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Ethnomedicinal Use of Wild Plants in Bundelkhand Region, Uttar Pradesh, India

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ABSTRACT

India is a great repository of medicinal wealth. The present investigation is an attempt to identify and document important medicinal and aromatic plants of the Bundelkhand region of Uttar Pradesh. Although this region is classified as a hot and dry locality, the great number of medicinal plant species defines it as a centre of diversity. An intensive survey of this region was conducted over the period of one year, revealing about 66 herbs and shrubs and 38 tree species with medicinal value. Most of them are used traditionally by local residents. Survey results indicate that the Lamiaceae family was dominant. Some species like *Centella asiatica* and *Aloe barbadensis* were very few while most species were threatened. Presently, plant diversity is declining sharply due to increasing biotic and abiotic stresses such as illicit felling of trees, over grazing, construction of roads, rapid urbanization and industrialization. Therefore, sustainable domestication is the only alternative to maintain the healthy natural status of such germplasm, especially those plants with limited distribution.

Keywords: medicinal and aromatic plants, over exploitation, plant diversity

INTRODUCTION

During recent years, herbal medicines of importance have become very popular. National programs on health care have emphasized herbal medicine. Fortunately, herbal medicinal flora is the richest natural resource in India, India being one of the major floristic regions of the world, well known for its medicinal wealth since the time of *Rig-veda*. The plants are used in different systems of pharmacy like Ayurveda, allopathy, Unani and homeopathy. However, wild sources are continuously shrinking due to reckless harvesting by people and industry. Thus, domestication through large-scale cultivation is the only means for sustainable conservation of this wealth of wild germplasm (Rawat 2003). The demand for herbal medicare will undoubtedly increase many-fold within the next few years, although cultivation of medicinal plants requires in-depth knowledge.

India is one of the few nations that is capable of producing most of the important plants for both modern and traditional systems of medicine due to wide variation in aspects related to climate, soil, altitude and latitude (Nautiyal 2000). A recent analysis on the number of medicinal plants used in different Indian systems of medicine shows that out of 17,500 flowering plants reported (Mao *et al.* 2009) so far from the Indian territory, about 2000 are used in all the classical systems, with an obvious overlap with regard to the number of species used in each system: Ayurveda (900 species), Sidha (800), Unani (700), and Amchi (300). Medicinal plants satisfy the millions of ethnic and indigenous people living in tribal and rural sectors of India. According to a study (Pushpangadan 2002) conducted by the Ministry of Environment and Forests (MOEF) Government of India, under the "All India coordinated project on Ethnobiology," the tribal communities in India use over 1,0000 wild plants to meet primary health care. Various researchers have reported that poverty is the main cause of degradation of plant resources. Further, haphazard collection of medicinal plant has created an adverse impact on the habitats of other plant species amongst which they exist.

The ever-growing demand of medicinal plants has often resulted in over exploitation of plant resources. Furthermore, unsustainable harvesting of these resources has led to endangerment and even extinction of several invaluable medicinal plants in their wild habitat (Bhattacharayya *et al.* 2006; Barhbhuiya *et al.* 2009; Parkash and Aggarwal 2010), due to human activities viz., urbanization, industrialization and expansion of agriculture and other development projects. In the Bundelkhand region of this study, people that reside in villages or close to towns use these wild plants for their various ailments. To share the knowledge with other local communities and to make people aware about the uses of theses wild plants more broadly, the present study was carried out with the objective of preliminary document the wild medicinal flora of Bundelkhand region, including their identification and present status.

MATERIALS AND METHODS

An extensive field survey of wild medicinal plants was conducted, covering hill slopes, forests, grasslands, wastelands, fallow lands and remote village localities. The survey took place in the flowering (Feb-March), fruiting growth (June-July) and maturing (Sept.-Oct.) periods of many plant species. Formal and informal interviews were conducted with local villagers to document their indigenous/traditional know-how regarding wild medicinally valuable plants. The study was conducted in 12 villages with an approximate population of 6,000. The ethno-botanical information of wild plants in these villages was conducted on a household basis. The information was collected from approximately 10% of the village population, who depended on the forest for various ethno-medicines. The informants included old and experienced males and females who were well acquainted with the plants and who could thus easily identify them. Initially, youth were also considered to collect the information but were finally excluded from the survey

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Research Note

because they did not have proper knowledge on ethno-medicinal plants, thus, only adults were considered. The plants were personally identified by the informants and representative samples were collected and prepared in a herbarium for identification, while standard literature was also consulted (Arora and Pandey 1996). Finally, a complete list was prepared.

