

Conservation of Germplasm and Role of Centre for Conservation & Utilization of Medicinal and Aromatic Plant of NBU, West Bengal, India

Monoranjan Chowdhury*, Aratrik Pal, Sujit Mondal, Payel Paul, Mridushree Basak,
Deepika Chettri and Roshni Chowdhury

Taxonomy of Angiosperms and Biosystematics Laboratory, Department of Botany, University of
North Bengal, 734 013 Siliguri, Darjeeling, West Bengal, India.

E-mail: mono_malda@yahoo.co.in

Abstract

Centre for Conservation & Utilization of Medicinal and Aromatic Plant is one of important Herbal garden in India and is located within the campus of University of North Bengal at the foothills of Darjeeling District, West Bengal. Present this ex-situ conservatories houses a total of 729 species of vascular plants belonging to 477 genera and 153 families. Several endemic and threatened species are going in this garden. The garden is very good store house of various medicinal and aromatic plants and also involve in active research activity.

Key words: Medicinal Plants, NBU, Medicine, Active compound, Conservation, India.

Healing the diseases of mankind with various plants based crude drugs containing various secondary metabolites of plants is an old age practice. The oldest literature has been found is medicinal plants' usage preparation of drugs on a Sumerian clay slab from Nagpur, approximately 5000 years old (Petrovska & Biljana, 2012). Simply these plants can be defined as "*Medicinal plants are those plants which are used in official and various traditional systems of medicines throughout the world*" (Maiti and Geetha, 2008). Addition to medicinal plants some plants gave aroma and flavours (with or without medicinal properties). Together these plants are considered as Medicinal and Aromatic plants.

Among ancient civilizations, India has been known to be rich repository of traditional knowledge and medicinal plants. The aromatic plants are also included within the total no. of Indian medicinal plants. About 8,000 herbal remedies have been codified in Ayurveda. The *Rigveda* (5000 BC) has recorded 67 medicinal plants, *Yajurveda* 81 species, *Atharvaveda* (4500-2500 BC) 290 species, *Charak Samhita* (700 BC) and *Sushrut Samhita* (200 BC) had described properties and uses of 1100 and 1270 species respectively, in compounding of drugs and these are still used in

the classical formulations, in the Ayurvedic system of medicine (Joy *et al.*, 1998). Yet today, according to the World Health Organization (WHO), as many as 80% of the world's people depend on traditional medicine for their primary health care needs (Ved and Goraya, 2007).

The forests in India is the principal repository of large number of medicinal and aromatic plants, which are largely collected as raw materials for manufacture of drugs and perfumery products. The exploitation held by the industries, directly or, indirectly from the nature coupled with increasing urbanization is leading steady erosion and loss of MAPs biodiversity from the natural habitat (Maiti and Geetha, 2008). Global warming, climate change etc., also contribute to this loss. Unfortunately, 50% of the tropical forests, the treasure house of plant and animal diversity have already been destroyed. In India, forest cover is disappearing at an annual rate 1.5mha/yr. and presently only 8% as against a mandatory 33% of the geographical area. Today, many valuable medicinal plants are under the verge of extinction (Joy *et al.*, 1998).

In India there are several laws and acts regarding environmental protection, e.g., Environmental (Protection) Act, 1986, Wildlife Protection Act,

1972, The Biological Diversity Act, 2002 etc. One of the recent initiatives taken by the Govt. of India is with help of National Medicinal Plant Board, establishment of *ex-situ* and *in-situ* conservatory. These conservatories not only provide in-situ and ex-situ cultivation and conservation to the MAPs, but also provide assistance for cultivation of these plants to the farmers and cultivars.

