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### Ethnobotanical studies of some of the traditionally important medicinal plants of Punjab (India)

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#### A B S T R A C T

Plants have an immense role in the sustainability of human life and are being used since ancient times to fulfill their needs. The complex relationship between the plants, humans and cultures is studied with the help of ethnobotany. In Punjab, *Azadirachta indica*, *Ficus bengalensis*, *F. religiosa*, *Terminalia arjuna*, *T. belerica*, *T. chebula*, *Embllica officinalis*, *Bauhinia variegata*, *Cassia fistula*, *Murraya koenigii*, *Citrus limon*, *Acacia nilotica*, *A. auruculiformis*, *Mangifera indica*, *Tinospora cordifolia*, *Aegle marmelos*, *Dalbergia sisso*, *Psidium guajava*, *Ziziphus jujuba*, *Albizza lebbek*, *Morus alba* plants in various forms are used extensively for the treatment of different ailments. In this review, the role of traditionally important medicinal plants that are grown in Punjab (India) have been evaluated alongwith their use as local remedies.

### Introduction

Plants play a pivotal role in the survival and development of human civilization. These are used as food and fodder, construction of houses, making of currency, clothes and musical instruments, as medicine and cosmetics, in dyeing, textiles, rituals, have ecological roles and for introduction of genetic variations etc. However, human interference, uncontrolled urbanization, agricultural practices, grazing and deforestation are posing tremendous pressure on the local flora and thus causing environmental deterioration. The threat is so much that the indigenous knowledge of

plants and their products is in danger of disappearing, forever. It has been found that there is strong vice-versa interrelationship between plants and humans. Human activities have strong impact on plant communities with which they interact, the humans themselves are also influenced by plants [1]. Ethnobotany is defined as the study of complex relationships between plants, their uses and cultures. The focus of ethnobotany is on the multiple use of plants and their management and perception in human society.

Chemoprevention is most important as is related to the use of plants for the prevention and cure of various human diseases. Plants have been used since ancient times and on the basis of their utility, many systems of medicines have been developed. The traditional systems of medicine include ayurveda, homeopathy, siddha, unani etc. Indians rely on the ayurveda system of medicine and had been practised from 5000 years. It is officially recognized that 2500 plant species have medicinal value while over 6000 plants are estimated to be explored in traditional, folk and herbal medicine. Presently, this plant-based traditional medical systems continue to provide the primary health care to more than three-quarters of the world's populace [2]. Ethnobotanical awareness among people will reinforce the use of local remedies, measuring the sustainability of local remedies and devise methods of transferring knowledge from generation to generation [3]. The present study is based on the evaluation of general information and folk uses of some of the traditionally important trees growing in Punjab, India.

### **Medicinal uses of plants**

The ethnobotanical value of some of the plants and their medicinal uses are mentioned herewith:

#### ***Azadirachta indica* A. Juss.**

*A. indica* A. Juss. (neem) belongs to family meliaceae. It is a vital ingredient in ayurveda and regarded as sarva roga nivarini (which keeps all diseases at bay) or arishtha (reliever of disease) as per charaka samhita. The roots, bark, gum, leaves, fruit, seed kernels and seed oil are used in a number of therapeutic preparations for both internal and topical use. Neem oil and the bark and leaf extracts have been therapeutically used

as folk medicine to control leprosy, intestinal helminthiasis, respiratory disorders, malaria, constipation and also as a general health promoter. Neem is mentioned in most Ayurvedic formulations for the treatment of skin disorders because of its detoxifying properties. Its leaves are used to get relieve from dryness, itching, conditioning of hair and scalp, as excellent exfoliants that tightens pores and removes impurities when used as a mask, cure ulcers and dandruff. Flower, fruits and leaves are used for blood purification, cough, diabetes, fever, jaundice, obesity, thirst, tumors and vomiting. Its leaves are known to possess antifungal and antibacterial properties. It inhibits the growth of acne-causing bacteria such as *Propionibacterium acnes* and *Staphylococcus epidermidis*. As antifungal, it inhibits the growth of fungi *Malassezia furfur*- causal organism of dandruff. Neem oil contains fatty acid and vitamin E that gets absorbed easily into the skin, it helps to rejuvenate skin cells and restore elasticity. Bark, leaf, root, flowers and fruits together cure blood morbidity, biliary afflictions, itching, skin ulcers, burning sensations and tuberculosis [4, 5].