During the field surveys, the present status of the wild medicinal plants, and the local eco-geographic and meteorological conditions were also noted for each site. In addition, seasonal availability and abundance of each species was also recorded.

Eco-geography and meteorology of the study site

Geographically Bundelkhand is situated in semi-arid region of Central India (south-western part of U.P. state) between 24.1° 26.27′ N latitude and 78.17° 81.34′ E longitude at 250–300 m.asl. The majority of the Vindhya region is covered by Laterite soil, which consist of iron-bricks (in local dialect it is termed muram); thus, part of this region has red soil (Chaudhary 2010). The climate of the region is tropical dry sub-humid. Rainfall varies from 850 to 1050 mm mostly during June to September. Temperature varies from 19.2-27.1°C (minimum) 38.8 to 42.4°C (maximum) in summer and 6.0 to 22.5°C in winter.

RESULTS AND DISCUSSION

Present status of wild medicinal plants

Detailed ethnomedicinal uses of plant species is Bundelkhand region is given in **Table 1**. The family Lamiaceae had the most (7) species. A high number of species were found in the other families (Asteraceae, Amaranthaceae and Solanaceae), each with 4 species. The family Lamiaceae found to be dominating family over other families in this region for wild medicinal herbs. *Achyranthus aspera*, *Cleome icosandra*, *Cassia tora*, *Oxalis* sp., *Cyprus rotundus*, *Hypti·suaveolens*, *Psoralia cordifolia* were most abundant. Some species viz., *Cetlella asiatica*, *Aloe barbandensis*, *Withania somnifera* and *Rauvolfia serpentina* are very few in this region. During the field survey it was noticed that about 50% of the wild medicinal herb resources found in that locality were not use by the local people due to lack of information on their medicinal uses. Presently there are no pharmaceutical industries in this region using wild medicinal herbs. However, these plants are reported to be consumed in many regions of India (Anonymous 1994; Arora and Pandey 1996). A high proportion of wild medicinal herbs in the locality were consumed as a whole by uprooting the plants.

In a recent investigation on medicinal herbs in dry regions, Dhanai and Uniyal (2006) reported that *Centalla asiatica* and *Mollugo spergula* are widely used by local people. The use of these two wild herbs in local diets has a significant role in mitigating malnutrition among locals. Sanjana (2005) studied the herbal legumes of dry regions. Hotwani and Mukherjee (2005) studied the medicinal plants of Burdwan, West Bengal, India. In their study they identified 100 species of medicinal plants belonging to 64 families and 114 genera growing in different parts of Burdwan district. Jain *et al.* (2006) reviewed the medicinal flora of Madhya Pradesh and Chattisgarh. They reported that the medicinal plants of these two regions comprise approximately 800 species and account for around 50% of the higher flowering plant species of India. Their studies showed that these two states are a pool for dozens of pharmaceutically important plants. Their survey on medicinal plants was carried out to collect information on both reported and unreported medicinal plants of that region.

Kumar (2005) studied the major threat and vulnerability to medicinal taxa located on Rajgir hills, Bihar. He reported that the intense biotic stress in the past few decades has reduced the forest scrub-jungle. His study also revealed that many important medicinal plants are threatened. Some of the obvious threats posed to the floristic diversity of the Rajgir hills and its enclosing valley are unrestricted felling of trees for fuel and fodder, grazing pressure by domestic cattle, selective removal of the economically important plant species, construction of roads and tourism. Datt and Lal (1993) studied the medicinal uses of some plants in the Pithoragarh district of Kumaon Himalaya, U.P., now situated in Uttarakhand state. Similarly, Uniyal *et al*. (2008) found great diversity among medicinal plants in the Nokrek Biosphere Reserve in Meghalaya. Significant work on medicinal plants was also conducted by various groups in India (Anonymous 1994; Sharma *et al*. 2000; Haridasan, 1999; Prajapati *et al.* 2003; Dhanai and Uniyal 2007). Verma *et al.* (2007) also highlighted the study of medicinal plants in an urban environment of Varanasi, Uttar Pradesh and reported that the traditional medicinal uses of 72 plant species by the local inhabitants. Joshi *et al.* (2010) conduct a study in Kumanun, Himalaya where people exploit plant resources for medicinal purposes in local health tradition, which is gradually becoming extinct due to developmental activities and for anthropogenic reasons. Therefore, to avoid overexploitation and to promote sustainable use, rapid conservation efforts are needed.