One *ex-situ* conservatory was established in the North Bengal University (NBU) campus in the year 1998. The garden was earlier named as "Garden of Medicinal Plants, NBU" and presently it is renamed as "Centre for Conservation & Utilization of Medicinal and Aromatic Plant". The Himalaya to Gangetic plains of west Bengal is quit rich with its medicinally important plants and location of this garden is also very singifinant and support various types of plant elements. (Chowdhury 2014, Chowdhury *et al.* 2016)

History & present status of Garden

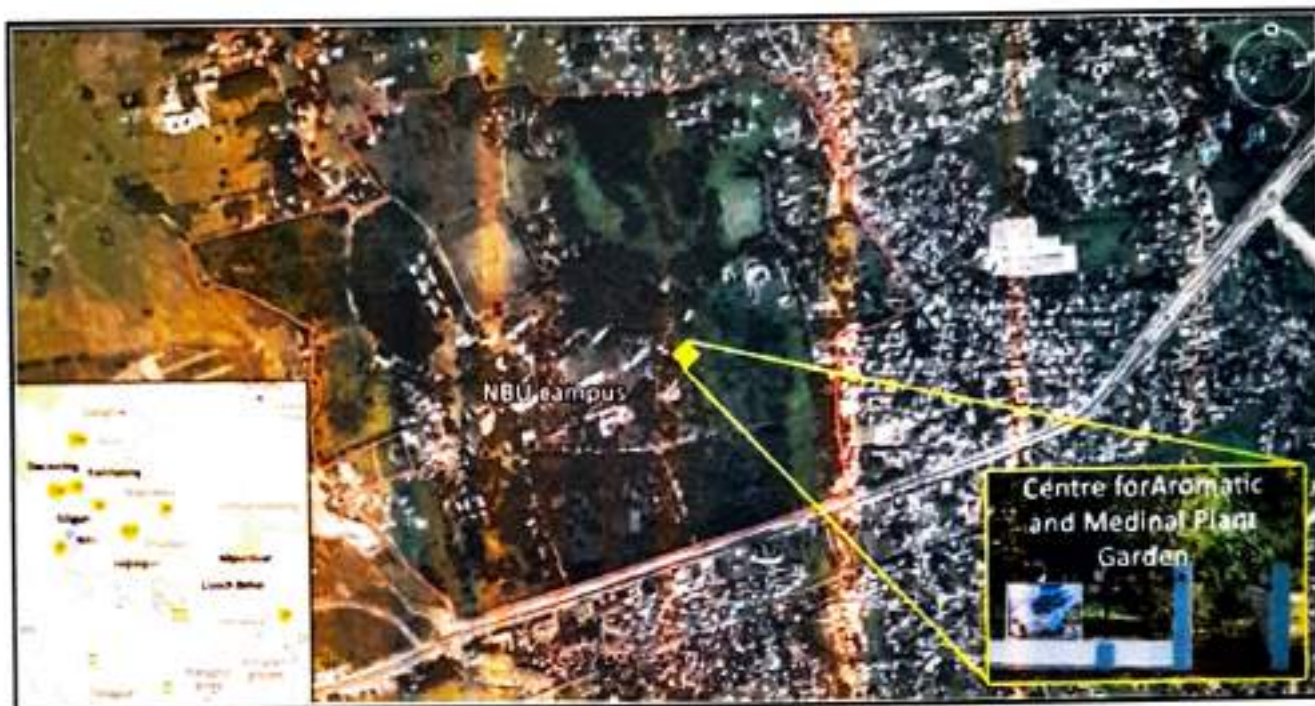
At very beginning a small garden was initiated in a small plot of land in front of the new building of the Department of Botany in the year 1993, inaugurated by Prof. K. N. Chatterjee, the then Vice-Chancellor of the University. With a financial assistance from the Department of Science and Technology, Govt. of West Bengal in the year 1998, letteron Garden of Medicinal Plants was modified by Prof. A. P. Das and Mr. M. U. Alam with financial assistance of National Medicinal Plants Board or NMPB, RKVY, WB-FPIH. Now it is named as "Centre for Conservation & Utilization of Medicinal and Aromatic Plant" and is one of the today's largest institutional aromatic and medicinal plant gardens in West Bengal. Dr. Monoranjan Chowdhury take the charge of this garden from 18.05.2016 and continuing the development and also initiated so many program relating to upgration of garden facilities of this *ex-situ* conservatories with the extensive assistance of the University authority and faculty members of the Department of botany, NBU.

