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#### Wungsem Rungsong

National Research Institute of  
Ayurvedic Drug Development,  
Department of AYUSH, 4-CN Block,  
Sector-V, Salt Lake, Kolkata-91.

#### Sreya Dutta

National Research Institute of  
Ayurvedic Drug Development,  
Department of AYUSH, 4-CN Block,  
Sector-V, Salt Lake, Kolkata-91.

#### Debajyoti Das

National Research Institute of  
Ayurvedic Drug Development,  
Department of AYUSH, 4-CN Block,  
Sector-V, Salt Lake, Kolkata-91.

#### Jayram Hazra

National Research Institute of  
Ayurvedic Drug Development,  
Department of AYUSH, 4-CN Block,  
Sector-V, Salt Lake, Kolkata-91.

#### Correspondence:

##### Wungsem Rungsong,

National Research Institute of  
Ayurvedic Drug Development,  
Department of AYUSH, 4-CN Block,  
Sector-V, Salt Lake, Kolkata-91.

E-mail: [asemosem@yahoo.com](mailto:asemosem@yahoo.com)

## A brief review on the Botanical Aspects and Therapeutic Potentials of Important Indian Medicinal Plants

Wungsem Rungsong, Sreya Dutta, Debajyoti Das, Jayram Hazra

### ABSTRACT

Medicinal plants have been used in virtually all cultures as a source of medicine since time immemorial. World Health Organization also currently encourages, recommends and promotes traditional herbal medicines in national health care programmes as such drugs are easily available at low cost and inherently safer than the potent synthetic drugs. The safety, quality and efficacy of medicinal plants are, therefore, required to be addressed through interdisciplinary research. Medicinal plant species which are endangered or rare should be identified and conserved through the coordinated effort of *in situ* and *ex situ* strategies. The wild medicinal plants should be explored to bring them under cultivation. The Indian subcontinent is a vast repository of medicinal plants. It is estimated that a total of over 7500 species of plants are used as medicines by several ethnic communities of India.

**Keywords:** Medicinal Plants, Health Care, Therapeutic Value, Market Potential.

### 1. Introduction

Medicinal plants have been used in virtually all cultures as a source of medicine since time immemorial<sup>[1]</sup>. Its use as a normative basis for the maintenance of good health has been widely observed in developing countries<sup>[2]</sup>. In this context, attempts have been made by the World Health Organization to identify all the medicinal plants used globally and listed more than 20000 species<sup>[3]</sup>. The use of plants as medicines has been an important component of the health care system in India. In India, the reference to the curative properties of some herbs in the Rigveda seems to be the earliest record of the use of plants as medicines<sup>[4, 5]</sup>. The Indian subcontinent is a vast repository of medicinal plants. There are about 45000 plant species in India, with concentrated hotspots in the regions of Eastern Himalayas, Western Ghats and Andaman & Nicobar Islands. It is estimated that a total of over 7500 species of plants are used as medicines by several ethnic communities of India. So, it is imperative that the important medicinal plants are recognized to boost their market potentialities in India, and thereby the share of India in the world herbal trade<sup>[6, 7, 8, 9]</sup>.

### 2. Materials and Methods

The most important medicinal plants of India, which too have good market potential, are briefly described below by dwelling upon their distinguishing features, part/s used as medicine and therapeutic values:

#### 2.1 Tulasi (Eng: Holy Basil; Fam: Labiatae/Lamiaceae)

*Ocimum sanctum* Linn., (Syn. *Ocimum tenuiflorum* L.) also known as 'The Mother Medicine of Nature' and 'The Queen of Herbs', is an erect, bushy, strongly aromatic herb with hairy stem. Leaves are opposite, elliptic-oblong, margins entire or slightly toothed, pubescent on both sides, dotted with minute glands, strongly scented; flowers small, purplish or reddish, borne in verticillaster inflorescence; **fruits** ellipsoid **nutlets**; seeds globose to sub-globose ,

Slightly compressed, pale brown to reddish brown with black markings. Different parts of the plant, especially leaves and seeds, possess therapeutic potentials <sup>[10,11,12]</sup>. Medicinal Use: Common cold and cough, fever, respiratory disorders, bronchitis, skin diseases, gastric disorders, diabetes, dysentery, headache, convulsion, earache, sore throat, chest trouble, dyspepsia, antifertility in women, antidote for scorpion sting and dog, snake and insect bites. Antibacterial, anticancer, antiasthmatic, anti-tuberculosis, antiemetic and diaphoretic in malarial fever <sup>[11, 13, 14, 15, 16, 17]</sup>.