#### ***Ficus bengalensis*.**

*F. bengalensis* Linn. syn. *F. banyana* Oken. belongs to family moraceae. It is a large evergreen tree distributed all over India from sub Himalayan region. It is a sacred tree and plants are found to be growing near temples. It is epiphytic when young. It is considered destructive to forest trees, walls and buildings and develops in these places from the birds droppings. It is popular in indigenous system of medicine like ayurveda, siddha, unani and homeopathy. In charaka samhita, it is known as nyagrodha due to its immense medicinal value. The bark of stem and roots, aerial roots, vegetative buds, leaves, fruits and latex are

medicinally important. These plant parts are used in dysentery, diarrhoea (aqueous extract of leaf buds mixed with sugar and honey), diabetes leucorrhoea, nervous disorders, osteomalacia, as tonic and astringent. In ayurveda, the plant is known for antidiabetic properties. Aerial roots or leaf buds of Nyagrodha when processed with milk is used in hemorrhages and bleeding piles. A decoction of leaf buds and aerial roots of banyan tree mixed with honey, might be given for checking vomiting and thirst; also during fevers with burning sensation. The aerial roots are useful in obstinate vomiting and leucorrhoea and are said to be used in osteomalacia of the limbs. The leaves are good for ulcers, leprosy, allergic conditions of skin, burning sensations and abscesses. The fruits are having cooling effect and are useful in unbalanced condition of *pitta* (related to heat, metabolism and transformation of body and mind). The latex is useful in neuralgia, rheumatism, lumbago bruises, odontopathy, hemorrhoids, gonorrhoea, inflammations, cracks of the sole and skin diseases. Milky juice and seeds are beneficial as local application to sores and ulcers, soles of the feet when cracked or inflamed and in rheumatism [6].

### ***Ficus religiosa***

*F. religiosa* Linn. (moraceae) commonly known as 'Peepal tree' is a sacred tree, worshipped in many parts of India and its leaves are used for religious purpose. *F. religiosa* is a Bo tree (Bodhi tree) as Lord Buddha attained enlightenment mediating under the Peepal tree. It is medicinally important and has got reference in ayurvedic and unani system of medicine and in several ancient holy texts like Arthasastra, Puranas, Upanisads, Ramayana, Mahabharata, Bhagavadgita and Buddhist literature etc. Charaka samhita and sushrut

samhita mentioned the pharmacological properties of this plants [7, 8]. In Ayurveda, *F. religiosa* belongs to a class of drugs called rasayana. Rasayana are rejuvenators, antioxidants and relieve stress in the body [9]. It is used for the treatment of diabetes, stress, dyspepsia, abdominal pain, inflammation, jaundice, enlargement of spleen and congestive heart failure. Traditionally, the bark is used as an antibacterial, antiprotozoal, antiviral, astringent, antidiarrhoeal, in the treatment of gonorrhoea and ulcers. The leaves reported antivenom activity and regulates the menstrual cycle [10]. Leaves are used to treat skin disorders. Its tender branches are used to treat fever. Fruits are used as laxatives which promotes digestion, checks vomiting, used in paralysis and to treat fever whereas fruit powder is used to cure asthma. Its latex is used as a tonic. The roots are chewed to prevent gum diseases. Its ripe fruits are good for the foul taste, thirst and heart diseases. Its seeds have proved useful in urinary troubles, as refrigerant and as laxative. The leaves are used to treat constipation, have wound healing properties, used to cure skin disorders. People in India collect the Peepal leaves, clean, dry, and then paint with the gold acrylic in order to preserve them for years. From the bark of the Peepal tree, reddish dye is extracted. Its leaves are used to feed the camels and the elephants. When the leaves are dried they are used for the decoration purpose [7-11].