The campus of NBU is quite rich itself with the record of over 700 plants and is quite rich various plants of interest (Das-Ghosh, 2009). The Garden

has been developed with this basic floristic background and that is why a good number of medicinal and aromatic plants are growing here naturally. The garden lies in 26°42'22.393" N latitude and 88°21'12.183" S longitude within Darjeeling District (Map 1). The garden of medicinal and aromatic plants housing several species of plants that are brought from various parts like Western Ghats, Eastern Ghats, central and gangetic plains, North East India and various altitudinal ranges of entire Himalaya and successfully introduced time to time (). It is spread over an area of 5 acre and is with well boundary with concrete and iron wear in all the side. It has two entry gates, one large main gate and one is small gate for everyday use. The total area of the garden is divided into three zones, viz. a. Block A (water tanks, conservation beds, many plants species, orchids etc.) b. Block B (net house, rare and endangered species, conservation beds, vermicompost pit, two store cum visitors room etc.), c. Block C (largest block, Aquatic species, humus and FYM pit, nursery beds, cultivation & demonestratuion plots, orchid rescue house etc.).

Role of Garden:

- Conservation of MAP & RET Plants
- Propagation of rare and endangered species
- Mass propagation of commercially viable Medicinal Plants for cultivation
- Training programs for interested farmers & students
- Assisting in marketing of crude drug
- Arranging regular awareness programs & workshops
- Distribution plants species as planting mataterials and research
- Proper conservation and proper identification
- One class arranged for Orientation and Refreshers courses under UGC-ASC participants.
- Assist to establish new herbal gardens in various institute/ organization
- Provide various sample to researchers, scientist in various institute/organization
- Assist interested people regarding MAP plants and their cultivation



Map 1: Location of garden (www. Googleearth.org)

Materials and Method

Regular monitoring, data collection and photography were made to record the entire germplasm resources of this garden. Newly introduced and newly observed plants were identified using keys provided by Bengal Plants (Vol. 1 & 2), Flora of Bhutan (Vol. 1, 2 & 3) etc. and e-floras and APG III was followed for classification of the plants and for nomenclature of the plants *www. theplantlist.org*, *IPNI*, *Tropicos* were used. To prepare the list of medicinal uses, Medicinal Plants (Joy *et al.*, 2001) and Indian Medicinal Plants (Khare, 2008) and some online references were followed.

Result and Discussion

The present detailed survey shows a total of 729 species (Fig. 1 & 2) of vascular plants belonging to 477 genera and 153 families are present in the garden (Table 1). Among them dicot and monocot together have 675 species whereas, gymnosperms and pteridophytes have 16 species and 38 species respectively. Different research work were conducted time to time on propagation techniques, conservation, phytochemical, ecological and molecular work (Choudhuri & Das, 2014, Mandal *et al.*, 2016, Basak *et al.*, 2018,) on various medicinal, aromatic and threatened species in laboratories of department of Botany and laboratory of Medicinal plants.

Table 1. Table showing total no. of family, genus and species total plant resources of the Garden.

Rank	Pteridophytes	Gymnosperms	Angiosperms		Total
			Dicots	Monocots	
Family	19	9	101	27	156
Genus	29	11	329	108	477
Species	38	16	496	179	729