## 2.2 Haridra (Eng: Turmeric; Fam: Zingiberaceae)

*Curcuma longa* Linn. is a robust, tropical, perennial herb with a central or main thickened rhizome (bulb) bearing a number of cylindrical primary, secondary or even tertiary rhizomes (fingers). The thick, short stem sends up tufts of large, broad, lanceolate, bright green leaves with long leaf stalks and acuminate apices. The flowers are pale yellow borne in a dense but short spike terminating the stem. Rhizome of the plant has medicinal value <sup>[12, 18, 19, 20]</sup>. Medicinal Use: Flatulence, dyspepsia, peptic ulcers, rheumatoid arthritis, allergy, amenorrhoea, diarrhoea, epilepsy, skin diseases, asthma, cough, haemorrhage, blood purifier <sup>[20, 21, 22, 23, 24]</sup>.

## 2.3 Sarpagandha (Eng: Rauwolfia/Indian Snakeroot; Fam: Apocynaceae)

*Rauwolfia serpentina* (Linn.) Benth. ex Kurz is an upright, perennating, evergreen, glabrous undershrub with tuberous roots, and is popularly known as India's wonder drug plant. Leaves simple, glabrous, lanceolate or obovate and generally in whorls of three to four, crowding the upper part of the stem; flowers white or violet-tinged and borne on corymbose cymes; fruit tiny, oval, fleshy which turns shiny purple-black when ripe. The roots of the plant are mainly used for medicinal purposes. The root bark is greenish-yellow to brown and displays irregular longitudinal fissures <sup>[10, 11, 19]</sup>. Medicinal Use: Insomnia, hypertension, insanity, epilepsy, hysteria, constipation, schizophrenia, intestinal disorders, cardiac and liver diseases. Anthelmintic, tranquilizer, antidote against the bites of snakes and venomous reptiles <sup>[11, 24, 26, 27, 41]</sup>.

## 2.4 Kumari (Eng: Aloe vera/True Aloe; Fam: Liliaceae)

*Aloe vera* (L.) Burm. (syn. *A. barbadensis* Miller) is a perennial, stemless, succulent plant with turgid green leaves joined at the stem in a rosette pattern. It has pale green, triangular, fleshy, serrated and spiky leaves tapering to a blunt point, yellow tubular flowers and fruits containing numerous seeds. The part that is used medicinally is its leaves. The parenchyma cells of the leaves contain a transparent mucilaginous gel called Aloe vera gel <sup>[11, 12, 18]</sup>. Medicinal Use: Gynaecological and gastrointestinal problems, minor wounds, skin diseases, blisters, burns including sunburns, ulcer, cooling of head, lowering blood sugar and lipid levels in diabetic and cardiac patients, prevention of hair loss and dandruff. The gel is further used in the cosmetic industry as a hydrating ingredient in creams like anti-wrinkle creams and moisturizers, sun lotions, shaving creams, lip balms, healing ointments, face packs, etc. <sup>[11, 24, 28, 29, 30]</sup>.

## 2.5 Guggulu (Eng: Indian Bedellium Tree; Fam: Burseraceae)

*Commiphora wightii* (Arn.) Bhandari is a much-branched shrub or small tree, characterized by thick main stem covered with silvery white, thin papery bark that comes off in rough flakes, exposing the

greenish underbark which also peels off in thin papery rolls. Branches crooked, knotty ending in sharp spines; leaves 1-3 foliate, leaflets subsessile, terminal ones the largest, rhomboid to ovate, irregularly toothed; flowers small, brownish pinkish, fascicled; fruit red when ripe, ovoid, acute, with 2-celled stone, rarely 4-valved. The guggul gum (oleo-resin) obtained from the trunk and a thick branch is used in medicine <sup>[10,12,31]</sup>. Medicinal Use: Hypolipidemia, hypercholesteremia, atherosclerosis, rheumatic conditions, arthritis, paralysis, cough, sore throat, menopausal symptoms, diarrhoea, fatigue, headache, jaundice, cancer, skin diseases and burns <sup>[11, 32, 33, 34, 35, 36]</sup>.

## 2.6 Brahmi (Eng: Thyme-leaved gratiola; Fam: Scrophulariaceae)

*Bacopa monnieri* (L.) Penn. is a small, glabrous, creeping, somewhat succulent herb with numerous branches. It has succulent, soft, hairy stem; relatively thick, small, simple, sessile, oval-shaped leaves and light purple flowers on long pedicles in the leaf axils. The entire plant is used medicinally <sup>[11, 20, 32]</sup>. Medicinal Use: Epilepsy, insomnia and skin disorders. Stomachic, digestive, antiepileptic, diuretic, antipyretic and analgesic. A good revitalizing herb for the nerve and brain cells, and a potent tonic to enhance memory power and respiratory function in cases of bronchoconstriction <sup>[11, 37, 38, 39]</sup>.