### ***Terminalia arjuna***

*T. arjuna* (Roxb.) Wight & Arn. is commonly known as arjuna and belongs to family combretaceae. The arjuna was mentioned in ayurveda by Vagbhata in seventh century, as its bark is used for the treatment for heart disease. It is traditionally prepared as a milk decoction. Its bark is used for the purposes of cardioprotection

and as relief in symptomatic hypertension. It appears to reduce blood pressure, lowers cholesterol level and pulse rate, and may increase aerobic exercise capacity. In the Ashtanga Hridayam, Vagbhata mentions arjuna in the treatment of wounds, hemorrhages and ulcers when applied topically as a powder. It has got reference for the treatment of cancer, dermatological and gynaecological complaints. It is also used as “a water pill,” and for earaches, dysentery, sexually transmitted diseases (STDs) and urinary tract infections. The leaves are fed to *Antheraea paphia* moth which produces the tassar silk (tussah). Its bark is used as tanning and dyeing material and produces light buff colour with red tint [12].

#### ***Terminalia belerica***

*T. belerica* Roxb. belongs to family combretaceae and is commonly known as bahera (hindi), beleric myrobalan (english), and bhībitaki (sanskrit). In Ayurveda, the drug is classified as an expectorant and has also got reference in unani and siddha system of medicine. It is an integral part of ayurvedic laxative formulation. Bahera is a component of triphala alongwith amla and harad. It is used in the treatment of common cold, pharyngitis and constipation. The bark is mildly diuretic and is useful in anaemia and leucoderma. The fruits are having a number of medicinal properties including ophthalmic, antipyretic, rejuvenating, astringent, antihelmintic and digestive. Unripe fruit is a mild laxative and ripe fruit is used as an astringent. Seeds are used as aphrodisiac. Oil extract from the seed pulp is used in leucoderma and alopecia. The fruit produces tannins and is used for tanning of leather, dyeing of clothes and as inks. The leaves are used as fodder. The tree is a source of good quality firewood and charcoal with calorific value of sapwood

being 5000 kcal/kg. The kernel produces a non-edible oil used in toilet soap and is good for hair [13].

#### ***Terminalia chebula***

*T. chebula* is a popular traditional medicine of family combretaceae. It is also known as chebulic myrobalan, haritaki, harad. It is known as the ‘King of Medicine’ in Tibet because of its immense healing properties. It is extensively used in unani, ayurveda and homeopathic medicine. It is used in the preparation of many ayurvedic formulations for infectious diseases such as chronic ulcers, diarrhoea, dysentery, leucorrhoea, pyorrhoea (ulcerated gums) and fungal infections of the skin. It is used for the cure of other diseases like cancer, paralysis, cardiovascular diseases, leprosy, arthritis, gout, epilepsy etc. It is an ingredient of triphala and used for the treatment of constipation. It is used to prevent aging and impart longevity, immunity and body resistance against disease development. The plant has the ability to prevent hemorrhage. It is good to increase the appetite, as digestive aid liver stimulant, as stomachic, as gastrointestinal prokinetic agent and mild laxative. It is used as a blood purifier, gargle for sore throat, and muscular rheumatism, ophthalmic (when taken with water), for skin itching and edema [14, 15].

#### ***Emblica officinalis***

*E. officinalis* known as *Phyllanthus emblica* is a member of family euphorbiaceae and is known as amla and Indian gooseberry. According to believe in ancient Indian mythology, it is the first tree to be created in the universe. The plant is mentioned as rasyana in charaka samhita and is known to prevent aging and promote longevity. It has a natural balance of five tastes i.e. sour, astringent, sweet, bitter and pungent. It is an

ingredient of triphala and number of herbal formulations. Fresh and dry fruits are extensively used as laxatives. It is richest natural source of vitamin C and the amount is more than orange and tomato. In ayurvedic texts, it is described as potent antacid. It helps in reducing all the three bodily humors (*vata*, *pitta* and *kapha*). It is having rejuvenating properties and is one of the ingredients of renowned herbal formulations, chayavanprasha. The fruits are known to possess antibacterial, antifungal and antiviral properties. Fruits are diuretic and used for the treatment of diarrhoea, ingestion, ulcers, inflammation, nausea, scurvy, fever, skin sores and wounds. The pericarp of the fruit is used in decoction alongwith other ingredients. This decoction is applied to boils and spots. The fruits are excellent antioxidants and act as potent scavengers of free radicals. Roots are used to cure dental problems. Juice of bark is used to cure gonorrhoea. Fruits are also known to prevent premature graying of hairs and makes them strong and free from dandruff. Its regular use improves immunity and protects heart, brain and other vital organs of body [16, 17].