Some of the obvious threats passed to the wild floristic diversity of dry regions are: unrestricted felling of trees, grazing pressure by domestic cattle, construction of roads, rapid urbanization and industrialization. There is evidence in reduction of area (14.6%) under grazing lands over the past 20 years. Most wild medicinal herb species are threatened in this region. This study also revealed some aquatic species and some terrestrial species viz. C*henopodium album*, *Aloe barbadensis*, *Achyranthus aspera*, *Boerhavia diffusa*, *Centella asiatica* and *Pistia stratiotes* are under threat.

Future strategy and public awareness

Varying physiographic features in different regions of dry areas has resulted in many ecological habitats. The loss of wild medicinal plant diversity is mainly due to habitat destruction by over-exploitation of biological resources, pollution, expansion of agriculture, industry, urbanization, construction and large-scale developmental projects. A future, detailed eco-climatic survey is required to better understand and manage wild medicinal plant diversity in this natural habitat. Sustainable domestication might be the only alternative to maintain their natural status.

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Table 1 Ethnomedicinal use of plants in Bundelkhand region, Uttar Pradesh, India.

Botanical name	English/Hindi name	Family	Uses
Herbs and shrub species			
Achyranthus aspera L.	prickles chaff/latjira	Amaranthaceae	Its juice is useful in piles, boils skin eruptions, large doses produces abortion, also used in cough, oral infection
Acorus calamus L.	sweet flag/safed banch, ghorabach	Araceae	Its aromatic rhizomes are used as carminative, stimulant to central nervous system as an tonic. Externally used in chronic rheumatism, also useful in diarrhea and dysentery.
Aerva lantana (L.) Juss.	gorakh booti, chaya	Amaranthaceae	It has anthelmatic and diuretic properties. Roots are used as demulcent, diuretic and for headache.
Ageratum conyzoides L.	goat weed, white weed, conyzoid floss flower	Asteraceae	Its juice is used for cure of allergic rhinitis.
Aloe barbadensis Mill.	Barbados aloe/ghikanvar, guarpatta	Liliaceae	Resinous drug of leaves is used as purgative, fruit pulp in piles, intestinal wounds in children
Amaranthus tricolor L.	tampal, amaranthus/bari chaulie	Amaranthaceae	It is astringent, used in diarrhea, dysentery, used externally in throat and mouth and as wash for ulcers.
Andrographis panniculata (Burm. F.) Wall. Ex Nees.	king of bitters/kiryat, kalmegh	Acanthaceae	Used as tonic, fevers, worm dysentery, useful for children suffering from liver and digestive complaints.
Argemone mexicana L.	mexican poppy, yellow thistle/pila dhatura, pili kateli	Papaveraceae	It is diuretic and used in dropsy, jaundice and cutaneous infections. Seed oil is beneficial in asthma, roots in chronic skin diseases.
Aristolochia indica L.	indian bertheort/isharmal	Aristolochiaceae	Its drug promotes digestion and regulates menstruation, used as stimulant, fevers, gastric stimulant
Asparagus racemosus Willd.	asparagus/satavar	Liliaceae	Root paste used as aphrodisiac, diuretic, anti-dysenteric in veterinary medicines.
Boerhavia diffusa L.	spreading hogweed, horse purslane/punarnava, bishkhapra, sent	Nyctaginaceae	Root is laxative, diuretic and anthelmintic. As diuretic it is useful in gonorrohea, successful in asthma. Whole plant constitutes the drug punarnava which contains an active principle “Punarnavine”.