## 2.7 Aswagandha (Eng: Winter Cherry/Indian Ginseng; Fam: Solanaceae)

*Withania somnifera* (L.) Dunal is an evergreen, erect, tomentose, branching shrub. The plant has long, brown, tuberous roots which are widely used in medicine. Leaves simple, ovate, glabrous; flowers greenish or lurid yellow, small, borne together in axillary, umbellate cymes; fruits globose berries, orange red; seeds yellow, reniform <sup>[12, 18, 40]</sup>. Medicinal Use: Anxiety and depression, ulcer, scabies, cardiovascular protection, hypothyroidism, bronchitis, insomnia, leprosy and arthritis. Slows the ageing process, increases immunity, potent aphrodisiac, tranquilizing narcotic and a general tonic to boost energy <sup>[11, 32, 41, 42, 43, 75]</sup>.

## 2.8 Amlaki (Eng: Gooseberry; Fam: Euphorbiaceae)

*Emblica officinalis* Gaertn. (Syn. *Phyllanthus emblica* L.) is a small- or moderate-sized tree with crooked trunk and spreading branches. The branchlets are glabrous or finely pubescent; leaves simple, subsessile, feathery, linear-oblong, light green resembling pinnate leaves, and closely set along the branchlets; flowers greenish yellow borne in axillary fascicles; fruit a berry, nearly globular, fleshy, juicy, acidic, yellowish-green, smooth, obscurely six-lobed. The fruit is known for its varied medicinal properties <sup>[12, 16, 18]</sup>. Medicinal Use: Anaemia, dyspepsia, cancer, hyperacidity, diabetes, jaundice, heart and eye ailments, common cough and cold, scurvy, flatulence, hemorrhage, diarrhoea, dysentery, respiratory and skin problems. Rejuvenative, cardioprotective, stomachic, digestive, immunity booster, liver and brain tonic <sup>[11, 16, 44, 45]</sup>.

## 2.9 Asoka (Eng: Ashoka Tree; Fam: Caesalpiniaceae)

*Saraca asoca* (Roxb.) De Willd. (Syn. *S. indica* Roxb.) is a medium-sized, evergreen tree with numerous spreading and drooping branches bearing deep green leaves in dense clusters. Leaves copper red when young and deep green when mature, alternate, paripinnate, oblong-lanceolate, base rounded or cuneate,

petiole short; flowers borne in short laterally placed corymbose, fragrant, yellowish orange turning scarlet before wilting; pods flat, leathery, black, tapering at both ends, containing 4-8 seeds; seeds ellipsoid-oblong, compressed. Stem bark and flower used in medicine. The stem bark is dark brown to grey or almost black with warty surface, often marked by bluish and ash white patches of lichens <sup>[10, 12, 31]</sup>. Medicinal Use: Gynecological and menstrual disorders, pruritus, dyspepsia, fever, diabetes, paralysis, hemiplegia, visceral numbness, bone fracture, blood disease, tumour and piles <sup>[11, 40, 46, 47, 48]</sup>.

### 2.10 Ativisa (Eng: Aconites; Fam: Ranunculaceae)

*Aconitum heterophyllum* Wall. is an erect, perennial, tuberous herb growing up to 1 m in height. Stem erect, simple or branched at times; leaves heteromorphic, simple, glabrous, ovate or orbicular-cordate, more or less 5-lobed, shortly petioled or sessile; inflorescence a slender raceme or a lax, leafy panicle; flowers large, hooded, more or less blue or violet, rarely whitish; fruits follicles, linear-oblong; seeds obpyramidal, blackish brown, angles acute or more or less winged. The roots are tuberous, paired, conical at ends, bark thin, whitish or grey, smooth with a bitter taste, and used in medicine <sup>[10, 12, 46]</sup>. Medicinal Use: Diarrhoea, dyspepsia, diabetes, gastroenteritis, vomiting, fever, cough, stomachache, diseases of nervous system, scorpion or snake bite. Anthelmintic, antiperiodic, aphrodisiac, anti-inflammatory and diuretic. This is, however, a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner <sup>[11, 25, 34, 49, 50]</sup>.