### ***Bauhinia variegata***

Kachnar and mountain ebony are the common names of *B. variegata* of sub-family caesalpinioideae of fabaceae. In ayurveda, different parts of this tree are mentioned to be used to treat various diseases. Plant parts have anti-diabetic, anti-inflammatory, antitumor, liver protective, antibacterial, haemagglutinating, antiulcer, antitumor action and tendency to cure thyroid problems. Its bark is used in treating stomach related problems, ulcers, cyst and tumors. Its leaves are very nutritious and helpful in curing weakness and reducing sugar level in body. Leaves and flowers are used to treat diarrhoea. Its flowers, flower

buds and fruits are used as vegetables and laxative. Roots are used as antidote to snake poison. Dried buds are used for the treatment of diarrhoea, dysentery, worms, piles and tumors. Leaves have nutritive value and are used as food for the growth and development of tassar silk worms [18].

### ***Cassia fistula***

*C. fistula* Linn. (Cassia) of sub-family caesalpinioideae of family fabaceae is commonly known as amulthus, amaltas and in English popularly called "Indian Laburnum". The plant has been extensively used in ayurvedic system of medicine for various ailments. It has been reported to possess hepatoprotective, anti-inflammatory, antifungal, antibacterial and wound healing properties. It is one of the ingredients, of the preparation known as Constivac (Lupin Herbal) a bowel regulator that relieves constipation. It is also one of the ingredients of the preparations known as Pilex and Purian (Himalaya drug company) for piles and detoxifier respectively. The root is prescribed as a tonic, astringent, febrifuge and strong purgative. Extract of the root bark with alcohol can be used for backwart fever. The roots are used in chest pain, joint pain, migraine, heart disease and blood dysentery. The leaves are laxative and used externally as emollient, a poultice (used for chilblains), in insect bites, swelling, skin eruptions, ringworms, eczema, rheumatism and facial paralysis. Leaves possess antiperiodic and laxative properties, used in the treatment of jaundice, piles, rheumatism and ulcers. The leaves and bark mixed with oil are applied to pustules and insect bites. Fruits are used as cathartic and in snake bite. The extract of the root is known to lower blood sugar levels upto 30%. The fruit pulp is used for constipation, colic and urinary disorders [19].



### *Murraya koenigii*

*M. koenigii* (Linn.) Spreng., commonly known as curry leaf or kari patta in Indian dialects, belonging to family rutaceae. It is a highly value plant for its characteristic aroma and medicinal value. It is widely used as herb, spice, condiments and also used to treat various types of ailments in Indian traditional system. Leaves are an important ingredient in an Indian cuisine as it promotes appetite and digestion. *M. koenigii* is used as a stimulant, antidysentric and for the management of diabetes mellitus. The different parts of plant are used as tonic and have stomachic and carminative properties. Leaves are applied externally to bruises and eruption. The leaves and roots are bitter, acrid, cooling, anti-helminthic, analgesic, cures piles, allays heat of the body, thirst, inflammation and itching. It is also useful in leucoderma and blood disorders. An infusion of the roasted leaves is used to stop vomiting. The juice of roots is good to relieve pain of kidneys. The pastes of leaves are applied externally to treat the bites of poisonous animals. The branches of plant are very popular for cleaning the teeth and used as datun as are known to strenghten the teeth and gums [20, 21]. The plant is mentioned to have influence on the activity of heart, cholesterol reducing property, antimicrobial, antiulcer, antioxidative, cytotoxic, antidiarrhoeal and phagocytic activity alongwith many more medicinal values.