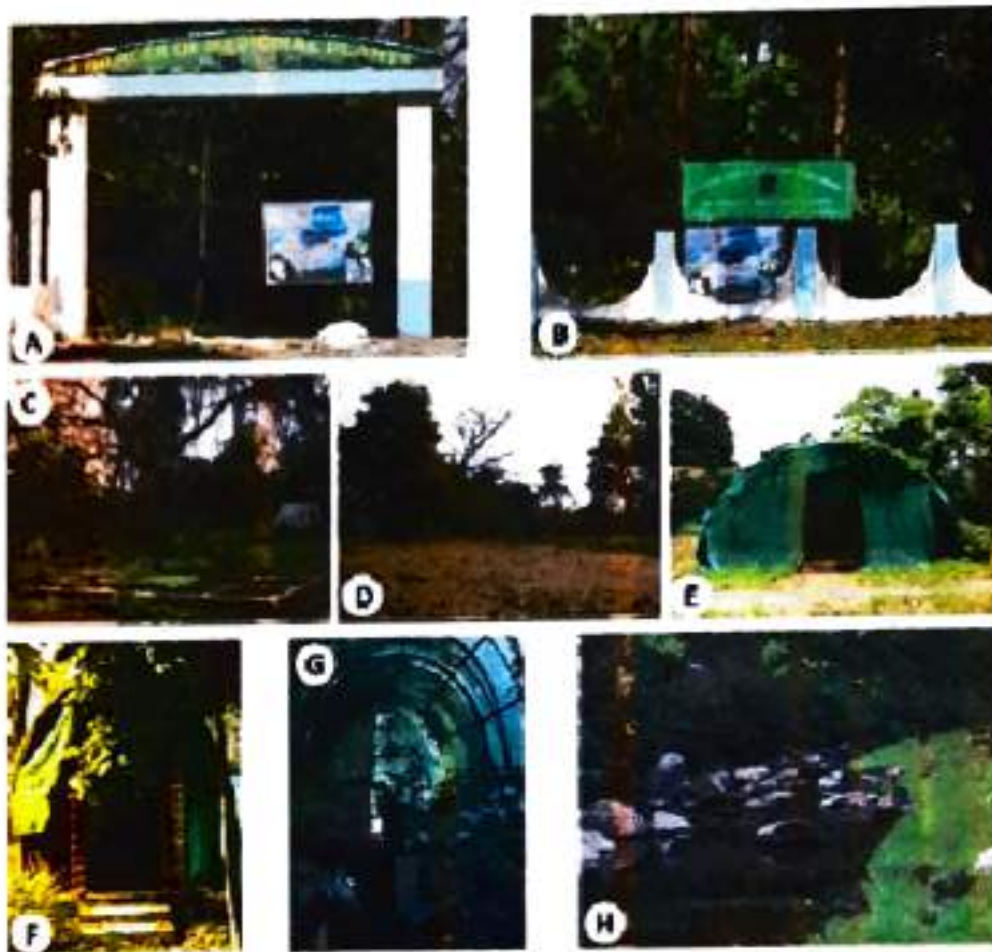


Fig. 1: (A) Main gate of the Centre for Aromatic and Medicinal Plant Garden; (B) A boundary portion of the garden; (C) Water tanks for aquatic plants; (D) A scenario inside garden; (E) Net house for conservation of medicinal plants; (F & G) Net house for propagation of RET plants; (H) A river-scape within garden

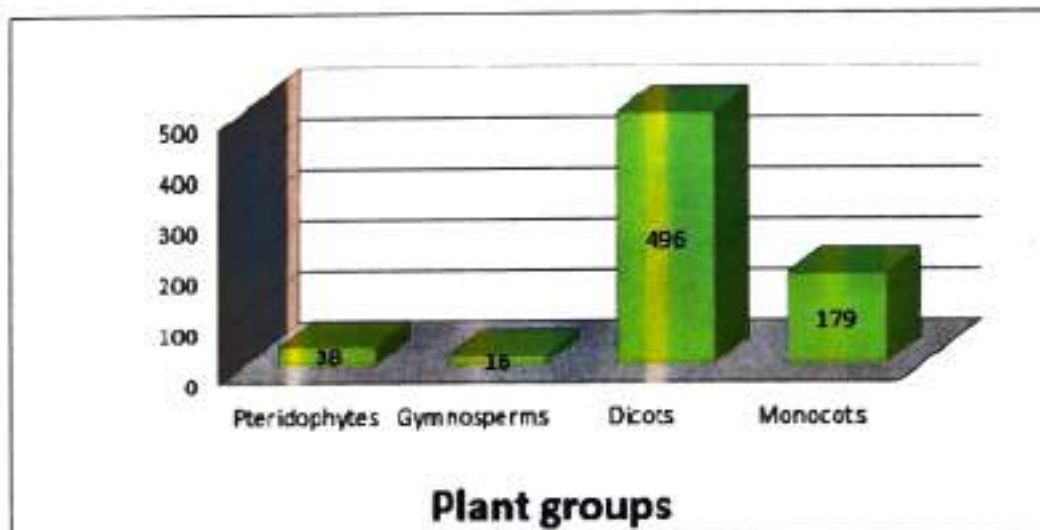


Fig 2: Rational representation of the plant groups

Medicinal plant resources

Among all these plants, there are total 366 species of important medicinal plants belonging to several plant groups. This germplasm resource serves conservation of the medicinal plants, resource for raw drugs etc. A list of medicinal plants is provided with their parts used, medicinal uses and active properties (Table 2).