### 2.11 Vidanga (Eng: Embelia/False Black Pepper; Fam: Myrsinaceae)

*Embelia ribes* Burm. f. is a large, scandant shrub with whitish grey stem and long, slender, flexible, terete branches. The roots are brownish grey with hairy reddish rootlets; leaves are simple, alternate, elliptic-lanceolate, coriaceous, gland-dotted, entire, shiny above and silvery beneath; flowers are small, white or greenish borne in panicles; fruits are globular berries, small like that of a pepper, wrinkled or warty, dull red to black, 1- or 2-seeded; seeds are globose, hollowed at the base, white-spotted. Fruits, leaves and roots have therapeutic effects <sup>[10, 11, 31]</sup>. Medicinal Use: Sore throat, odontalgia, abdominal, inflammatory and mental disorders, constipation, headache, flatulence, indigestion, jaundice, snake bite and skin diseases. Anthelmintic, diuretic, carminative and contraceptive <sup>[32, 41, 51, 52]</sup>.

### 2.12 Bilva (Eng: Bael/Stone Apple; Fam: Rutaceae)

*Aegle marmelos* (L.) Corr. Serr. is a small- or medium-sized, slender, aromatic, gum-bearing tree with short trunk and thick, soft, flaking bark. A clear, gummy sap exudes from wounded branches, which gradually becomes solid. Leaves alternate, ovate to elliptic, aromatic, trifoliate with straight, sharp axillary thorns (buds); flowers fragrant, greenish white, borne in axillary panicles; fruit globose, hard-shelled, dotted with aromatic minute oil glands, grey-green but turns yellowish when fully ripe. The pulp is sweet, fibrous, thick, yellowish-orange to brown, and contains numerous seeds which are oblong, compressed, bearing woolly hairs. Leaf, fruit, stem and root of the plant at all stages of maturity are used in medicine <sup>[12, 20, 53]</sup>. Medicinal Use: Diarrhoea, dysentery, colitis, diabetes, asthma, blood pressure, jaundice, typhoid, wound, swollen joints and frequent vomiting during pregnancy. Laxative, digestive, astringent, antidiuretic, anthelmintic, antipyretic and

carminative <sup>[11, 54, 56, 57]</sup>.

### 2.13 Chandana (Eng: Indian sandalwood/White sandal tree; Fam: Santalaceae)

*Santalum album* Linn. is a small evergreen tree with slender drooping as well as erect branches. Leaves simple, opposite, thin, ovate or ovate elliptical, glabrous and shining green above and glaucous and slightly paler beneath, entire; flowers purplish brown, small, in terminal and axillary panicle; fruits fleshy drupe, globose, dark purple when ripe, single-seeded; seeds hard and globose. Its heartwood possesses medicinal properties. The heartwood is yellowish brown, strongly scented and contains the essential oil <sup>[12, 18, 40]</sup>. Medicinal Use: Bronchitis, catarrh, common cold and cough, sore throat, initial phase of pox, skin diseases, headache, memory improvement and blood purifier. Sedative, diuretic, antimicrobial, antihyperglycemic and antioxidant <sup>[11, 12, 25, 40, 58, 59]</sup>.

### 2.14 Kirata (Eng: Chiretta/Clearing Nut Tree; Fam: Gentianaceae)

*Swertia chirata* Ham. ex Wall. is an erect, branched, robust annual herb. The stem is cylindrical below and 4-angled upwards, containing a large pith and root is stout, short, tapering, bearing a few rootlets. Leaves broadly lanceolate, acute, 5-nerved and subsessile; inflorescence a large leafy panicle; flowers numerous, greenish yellow, tinged with purple colour; fruit capsule, minute, ovoid or egg-shaped, many-sided, sharp-pointed; seeds smooth and many-angled. The whole plant has medicinal value <sup>[12, 18, 46]</sup>. Medicinal Use: Fever, skin diseases, bronchial asthma, piles, dyspepsia, malaria and tuberculosis. Laxative, antipyretic, hepatoprotective, febrifuge, stomachic, anthelmintic and hypoglycaemic <sup>[11, 18, 41, 60, 61]</sup>.

### 2.15 Guduchi (Eng: Heart-Leaved Moonseed; Fam: Menispermaceae)

*Tinospora Cordifolia* (Willd.) Miers. is a large, glabrous, deciduous climbing shrub. The stem of this plant is rather succulent with long thread-like aerial roots coming up from the branches and creamy white to grey, warty, thin, papery bark which peels off easily. Leaves simple, alternate, cordate, membranous, petiole long; flowers minute, yellow, appearing in axillary or terminal racemes when the plant is leafless, unisexual, male flowers clustered and female flowers solitary; fruit an ovoid and succulent drupe, lustrous, red, single-seeded; seed fleshy and curved. Its root, stem and leaf are used as medicines <sup>[10, 16, 40]</sup>. Medicinal Use: Diabetes, allergy, gout, piles, high blood sugar, febrile conditions, lymphoma and other cancers, fever, hayfever, dyspepsia, rheumatoid arthritis, hepatitis, urinary disorders, gonorrhoea and syphilis. Antispasmodic, antiallergic, antileprotic, antipyretic, aphrodisiac, rejuvenative and boosts immune system <sup>[11, 25, 31, 46, 62]</sup>.