Canabis sativa L.	hemp/ganja, bhang, charas	Cannabinaceae	Drug is also used as stomachic, antispasmodic, analgesic and sedative. The leaves juice applied to removes dandruff and vermin.
Cassia tora L.	sickle senna, lamer/chakunda, pamar	Caesalpiniaceae	Seeds are tonic and stomachic, but they are particularly used externally in skin diseases, leprosy
Catharathus roseus (L.) G. Don.	medagascar periwinkle/sada sawagan, sadabahar	Apocynaceae	The roots and leaves decoction or extract active on hypertension and flower is used in Cancer therapy and diabetes.
Celosia argenta L.	feather cocks comb, quill grass/safed murga	Amaranthaceae	Seeds are useful in blood diseases and mouth sores and or eye diseases.
Centella asiatica (L.) Urban.	asiatic pennywort/brahmi	Hydrocotylaceae	Leaf and stem drug, used as an alternative, tonic and diuretic, also used in nervous system and skin diseases
Centratherum anthelminticum (L.) O. Kuntze.	somraj	Asteraceae	Seeds are used as an anthelmintic and are effective against thread worms.
Chenopodiuum album L.	pigweed/bathua	Chenopodiaceae	Leaves are rich in vitamin C. It is mildly laxative. Plant is used to relive stomach pain.
Cleome viscosa L.	wild mustard/jangli hurhur	Capparidaceae	Useful in case of round worms, recent wounds, They are anthelmintic, carminative and stimulant in action.
Clitoria ternatia L.	aparajita, gokarni	Fabaceae	Seeds are used as purgative and roots as cathartic, diuretic and purgative, also employed in weakness of sight, sore throat and mucous disorders, in tumours and dropsy.
Cocculus hirsutus (L.) Diels		Menispermaceae	Roots are useful in chronic rheumatism and venereal diseases. roots is sedative, hypotensive cardiotonic and spasmolytic.
Cynodon dactylon (L.) Pers.	grass, couch grass, creeping panic grass/ durban, doob	Poaceae	The fresh juice of the grass astringent and is useful in haematuresis and as an application in catarrhal ophthalmic, also for cuts and wounds.
Cyperus rotundus L.	motha	Cyperaceae	The tubers have tonic and stimulant effect. It also used in demulcent, diuretic, diaphoretic, astringent, vermifuge properties in fever, diarrhea, dysentery, dyspepsia, vomiting cholera
Datura stramonium L.	thron apple, jimson weed/ dhatura	Solanaceae	Leaves and seeds are narcotic and sometimes used for criminal Poisoning. Drug consists of dried leaves, flowering tops and seeds which are used in treatment of asthma.
Desmodium triflorum (L.) Dc.	kudaliya	Fabaceae	The fresh juice of the plant is given to children for cough. It also used in cough, bronchitis, wounds, dysentery, burning sensation.
Desmostachya bipinnata (L.) Stapf.	kusa	Poaceae	Used as ingredient of medicine in dysentery.
Echinops echinatus Roxb.	utakanta	Asteraceae	Plant is diuretic, nerve tonic and used in cough, indigestion and ophthalmic. Powdered roots are applied to wounds in cattle to destroy maggots.
Eclipta prostrate (L.)	trailing eclipta/ bhangra, babri	Asteraceae	Plant juice used for catarrhal jaundice, hair oil for blackening and strengthening hair. Root used as tonic. Seeds are aphrodisiac.
Euphorbia hirta L.	pill-bearing spurge /asthma plant, Lal dudhi	Euphorbiaceae	Drug is used in bronchial affections, cough, asthma and in removing worms in children. Also in bronchitis and other respiratory tract conditions.
Hemidesmus indicus (L.) Schult.	indian sarsoparilla. magrabce/anantmul kapuri	Periplocaceae	The fragrant root-bark possesses demulcent, alternative tonic properties, its hot infusion with milk and sugar is a good alternative tonic especially for children in cases of chronic cough and diarrhoea.

Table 1 (Cont.)