### *Citrus limon*

*C. limon* (Linn.) Burm also known as lemon is a plant of family rutaceae. It is rich in vitamin C and is a powerful medicinal plant with numerous therapeutic benefits. The plant is known for its anticatarrhal, antihypertensive, antispasmodic, diuretic, antibacterial, antiinflammatory and

antifungal properties. It is beneficial for blood circulation and is known as capillary protector and also help in lowering blood pressure. It act as blood cleanser, nerve tonic, has anti-ulceric and vermifuge properties and improves digestion. It eliminates gastric acidity and stimulates the functioning of the liver. It is also helpful in cases of flatulence and vomiting. Citrus is useful in cases of headaches, especially migraines. Lemon juice is used in topical application for healing wounds, herpes and other skin conditions. The boiled lemonade is used against colds and as sweat increaser. Lemon seeds boiled in cow milk have vermicide effect. It is effective against scurvy, regulates the nervous system, fights against depression, stress and anxiety. Lemon leaf is sedative (used to cure insomnia) and antispasmodic. The fruit rind is good remedy for lack of appetite, indigestion, constipation and typhoid fever [22].

### *Acacia nilotica*

*A. nilotica* (L.) Willd. ex Del. is also known as gum arabic tree, babul, kikkar, Egyptian thorn, or prickly *Acacia* is multipurpose nitrogen fixing tree legume. It belongs to family fabaceae. The plant is important for a variety of functions and is economically used as a source of tannins, gums, timber, fuel and fodder. Babul plant is having therapeutic ability and is used as anti-cancer, anti-tumor, astringent, anti-oxidant, natriuretic, antispasmodial, diuretic agent. It is used for the treatment of intestinal pains and diarrhoea, nerve stimulant, cold, congestion, coughs, dysentery, fever, hemorrhages, leucorrhoea, leucoderma, leprosy, ophthalmia, tuberculosis and sclerosis. Its seeds have antimalarial, antidiabetic, antihypertensive and antispasmodic activities. The leaves and pods are an excellent fodder with

antiinflammatory properties and are rich in protein. The pods have molluscicidal and algicidal properties. The bark is used extensively for colds, bronchitis, biliousness, diarrhoea, dysentery, bleeding piles and leucoderma. Roots of *A. nilotica* are used as an aphrodisiac and the flowers for treating syphilis lesions. Gum obtained from the tree is pharmaceutically used as suspending and emulsifying agent and in preparation of many formulations. Its resins repel insects and water [23, 24].

### ***Acacia auriculiformis***

*A. auriculiformis* A. Cunn. ex Benth. is an exotic species in Punjab. It is known as Australian wattle and belongs to sub-family mimosoideae and family fabaceae. The flowers of plant are a source of pollen for honey production. It is a major source of firewood. The wood is used as source of paper pulp. The bark of plant contain sufficient amount of tannin and is used as tanning and in batik textile industry [25].

### ***Mangifera indica***

*M. indica* Linn. belongs to family anacardiaceae and is distributed throughout the world. It is known as mango, aam, amra etc. The plant is cultivated for the fruits. Its charred and pulverized leaves make a plaster to remove warts. Seeds are used to treat cold and coughs, obstinate diarrhoea and bleeding piles. The bark is astringent, homeostatic and has antirheumatic properties. Its bark yields a dye that is used for coloring silk fibres. It is an important honey plant secreting large quantities of nectar [26].

### ***Tinospora cordifolia***

Guduchi or giloya (*Tinospora cordifolia* (Willd.) Miers ex Hook. F. & Thoms) is a

large, glabrous, deciduous climbing shrub belonging to the family menispermaceae. In Hindu mythology, giloya refers to the heavenly elixir that have saved celestial beings from old age and kept them eternally young. It is widely used in ayurvedic system of medicine for its general tonic, antiperiodic, anti-spasmodic, anti-inflammatory, antiarthritic, anti-allergic and anti-diabetic properties. The plant is used in ayurvedic, "Rasayanas" to improve the immune system and the body resistance against infections. The root of this plant is known for its stress relieving, anti-leprotic and anti-malarial activities [26, 27].