### 2.16 Daruharidra (Eng: Indian Barberry/Tree Turmeric; Fam: Berberidaceae)

*Berberis aristata* DC is an erect, large, woody, deciduous spiny shrub growing to 2-3 meters in height, bearing yellow flowers in corymbose raceme and a yellow, brittle wood covered by pale and yellowish grey bark. Roots are woody, cylindrical and knotty with a yellowish brown, thin bark and the leaves are leathery, toothed with many small indentations along the margins. Fruits bright red or purple black berries. Stem, root and fruit have medicinal values <sup>[10, 12, 20, 53]</sup>. Medicinal Use: Fever, liver and spleen diseases,

menorrhagia, jaundice, rheumatism, ulcer, piles, conjunctivitis, wound, skin disease, gonorrhoea and diarrhoea. Laxative, stomachic, antiperiodic, antimicrobial, antioxidant, anti-inflammatory, anti-tumor and antidiabetic [11, 20, 25, 63, 64].

### 2.17 Isabgol (Eng: Blond Psyllium; Fam: Plantaginaceae)

*Plantago ovata* Forsk. is a stemless or nearly stemless, soft, hairy annual herb in which the leaves are born alternately on the stem or in rosettes adhering to the soil surface. The leaves are narrowly linear or linear lanceolate, opposite, finely acuminate, entire or toothed, attenuated at the base and usually three-nerved; flowers numerous, white, small in ovoid or cylindrical spikes; fruit capsule, ellipsoid, obtuse, the upper half coming off as a blunt conical lid; seeds ovoid-oblong, boat-shaped, smooth, yellowish brown. Seed and seek husk have medicinal properties [11, 18]. Medicinal Use: Constipation, diarrhoea, dysentery, soften the stools of those with haemorrhoids. Anti-inflammatory, laxative, emollient, demulcent, diuretic, antitoxic and hypocholesterolemic [11, 36, 65, 66, 67].

### 2.18 Jatamansi (Eng: Spikenard; Fam: Valerianaceae)

*Nardostachys jatamansi* DC. (Syn. *N. grandiflora* DC.) is an erect, perennial, rhizomatous herb with long, stout, woody rootstock covered by fibres from the petioles of withered leaves. Stem more or less pubescent upwards, often glabrate below; leaves radical as well as cauline, radical leaves large, longitudinally nerved, slightly pubescent, narrow down the petiole and cauline leaves sessile, oblong or sub-ovate; flowers campanulate, pinkish red to bluish white in dense cymes; fruit covered with white hairs and crowned by the ovate, acute, often dentate calyx teeth. The part used medicinally is rhizome [10, 11, 12]. Medicinal Use: Insomnia, epilepsy, hysteria, convulsion, hair loss, hypertension and heart disease. Stomachic, carminative, tranquilizer, sedative, antibacterial, antispasmodic and diuretic [46, 68, 69, 70].

### 2.19 Kalmegh (Eng: King of Bitters; Fam: Acanthaceae)

*Andrographis paniculata* (Burm. f.) Wallich ex Nees is an extremely bitter, erect herb which grows to a height of 30-110 cm. Inflorescence is raceme or panicle, bearing small, white flowers with rose-purple spots on the petals. Stem slender, dark green, quadrangular with longitudinal furrows and wings on the angles; leaves glabrous, simple, opposite, lanceolate with entire margin; fruit a capsule, linear-oblong, compressed, containing small, numerous yellow-brown seeds. The aerial parts (leaves and stems) of the plant constitute its drug [11, 12, 18]. Medicinal Use: Fever, hepatitis, dyspepsia, common cold, detoxification of the body, cough, bronchitis, sinusitis, pharyngotonsillitis, diarrhoea, cancer and snake bites. Antibacterial, laxative, anti-inflammatory and blood purifier [17, 23, 71, 72, 73].

### 2.20 Katuka (Eng: Picrorhiza; Fam: Scrophulariaceae)

*Picrorhiza Kurroa* Royle ex Benth. is a small perennial creeping herb, which spreads by its stolons. A whorl of radical, spatulate and sharply serrated leaves with sharp apices arises from its rhizome. Flower white or pale blue purple on a long spike; fruit a capsule, ovoid; seed: extremely small, white. Its drug comprises of dried rhizomes. The rhizome is bitter tasting, elongated, wrinkled, prominently striated, and evanescent inside due to which it can be easily compressed [18, 11, 31]. Medicinal Use: Jaundice, fever, immune disorders, bronchial asthma, dyspepsia and skin diseases. Anti-inflammatory, hepatoprotective, stomachic, laxative, antioxidant, antiperiodic and anthelmintic [12, 13, 23, 46, 74, 75].