Botanical name	English/Hindi name	Family	Uses
Herbs and shrub species (Cont.)			
Hybanthus enneaspermus (L.) F. V. Muell.	ratanpurus	Violaceae	Leaves and tender stalks are used as demulcent and roots in bowel complaints of children.
Hyptis suaveolens	vilaiti tulsi	Lamiaceae	Herb is useful for insect bites and other wounds, leaves are used in poultices for headache and also applied on abdomen of children worms.
Iiberis amara L.	rocket candy tuft	Brasicaceae	An infusion of herb is considered an excellent remedy for rheumatic complaints. It relieves the chronic cases of arthritis. Seeds are used in asthma and bronchitis.
Ipomoea purpurea (L.) Roth.	tall morning-glory	Convolvulaceae	A plant is reported to be used as laxative, purgative and antisyphilitic. A paste made from root is applied as a poultice to backaches and sore muscles
Leucas aspera (willd) Spreng.	thumbe. chhota-balkusa	Lamiaceae	Mixed with honey, flowers are used for cough and cold. An alcoholic extract of leaves shows antibacterial activity. They are useful in colic, dyspepsia, verminous, arthralgic chronic skin eruption, catarrh in children intermittent fever and ulcers.
Leucas cephalotes	goma, motapati	Lamiaceae	Syrup from flowers used for cough and cold
Linum usitatissimum L.	flax, linseed/alsi	Linaceae	Linseed mucilage is used in pharmaceutical industries as demulcent. Crushed linseed is applied in form of poultice for inflammations, ulcers and boils.
Malva sylvestris L.	the common mallow/ vilayati-kangai, gulkhais	Malvaceae	The seeds are employed internally in decoction as a demulcent. Leaves are made into a poultice as an emollient external application. Flowers and immature fruits are used for whooping cough.
Malva verticillata L.	guchhapushp, mradupatra	Malvaceae	Root is used for whooping cough. Leaves and stems are given to women in advanced stage of pregnancy.
Mentha aquatica L.	water mint, marsh mint/tivra	Lamiaceae	Volatile oil from plant is used for headache and also in cholera.
Mentha longifolia (L.) Huds.	Mint/Jangli pudina	Lamiaceae	Dried leaves are used as carminative and stimulant.
Mirabilis jalapa L.	Four O'clock plant, Gulabbas	Nyctaginaceae	The dried root possess some nutrient qualities, its pest applied as lep in contusions.
Nelumbo nucifera Gaertn.	east Indian lotus, sacred lotus/kamal, kanwal	Nelumbonaceae	The flowers, Filaments and juice of the flower stalks are refrigerant and astringent, useful in fevers and cardiac tonic. The tubers use to cool the head and eyes, mucilaginous roots are demu1cent, given in piles. The seeds are used in skin affections.
Ocimum americanum L.	hoary basil/kali kulsi, mamri	Lamiaceae	The seeds are considered diuretic, tonic and preparation of cooling drinks. A decoction of the plant is taken for coughs, leaves for dysentery and also used as a mouth wash for reliving toothache.
Ocimum basilicum L.	sweet basil/bantulsi	Lamiaceae	The seeds are mucilaginous and demulcent and diuretic in effect. They are useful in internal piles and constipation. The cold infusion of the seeds is useful in after-pains of parturition, leaf juice is dropped into the ear in earache and dullness of hearing.
Operculina turpethum (L.) Silva-Manso	Indian jalap/nisoth, pitohri	Convolvulaceae	A resinous substance (turpentine) obtained from the root bark is used as a purgative.
Opuntia elatior Mill.	hathhathoria, nagphani	Cactaceae	The backed fruit is given in whooping cough. A syrup of the fruit increases secretion of the bite.
Oxalis acetosella L.	common wood-sorrel/khati boonti	Oxaliadaceae	The plant possesses refrigerant, diuretic, and antiscorbutic properties, it is used in liver and digestive disorder. The plant possess febrile diseases, urinary affections, catarrh and to remove cancerous growth from the lips.
Oxalis corniculata L.	Indian sorrel	Oxaliadaceae	The leaves considered cooling, refringerent and antiscorbutic, used for removing corns, warts and other excrescences on the skin. An infusion of the leaves is used to remove capacity of the cornea. The fresh leaves are made into a curry, which improves the appetite and digestion of dyspeptic patients.
Phaulopsis dorsiflora (Retz.) Santapau.		Acanthaceae	Plant is used for dressing wounds. Fresh juice is applied to sores.
Phyllanthus fraternus Webster.	jaramla, jangli amli	Euphorbiaceae	The plant is considered deobstruent, diuretic, astringent and cooling, used in jaundice, half ounce rubbed up in a cup of milk is given at morning and evening.
Phylanthus maderaspatensis L	kanocha bazarmani, ranavali	Euphorbiaceae	An infusion of leaves is used for headache. Seeds possess laxative, carminative and diuretic properties.
Pistia stratiotes L.	water lettuce, tropical duck weed/jalkumbhi, takapana	Araceae	Plant juice is used in earache and ashes are applied to the ring worm. Leaves are used in eczema, leprosy, ulcers, piles and skin diseases. Also made into poultice applied to hemorrhoid, mixed with rose water and sugar given in asthma and cough with coconut milk in dysentery.
Portulaca oleracea L.	common purslane/khursa, kulfa	Portulacaceae	Plant is used for scurvy, liver diseases, spleen, kidney, bladder, cardio vascular diseases, dysentery. It is also used as blood purifier in homoeopathy.
Psoralea corylifolia L.	babchi, babchi	Fabaceae	An oleo-resinous substance from its seeds is used in treatment of leucoderma, leprosy and other skin diseases, used as anthelmintic and for promoting urination.