### ***Aegle marmelos***

The bael (*A. Marmelos*) (L.) Corr.) is another Indian plant, which has enormous traditional uses against various diseases. The plant belongs to family rutaceae. It is generally considered as sacred tree by the Hindus, as its leaves are offered to Lord Shiva during worship. The different parts of bael are used for various therapeutic purposes, such as for the treatment of asthma, anaemia, fractures, healing of wounds, swollen joints, high blood pressure, jaundice, diarrhoea, and brain typhoid troubles during pregnancy. It has been used as a herbal medicine for the management of diabetes mellitus. The ripe fruit is a good and simple cure for dyspepsia. The oil obtained from unripe fruits is said to be useful in removing the peculiar burning sensation in the soles. The roots and the bark of the tree are used in the treatment of fever. The leaf part of the plants have been claimed to be used for the treatment of inflammation, asthma, hypoglycemia, febrifuge, hepatitis and analgesic. Fruit of the plant is used for intestinal tonic, chronic constipation and dysentery; some forms of indigestion, debility, cholera, hemorrhoids, intermittent fever and for heart palpitation [28].

### ***Dalbergia sisso***

*D. sissoo* DC is commonly known as shisham and belongs to family fabaceae. The plant has got reference in ayurveda. Leaf juice is used for eye ailments. The wood and bark is having abortifacient, antihelminthic, antipyretic, aphrodisiac, expectorant and refrigerant properties. The wood and bark is also used for anal disorders, blood diseases, burning sensations, dysentery, dyspepsia, leucoderma, and skin ailments. Herbal preparation of *D. sissoo* and *Datura stramonium* with cow urine can be used as a potent antiseptic preparation for the prevention and treatment of chronic bacterial infections [29].

### ***Psidium guajava***

*Psidium guajava* Linn. is a small medicinal tree and is popularly known as guava (family myrtaceae) and has been used traditionally as a medicinal plant throughout the world for a number of ailments. Guava leaf extract has analgesic, anti-inflammatory, antimicrobial, hepatoprotective and antioxidant activities. *P. guajava* is mainly known for its antispasmodic and antimicrobial properties in the treatment of diarrhoea and dysentery. Its pulp reduces the body weight, glycemia and cholesterol levels [30].

### ***Ziziphus jujuba***

*Z. jujuba* Mill, a member of the family rhamnaceae, commonly known as beri. According to ayurveda, the root of *Z. nummularia* is bitter and cooling, and cures coughs, biliousness and headache. The bark cures boils and is good for the treatment of dysentery and diarrhoea. The leaves are antipyretic and reduce obesity. The fruit is cooling, digestible, tonic, aphrodisiac, laxative and removes biliousness, burning

sensations, thirst, vomiting and is also good in treating tuberculosis and blood diseases. The seeds cure eye diseases and are also useful in leucorrhoea [31].

### ***Albizia lebbek***

*A. lebbeck* Linn. belongs to family fabaceae. It is used in Indian folk medicine to treat several inflammatory pathologies such as asthma, arthritis and burns. It is reported to be useful in treatment of Alzheimer's and Parkinson's diseases. The flowers are being commonly used to treat anxiety, depression and insomnia in traditional system of medicine [32].

### ***Morus alba***

*Morus alba* Linn., a popular medicinal plant belongs to family moraceae, has long been used commonly in Ayurvedic and many of traditional systems of medicine. The plant is widely used for the treatment of asthma, cough, bronchitis, edema, insomnia, wound healing, diabetes, influenza, eye infections and nosebleeds. Traditionally, the mulberry fruit has been used as a medicinal agent to nourish the blood, benefit the kidneys and treat weakness, fatigue, anemia and premature graying of hair. It is also used to treat urinary incontinence, dizziness and constipation in the elderly patient. It has been used in the indigenous system of medicine for cooling, acrid, purgative, diuretic, laxative, anthelmintic, brain tonic, antibacterial, hepatopathy properties. They are useful in vitiated condition of *vata* and *pitta*, burning sensation [33].

### **Conclusion**

Medicinal plants have been used since prehistoric period for the cure of various diseases. Nearly about 80% of the world's populations still depend upon traditional remedies together with folklore system



mainly based on phytotherapy. Since these are in common use by the local people and are of great importance that's why a lot of people are engaged in the trade of important medicinal herbs throughout the world. Especially, people living in villages have been using indigenous plants as medicines. In certain parts of country, these potential sources of drugs are overexploited and might led to the extinction of important plants. However, advancement of modern drug development sometimes tend to make people adopt faster healing procedures ignoring the rich ayurvedic heritage of our country. In such situations, it is necessary to generate ethnobotanical awareness among people alongwith sensible use of these exhaustive resources for healthy life.

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