### 2.21 Kokum (Eng: Red Mango; Fam: Guttiferae)

*Garcinia indica* Choisy is a slender, small, evergreen tree with a dense canopy of green leaves and red-tinged tender emerging leaves. leaves simple, opposite, glabrous, oblong-lanceolate, margin slightly repand; flowers unisexual, pale yellowish, male flowers in axillary and terminal fascicles, female flowers solitary or 2-3 together; fruit berry, globose, smooth, purplish red, 5-8 seeded; seeds compressed, embedded in pulp. The parts used medicinally are fruits and leaves [10, 11, 20]. Medicinal Use: Obesity, ulcer, haemorrhoid, diarrhoea, dysentery, piles, colic, inflammations, rashes, burns, rheumatic pains and bowel complaints. Antioxidant, antimicrobial, emollient and anticarcinogenic [11, 20, 76, 77, 78].

### 2.22 Kushta (Eng: Costus; Fam: Compositae)

*Saussurea lappa* C.B. Clarke is a robust, tall, perennial herb. Root is long, stout having a strong characteristic odour and is the part used for medicine. Leaves membranous, irregularly toothed, basal leaves large with long lobately winged stalks, upper ones small; flowers bluish purple to black arranged in axillary and terminal heads, flower heads stalkless, hard and round; fruit achene, hairy, compressed, curved and cupped [10, 11, 53, 79]. Medicinal Use: Bronchial asthma, ulcer, cough, headache, epilepsy, flatulence, colic, pruritus, diarrhoea, fever, skin infections and gout. Anti-inflammatory, antiarthritic, aphrodisiac, antiseptic and disinfectant [10, 11, 32, 79, 80].

### 2.23 Yastimadhuka (Eng: Licorice/Sweetwood; Fam: Papilionaceae/Fabaceae)

*Glycyrrhiza glabra* Linn. is a leguminous plant with oval, compound pinnate leaves; white to purplish flowers produced in a loose inflorescence (spike) and oblong, flat, compressed pods each containing 3-5 brown, reniform seeds. The medicinally used part of the plant is the root. The taproot is cylindrical, long, yellowish inside with a characteristic odour and sweet taste, and subdivides into subsidiary roots from which the horizontal woody stolons arise [10, 11, 40]. Medicinal Use: Sore throat, gastric, duodenal ulcer, dyspepsia, rheumatism, tuberculosis, arthritis, cough, asthma and bronchitis. Laxative, diuretic, emmenagogue, contraceptive, anti-inflammatory, antiviral, detoxifies and protects the liver [23, 24, 53, 81, 82].

### 2.24 Pippali (Eng: Long Pepper; Fam: Piperaceae)

*Piper longum* Linn. is a dioecious, slender, aromatic climber with perennial woody roots and jointed stems thickening at the nodes. The leaves are ovate, cordate with broad rounded lobes at the base, sub-acute, entire, glabrous, dark green and shining above, and pale and dull beneath. The unisexual flowers are borne in solitary, pedunculate spikes-the male spikes slender and long, while the female spikes thick and short. Fruit very small, ovoid, completely sunk in solid fleshy spike which is erect, cylindrical, blunt, blackish green and shining. The fruit of this plant is used as medicine [11, 18, 40]. Medicinal Use: Common cough and cold, bronchitis, asthma, indigestion, loss of appetite, rejuvenation, convulsion, insomnia, epilepsy, flatulence, stomachache, tumour and diseases of the spleen. Analgesic, sedative, diuretic, antipyretic and hypotensive [13, 25, 40, 83, 84].

### 2.25 Meshashringi (Eng: Periploca of the woods; Fam: Asclepiadaceae)

*Gymnema sylvestre* R. Br. is a large, woody, much branched, climbing shrub running over the tops of tall trees. Stem is sparsely lenticellate, twinning and branched; leaves simple, opposite, ovate-elliptic, thinly coriaceous, acute or shortly acuminate, smooth above and sparsely or densely velvety beneath; flowers small, yellow, in axillary and lateral umbellate cymes; fruit a slender follicle, attenuated into a beak; seeds dark brown, ovate-oblong, flat with a thin broad marginal wing. The medicinally active parts of the plant are leaves and roots. The leaves, when chewed, destroy the sensory perception of sweet taste [11, 18, 46]. Medicinal Use: Diabetes, stomach ailments, diarrhoea, asthma, cardiopathy, glycosuria, obesity, dyspepsia, pain in eyes, constipation, haemorrhoid and cough. Hypoglycemic, antipyretic, anthelmintic, antiviral and diuretic [16, 41, 82, 86].