Table 2. Some important medicinal plants from the garden and their parts used, medicinal uses and active properties.

Plant Name	Parts Used	Medicinal Use	Active properties
<i>Abelmoschus moschatus</i> Medik.	Seeds, root, leaves	Antispasmodic, diuretic, stomachic, nervine	Alpha cephalin, furesol, ambrettolic lactones, ambrettolide, beta-sitosterol
<i>Abroma augusta</i> (L.) L.f.	Rootbark	Used for dysmenorrhoea, amenorrhoea; abortifacient, galactotrophic	abromine, friedelin, abromasterolcholine
<i>Abrus precatorius</i> L.	Seeds	Tetratogenic, uterine stimulant, abortifacient, toxic	Abrin, abrol, precol, glycyrrhizin
<i>Abutilon indicum</i> (L.) Sweet	Plant, seeds, leaves, bark, root	Anthelmintic, febrifuge, demulcent, anti-inflammatory, emollient, antibacterial, astringent, diuretic, nervine tonic	Mucilage, tanins, asparagines, gallic acid, saponins
<i>Acacia catechu</i> (L.f.) Willd.	bark	Astringent, antidiarrhocal, antileprotic	Catechin, Cyanidanol, Catechutannic acid
<i>Acalypha indica</i> L.	Plant	Antibacterial, emetic, expectorant	Kaempferol, acalyphamide, quinone
<i>Acampe praemorsa</i> (Roxb.) Blatt. & McCann.	Root	Used for rheumatism, as tonic	-
<i>Achyranthes aspera</i> L.	Plant, flowers, root, seeds	Astringent, pectoral, diuretic, hepatoprotective, emmenagogue, abrofacient, haemostatic, emetic, antifungal	Achyranthine, betaine
<i>Achyranthes bidentata</i> Blume	Plant	Astringent, diuretic, spasmolytic	Achyranthine, oleanolic acid
<i>Acmella uliginosa</i> (Sw.) Cass.	Plant, seeds, root	Antidysenteric, diuretic, lithotriptic, used in scabies, psoriasis, xerostomia, purgative	alpha- and beta- amyri- naster, myricyl alcohol

<i>Acorus calamus</i> L.	Rhizome	Nervine tonic, tonic, tranquilizer, hypotensive, sedative, analgesic, spasmolytic, anticonvulsant	Beta-asarone, alpha-asarone
<i>Adenanthera pavonina</i> L.	seeds	Astringent, styptic, anti-inflammatory, anticephalgic	O-acetyethanolamine
<i>Aegle marmelos</i> (L.) Corrêa	Roots, Leaves, Fruits	Stomachic, antidiarrhoeal, digestive, astringent, spasmolytic, hypoglycaemic	Xanthotoxol, alloimperatorin methyl ether, rutin, aegeline, marmesin
<i>Aerides odorata</i> Lour.	Fruits, root, leaves	Anti-inflammatory; used in the treatment of joint pain, wounds, tuberculosis, healing boils in nose and ear	-
<i>Aerva lanata</i> (L.) Juss.	Plant	Diuretic, lthontriptic	Palmitic acid, beta-sitosterol, alpha-amyrin
<i>Agave americana</i> L.	Leaves	leaves are used for diseases like warts, cancerous ulcers, putrid tumors; and as resolvent in syphilis and scrofula: antibacterial	Steroidal saponins, hecogenin, piscidic acid
<i>Ageratum conyzoides</i> (L.) L.	Plant	Anti-inflammatory, antibacterial, antifungal, styptic	Stigmasterol, beta-sitosterol
<i>Alangium chinense</i> (Lour.) Harms	Bark, root	Anthelmintic, sedative	-
<i>Albizia lebbek</i> (L.) Benth.	Bark, seeds, flowers, pods	Antiseptic, antibacterial, antiallergic, antidysenteric, antidermatosis, antiprotozoal	Saponins, oleanolic acid, albigenic acid, albigin, acacic acid
<i>Allium cepa</i> L.	Plant, bulb	Anticoagulant, antibiotic, antibacterial, anti-inflammatory, antisclerotic, antiasthmatic, expectorant, carminative, antispasmodic, diuretic, hypotensive, antidiabetic	Allylpropyldisulphide, alicin, alliin, diphenylamine