Table 1 (Cont.)

Botanical name	English/Hindi name	Family	Uses
Herbs and shrub species (Cont.)			
Ranunculus sceleratus L.	blister butter cup	Ranunculaceae	Its juice is used in rheumatism dysuria asthma, pneumonia also used against skin disorder. Seeds are used as tonic and also prescribed in kindly troubles.
Rauvolfia serpentina	chandrabhaga, surpagandha	Apocynaceae	Drug *Rauvolfia*, obtained from roots, used for relief from nervous disorders, hypertension and as a sedative and tranquilizing agent. Root extract is also used for intestinal disorders.
Scirpus grossus L. F. S. *Kysoor* (Roxb.)	kaseru	Cyperaceae	Its tubers are edible and are also reported to posses laxative, tonic, cooling and diuretic properties.
Sida cordifolia	bala	Malvaceae	Leaves are eaten as vegetables. It used in swelling to joints due to arthritis in animals.
Solanum nigrum L.	black nightshade/makoi	Solanaceae	Freshly prepared plant extract is considered useful in treating cirrhosis of liver. Boiled leaves and tender schools are recommended to patients suffering from dropsy.
Solanum sursttense Burm. F.	yellow-berried highshade/kateri	Solanaceae	Roots is an expectorant forming an ingredient of Ayurvedic medicine dasmula, used in cough asthma and pain of chest. Fruit juice is used in sore throat and leaf juice mixed with black pepper is recommended in rheumatism.
Tephrosia purpurea (L.) Pers.	purple tephrosia/sarphonka, ban nil	Fabaceae	Powdered leaves are smoked for relief from asthma and cough. It is a good brain tonic. Root decoction is mixed with little quantity of sugar to cure urinary diseases.
Tribulus terrestris L.	land-cal-trops/gokhni	Zygophyllaceae	Fruits have diuretic and tonic properties for treating calculous affection, leaf paste is used for treatment of stones in bladder. Roots possess aperient and tonic properties.
Trichosanthes anguina L.	snake gourd/chachinda, chachinga	Cucurbitaceae	Roots and seeds are used in medicines for expelling worms, and for treating diarrhea and syphilis. Leaf juice is rubbed over the liver in liver congestion and fever.
Withania somnifera (L.) Dunal	asgand, ashwagandha	Solanaceae	The roots are the source of the drug Ashwagandha. It is useful in cough, dropsy, rheumatism, and female disorders, and as a sedative in cases of sense of disability.
Adhatoda vasica Nees.	adadodai/adulasa	Acanthaceae	Leaves and roots are used in cough, chronic, bronchitis, asthma.
Tree species			
Aegal marmelos (L.) Corrêa	bael	Rutaceae	Pulp and fruit used as a Aroma, cooling, astringent.
Ailanthus excelsa Roxb.	maharukh	Simaroubaceae	Bark extract used as aroma, tonic, antiseptic.
Azadiracta indica A. Juss	neem	Meliaceae	All parts used for tonic, astringent, demulcent, stomach.
Butea monosperma (Lamk) Taub.	palas	Papilionaceae	Used of seed and leaves as anthelumintic, astringent, diuretic purgative and aphrodisiac.
Bauhinia variagata (L.)	hijal, kachnar	Caesalpiniaceae	Seed, bark and leaves used as alternative tonic, astringent and indyspepia. Dry flowers and buds used in diarrhea, piles, dysentery, bark extract also in tuberculosis, leprosy, ulcer, with honey used for various ladies disorders.
Cassia fistula (L.)	indian laburum/amaltas	Caesalpiniaceae	Extract of all the parts used as laxative, astringent tonic, purgative.
Cassia auriculata (L.)	senna	Caesalpiniaceae	Root and bark extract used as diphor, expect, emetic astringent, tonic.
Ceiba pentandra (L.) Gaertn.	kapok	Bombacaceae	Extract of leaves, roots and fruits used as tonic, astringent, demulcent.
Cordia dischotoma forst. f.	sebestens	Boraginaceae	Fruit extract used as astringent, anthelum, diuretic, demulcent.
Ficus religiosa (L.)	pipal	Moraceae	Bark extract used as astringent, gonorrhea, pain of bones.
Ficus bengalensis (L.)	banyan/bargad	Moraceae	Infusion of bark used as tonic astringent, leaf extract in wounds.
Jatropha curcas (L.)	pyhsic nut/ratanjot		Extract of nut, seed and other used as purg and fish poison.
Mallotus phillippensis (Lam) Muell. Arg	kamela	Euphorbiaceae	Glands and hairs on fruit used as bitter, anthelm cath, stypic.
Mangifera indica (L.)	mango/aam	Anacardiaceae	Ripe fruit, rind of fruit, kernel and bark used as laxative, diuretic, astringent, stimulant, tonic and anthelmintic.
Tamarindus indicus (L.)	imli	Caesalpiniaceae	Fruit extract used as refrigent, digestive, carminative and laxative
Terminalia arjuna Bedd.	arjun	Combrataceae	Extract of bark and fruit used as tonic, astringent, deobstruent, leaf extract in ear pain.
Euphorbia neriifolia Roxb.	mausa sij	Euphorbiaceae	Milky juice and root used for purgative, expect in scorbian sting and snake bite, antiseptic, fish poison.
Emblica officinalis Gaertn.	amla	Euphorbiaceae	Fruit powder used in anemia, gastric, jaundice, liver swelling, urinary, asthma, lucoria, bronchitis etc., leaves in boiled water used un blood sugar.
Syzium cummini (L.) Skeels	jamun	Myrtaceae	Flower and leaves extract used in diabetes, bark as blood purifier, bark with goat milk in dysentery, diarrhea.
Madhuca logifolia Macb.	mahua	Sapotaceae	Fruit and flower juice used in blood purifier, cardiac, ear pain etc., bark extract used in ulcer, leprosy.
Zyzipus mauritiana Lamk.	ber	Rhamnaceae	Fruit is used for stomachs, anti-poisonous, leaves with areca nut used in typhoid.
Acacia nilotica(L.) Willd. Ex Del.	babool	Mimosoidaceae	Bark extract used as astringent.
Acacia catechu Willd	kath	Mimosoidaceae	Bark and heart wood extract used as astringent.
Albizia lebbek Benth.	siris	Fabaceae	Bark and seeds extract used as astringent tonic.
Albizia procera (Roxb.) Benth.	safed siris	Fabaceae	Bark and seeds extract used as astringent tonic.