### 2.26 Shatavari (Eng: Asparagus; Fam: Liliaceae)

*Asparagus racemosus* Willd. is a scandent, much branched, spinous undershrub having woody stem sparsely covered with strong, straight or recurved spines. It has a stout rootstock bearing numerous, succulent fusiform roots fascicled at stem base, and an inflorescence bearing tiny white flowers in small spikes. Leaves are reduced to minute spinescent structures subtending leaf-like cladodes which are in tufts of 2-6 in a node, and constitute the main photosynthetic organs. Roots possess medicinal property [11, 18, 20]. Medicinal Use: Behavioral disorder, brain dysfunction, cancer, ulcer, dysentery, diabetes, bronchitis, tuberculosis, pain, dyspepsia, constipation, wound and uterine bleeding. Antipyretic, diuretic, antispasmodic, aphrodisiac, stimulates breast milk production and a versatile female tonic [12, 53, 79, 87, 88].

### 2.27 Shankpushpi (Eng: Bindweed; Fam: Convolvulaceae)

*Convolvulus pluricaulis* Choisy is a prostrate, perennial herb with woody rootstock and slender, wiry, thinly hairy stem. Leaves radical, spatulate, small, subsessile, linear to oblong with prominent nerves; flowers 1-3, axillary, white, pale or purplish; fruit globose capsule. All parts of the herb have therapeutic values [11, 12, 89]. Medicinal Use: Insomnia, epilepsy, urinary disorders, hypertension, neurodegenerative diseases, anxiety, diabetes, headache, vomiting and snake bites. Laxative, antistress, aphrodisiac, rejuvenator and an enhancer of memory and concentration [11, 13, 89, 90, 91].

### 2.28 Safed Musli (Eng: Indian Spider Plant; Fam: Liliaceae)

*Chlorophytum borivilianum* Sant. & Fern. is a tuberous herb with condensed stem disc from which a whorl of leaves originates, and grows up to a maximum height of 1.5 feet. Leaves sessile with sheathing bases, linear with acute apex, slightly yellowish, coriaceous; flowers small, white, pedicellate, produced on panicles; fruit a capsule, trilobed, green to yellow; seeds black, shiny, oblong with angular edges. The white fibrous roots of the plant are modified into fasciculated roots with tapering ends, and are the medicinally useful part [12, 92, 94]. Medicinal Use: Rheumatism, joint pains, gonorrhoea, leucorrhoea, prenatal and postnatal problems in women, diabetes and diarrhoea. Revitalizer, increases lactation in feeding mothers, boosts immune system and is considered as an alternative 'viagra' as it is aphrodisiac and used in male impotency [93, 94, 95, 96, 97].

### 2.29 Svarnapatri (Eng: Senna/Indian Senna; Fam: Caesalpiniaceae)

*Cassia angustifolia* Vahl. is a small shrub with pale green, smooth and erect stem. Leaves compound, pinnate, usually 5-8 jugate, pale yellowish green, glabrous, leaflet oval-lanceolate with pointed apex; inflorescence raceme, axillary, many-flowered; flowers small, yellow; fruit pod, oblong, flat, brown containing several seeds; seed obovate, cuneate, dark brown. Leaves and fruits have medicinal properties [10, 11]. Medicinal Use: Constipation, dyspepsia, skin diseases, anaemia, bronchitis, jaundice, dysentery, fever and haemorrhoid. Laxative, purgative, antipyretic, vermifuge, aphrodisiac, diuretic and anthelmintic [11, 24, 65, 98, 99].

### 2.30 Lashuna (Eng: Garlic; Fam: Liliaceae)

*Allium sativum* Linn. is a perennial, grass-like herb with composite or compound underground bulb that has medicinal value. It has a shallow fibrous root system at the bottom of the bulb and a tall, erect flowering stem above enclosed by tubular leafy sheaths. Leaves opposite, erect, long, flat with a crease down the middle and flowers white, starry borne in umbel. Fruits and seeds are rarely formed [11, 18, 19]. Medicinal Use: Hypertension, high cholesterol, heart disease, nose, eye, ear and throat infections, fever, cough, headache, flatulence, dyspepsia, stomachache, sinus congestion, gout, rheumatism, bronchitis and snakebite. Aphrodisiac, anthelmintic, antiasthmatic, antispasmodic, antiseptic, anticancer, detoxifies the body and suppresses the growth of certain tumours [11, 24, 53, 100, 101, 102].