<i>Allium sativum</i> L.	Plant, bulb	Antibiotic, fungicide, bacteriostatic, anthelmintic, antithrombic, hypotensive, hypoglycaemic, hypocholesterolaemic	Sulphur compounds, allilin, allicin
<i>Alocasia macrorrhizos</i> (L.) G. Don	Rootstock, leaf, tubers	Diuretic, mild laxative, anti-inflammatory, astringent, styptic, antitumour, rubefacient	Triglochinin, iso-triglochinin, HCN
<i>Aloe vera</i> (L.) Burm.f.	Plant, sap/gel	Purgative, emmenagogue, emollient, anti-inflammatory, antimicrobial	Anthraquinone glycosides, carboxypeptidase
<i>Alpinia galanga</i> (L.) Willd.	Rhizome	Carminative, stomachic, circulatory stimulant, diaphoretic, anti-inflammatory	Methyl cinnamate, cineole, d-pinene
<i>Alpinia malaccensis</i> (Burm.f.) Roscoe	Rhizome, fruits	emetic	Methyl cinnamate
<i>Alpinia zerumbet</i> (Pers.) B.L.Burt & R.M.Sm.	Rhizome	Antiulcerative, spasmolytic	Alpha- and beta-pinene, borneol
<i>Alstonia scholaris</i> (L.) R. Br.	Bark	febrifuge, antiperiodic, spasmolytic, antidysenteric, uterine stimulant, hypotensive	Echitamine
<i>Alternanthera sessilis</i> (L.) R.Br. ex DC.	Whole plant	Febrifuge, cholagogue, galactagogue	alpha- and beta-tocopherol, stigmasterol
<i>Amaranthus blitum</i> subs <i>p. oleraceus</i> (L.) Costea.	Whole plant	Stomachic, cooling, emollient, antibilious	-
<i>Amaranthus spinosus</i> L.	Plant, pollen extract	Galactogenic, laxative, spasmolytic, emollient, diuretic, anti-allergic	Alpha-spinasterol, hentriacontane
<i>Amomum subulatum</i> Roxb.	Seeds, pericarp	Antiemetic, stomachic, antibilious, astringent, alexipharmic, antibilious	Chalcone, alpinetin, cineole
<i>Anacardium occidentale</i> L.	Fruits, seeds, leaves, bark	Fungicidal, vermicial, protozoicidal	Anacardic acid