Table 1 (Cont.)

Botanical name	English/Hindi name	Family	Uses
Tree species (Cont.)			
Pongamia pinnata	karanj	Papilionaceae	Folk medicine for the treatment of rheumatism, human and animal skin diseases, leaf juice for colds, cough, diarrhea, dyspepsia, leprosy.
Eucalyptus grandis Hill ex Maiden	eukalyptus	Myrtaceae	Leaves essential oil used as medicinal value in cough and cold.
Dalbergia sissoo Roxb. Ex DC.	sissoo/sisham	Leguminosae	Root extract used in leprosy, leaves in gonorrhea.
Cassia angustifolia	senna	Leguminosae	Leaves and pods are used as laxatives.
Pterocarpus marsupium Roxb.	bija sal	Papilionaceae	Medicine for gonorrhea.
Holoptelia integrifolia Planch	kanju	Ulmaceae	Carminative, astringent.
Lagerstroemia parviflora Roxb.	sidha banteak	Lytheraceae	Bark used as expectorant, emetic, carmine.
Melia azedirach (L.)	bakain	Meliaceae	Used for astringent, stomach, purgater and stimulant.
Michelia champaca (L.)	champa	Magnoliaceae	Flower extract used as medicine.
Schleichera oleosa (Lour) Oken	kusum	Sapindaceae	Flower extract used as astringent and tonic
Psidium guajava Raddi	amrud	Myrtaceae	Boiled leaf extract used traditionally in pyorrhea.
Artocarpus heterophyll Lamk	jack fruit/kathal	Moraceae	Leaves, roots and flower used as medicine.

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