### 2.31 Nimba (Eng: Neem; Fam: Meliaceae)

*Azadirachta indica* A. Juss. is a tree with straight trunk and long spreading branches forming a broad round crown. Leaves pinnately compound, composed of short-petiolate, narrow-ovate, curved, toothed leaflets arranged in alternate pairs; inflorescence axillary panicle; flowers numerous, white, fragrant, pedicellate; fruit yellowish drupe, oblong, containing thin pulp surrounding a single seed. All parts of the tree, especially leaf, fruit and stem bark have medicinal values [10, 20, 36]. Medicinal Use: Jaundice, ulcer, ringworm, blood impurities, septic wounds and boils, cardiovascular disease, diabetes, gingivitis, malaria, rheumatism, asthma, colic, conjunctivitis, dysentery, epilepsy, kidney stones, leprosy, leucorrhoea, scabies, smallpox, sprain and muscular pain. Antiseptic, antiallergic, antibacterial, contraceptive, antiplaque, emmenagogue and as pesticide, vermicide and mosquito repellent [13, 36, 81, 103, 104].

### 2.32 Kutaja (Eng: Bitter Oleander; Fam: Apocynaceae)

*Holarrhena antidysenterica* (Roth) A. DC is a large shrub or small tree with milky white latex. Leaves simple, opposite, sessile or subsessile, broadly ovate to elliptic-oblong, abruptly acuminate, rounded or obtuse at base; flowers white, fragrant, arranged in a cluster in large terminal branch; fruits long, slender follicles, twin fruits-two fruits arising from a node, each fruit containing numerous, flat, brown seeds. Stem bark and root have therapeutic values [10, 11, 79]. Medicinal Use: Dysentery, tuberculosis, diarrhoea, diabetes mellitus, piles, indigestion, colic, gastritis, diseases of the skin and spleen. Amoebicidal, antibacterial, anthelmintic, astringent, promotes conception and tones up vaginal tissues after delivery [11, 41, 105, 106].

**2.33 Kakamachi (Eng: Black Nightshade; Fam: Solanaceae)**

*Solanum nigrum* Linn. is herbaceous plant with an erect, glabrous or more or less pubescent, much divaricately branched stem. The leaves simple, ovate-lanceolate, subacute or acuminate, glabrous, entire sinuate toothed, tapering into the petiole; flowers small, in extra-axillary subumbellate 3-8 flowered cymes; fruit berry, small, globose, green at first but purplish black when ripe, smooth, shining; seeds discoid, yellow, minutely pitted. The entire plant including fruit, stem and leaf, is used as medicine. The unripe fruits are poisonous <sup>[11,12,18]</sup>. Medicinal Use: Liver disorders, stomach ulcer, dysentery, piles, fever, chronic skin ailments, gout, earache, tuberculosis and eye diseases. Diuretic, sudorific, anti-inflammatory and anti-tumor <sup>[13, 41, 107, 108]</sup>.

**3. Conclusion**

Plants have been used since time immemorial/antiquity for the treatment of human ailments. Even today, the traditional systems of medicine continue to be widely practiced. The World Health Organization currently encourages, recommends and promotes traditional herbal medicines in national health care programmes as such drugs are easily available at low cost and inherently safer than the potent synthetic drugs. According to WHO estimate, about 80% of the world population relies on traditional medicines, mostly on plant drugs. The safety, quality and efficacy of medicinal plants are, therefore, required to be addressed through interdisciplinary research due to the tremendous worldwide expansion of their use as medicines. The use of plant drugs also demands correct identification and characterization as their safety and efficacy depend on the use of proper plant part and its biological potency, which in turn depends upon the presence and nature of required active compounds/secondary metabolites. It is imperative to use phytochemical parameters to screen and analyze the bioactive compounds, not only for the quality control of the crude drugs but also for the elucidation of their therapeutic mechanisms. Good manufacturing practice (GMP) should be ensured so that products are consistently produced and controlled to the quality standards appropriate to their intended use as required under marketing authorization. The recent global resurgence of interest in herbal medicines has also led to an increased demand for them. But while the demand for medicinal plants is growing, some of them are increasingly facing constant threat of extinction under the duress of massive exploration and habitat degradation; and India's share of the world herbal trade is less than 1% despite its rich biodiversity, traditional knowledge and heritage of herbal medicines. So, a scientific approach for large scale cultivation and propagation of medicinal plants is needed to meet the market demand and to utilize them in a sustained manner. Medicinal plant species which are endangered or rare should be identified and conserved through the coordinated effort of *in situ* and *ex situ* strategies. The wild medicinal plants should be explored to bring them under cultivation.

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