anti-oxidant activity. Also used as carminative, astringent, vermifuge, and anti-dysentery drug, the roots are used as a medicine against hydrophobia [47].

Its fruits are effective against gastric ulcer [48], leprosy, diseases of the blood, fatigue, diabetes [49] and leucoderma, bleeding nose and cough. Its bark is helpful against asthma and possessed wound healing activity [50], anti-inflammatory, analgesic, anti-lipid- peroxidation activity [51] and anti-protozoal activity against *Entamoeba histolytica* whereas its leaves are used against bronchitis and as anti-fungal agent [52]. Stem bark is used in gonorrhoea, bleeding, paralysis, diabetes, diarrhoea, bone fracture, antiseptic, astringent and antidote [53].

Bamboos (*Bambusa arundinacea*)

It is a member of the Graminae (Poaceae) family. It is one of the fastest-growing plants on earth with reported growth rates of 100 cm (39 in) in 24 hours [54]. It is thorny tree, stems many, tufted on a stout root-stock, grows upto 30 meter high, culms 15-18 cm across, nodes prominent, the lower emitting horizontal almost naked shoots armed at the nodes with 2-3 stout recurved spines, internodes upto 45 cm long, Leaves 17.5 – 20.5 X 2-2.5 cm, linear or linear – lanceolate, tip stiff, glabrous or puberulous beneath, margins scabrous, base ciliate, mid-rib narrow, leaf-sheath ending on a thick callus and shortly bristly auricle. Inflorescence, an enormous panicles often occupying the whole stem. Caryopsis (grain) oblong 5-8 mm long, grooved on one side. Flowering and Fruiting : Once in life time, often during September – May [55,56,57,68,59].

Bamboo (*Bambusa arundinacea* Linn Graminae) consist of leaves & dried fruits [60]. Its leaves mainly contain protein, gluteline, lysine, methionine, betain, cholin, proteolytic enzyme, nuclease, urease [61]. A common bamboo found distributed throughout the moist parts of India [57].

According to Hindu Mythology the common names of Lord Krishna-Venugopal, Bansilal, Murali and Muralidhar reflect his association with Bansuri or Venu, his constant companion. Bansuri is actually a flute made of bamboo. That is the reason, bamboo is revered in India because it is associated with Lord Krishna.

Bamboos (*Bambusa arundinacea*) root (burnt root) is applied to ringworm, bleeding gums, painful joints [62]. Seeds are acrid, laxative, said to be beneficial in strangury and urinary discharges [63]. Bark is used for skin eruptions. Leaf is emmenagogue, antileprotic, febrifuge, bechic, used in haemoptysis [62]. Shoots used in serum profile of protein and oxaloacetic/pyruvic transaminase activity show the extract to be relatively non-toxic [64]. The Water-phase extract of bamboo shavings (WEBS), antimicrobial activity against *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli*, *Aspergillus niger*, *Penicillium citrinum* and *Saccharomyces cerevisiae* [65]. The combination of herbal product (methanol extract of *Bambusa arundinacea*) with modern medicine (Non-Steroidal Anti-inflammatory Agent NSAIDs) will produce the best anti-inflammatory drug and will be useful for

long-term treatment of chronic inflammatory conditions like rheumatoid arthritis with peptic ulcer [66].

Conclusion

Numerous studies have been conducted on different parts of the sacred plants. The present review literature supports the potential use of Sandalwood, Tulsi, Amla, Peepal and Bamboos plant as a medicinal plant. It provides the knowledge of history, source, physical and chemical nature of pharmacology, traditional, medicinal and therapeutic use of different sacred plants. Different parts of these plants show the antibacterial, antifungal, antioxidant, antidiabetic, antipyretic, diuretic, antitussive, antiulcer, anticonvulsant, antitumor, Immunomodulatory activities etc. These activities may be due to the different active phytochemicals like tannic acid, flavonoids, tocopherol, curcumin, ascorbate, carotenoids, polyphenols, etc.

Due to their mythological value these plants are easily available in the household and nearby vicinity. Traditional ayurveda system has explained the importance of these plants due to their medicinal values moreover they are very safe in nature. In view of the nature of these plants, more research can be done to investigate the unexplored and unexploited potential of these plants with potentially active principles of pharmacological activity and limited toxicity.

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