<i>Ananas comosus</i> (L.) Merr.	Fruits, stem	Anti-inflammatory, muscle relaxant, digester, show inhibition of blood platelet aggregation	Bromelain
<i>Andrographis paniculata</i> (Burm.f.) Nees	Plant, leaves, stem	holinergic, antispasmodic, hepatoprotective, stomachic, anthelmintic, alterative, febrifuge, purify blood	Andrographolide, deoxyandrographolide
<i>Anisomeles indica</i> (L.) Kuntze	Whole plant	Anti-inflammatory, anti-bacterial, anticancer, antirheumatic, astringent, carminative, tonic	Apigenin, beta-sitosterol, flavones
<i>Annona reticulata</i> L.	Leaves, fruits, bark	Insecticide, styptic, anthelmintic, antidysenteric, astringent, vermifuge	Annorecticuin, isoannorecticuin, dopamine, salsolinol, coclaurine
<i>Annona squamosa</i> L.	Leaves, seeds, root	Insecticide, abortifacient, purgative, invigorating, sedative, antibilious, antiemetic, expectorant, astringent, antidiarrhoeal, antidysenteric	Quinoline, Squamone, bullatacinone
<i>Aquilaria malaccensis</i> Lam.		Astringent, carminative, antiasthmatic, antidiarrhoeal, antidysenteric,	Agar oil, agarol
<i>Areca catechu</i> L.	Seeds	Tacniacide, astringent, stimulant	Arecoline, arecaidine, guvacine, isoguvacine, arecanut tannins
<i>Argemone mexicana</i> L.	Seed, leaf, root	Induce toxicity, used externally for ulcers and skin diseases	isoquinoline, berberine, protopine
<i>Aristolochia indica</i> L.	Roots, rhizome	Oxytocic, abortifacient, emmenagogue, gastric stimulant, bitter	Aristolochic acids, aristolactans
<i>Artemisia vulgaris</i> L.	Leaf, flower top, plant	Emmenagogue, nervine, menstrual regulator, stomachic, anthelmintic, choloretic, diaphoretic, antilithic	Cineol, thujone, thujyl, citral

<i>Artocarpus lacucha</i> Buch.-Ham.	Bark, seeds, stem	Anti-inflammatory, purgative, vermifuge	Oxyresveratrol, artocarpin
<i>Asparagus adscendens</i> Roxb.	Root	Aphrodisiac, galactagogue, demulcent, cooling, antacid	Asparagin, stigmasterol, sarsasapogenin
<i>Asparagus officinalis</i> L.	Root	Diuretic, laxative, sedative, cardiogenic, galactagogue	Asparagosides, asparagusic acid, asparagines, rutin, kaempferol, quercetin, inulin
<i>Asparagus racemosus</i> Willd.	Root	Galactagogue, styptic, disinfectant (intestinal), astringent, nervine tonic	Shatavarins i-iv, sitosterol
<i>Averrhoa carambola</i> L.	Flowers, fruits, root	Laxative, antidyenteric, antiphlogistic, febrifuge, antiinflammatory, antispasmodic	Oxalic acid, potassium oxalate
<i>Ayapana triplinervis</i> (Vahl) R.M.King & H.Rob.	Plant, leaves	Laxative, cardiac stimulant, emetic, expectorant, bechic, antiscorbutic, alterative, anticholerin, haemostatic	Ayapin, ayapinin, carotene, vitamin C
<i>Azadirachta indica</i> A.Juss.	Bark, leaves, flowers, seeds	Antimicrobial, antifungal, anthelmintic, insecticidal, antiviral, antipyretic, antimalarial, antiperiodic, mosquito larvicidal, anti-inflammatory, antifertility, spermicidal, hypoglycaemic	Nimbin, nimbinic, nimbandiol, quercetin, azadirachtin, nimbol
<i>Bacopa monnieri</i> (L.) Wettst.	Leaves, vegetable	Adaptogenic, diuretic, astringent, sedative, anti-anxiety agent, antiplasmodic	Brahmine, herpestine
<i>Barleria cristata</i> L.	Plant, root, leaves	Hypoglycaemic, sasmogenic, antianaemic	Apigenin, naringenin, quercetin, malvandin, anthraquinones
<i>Barleria strigosa</i> Willd.	Plant	Antiseptic, expectorant, antianimaemic	Beta- and gamma-sitosterol

<i>Bauhinia acuminata</i> L.	Bark, leaves	Antibilious, ant-inflammatory	-
<i>Bauhinia purpurea</i> L.	Bark, flower buds, flowers, stem, plant	Astringent, antidiarrhoeal, antidysenteric	Astragalin, isoquercitrin, quercetin, anthone, chalcone glycosides
<i>Bergenia ciliata</i> (Haw.) Sternb.	Leaves, root, rootbark	Antiscorbutic, astringent, spasmolytic, antidiarrhoeal, antilithic, cardiotoxic, CNS depressant, anti-inflammatory, diuretic and anti-diuretic	Bergenin, gallic acid, glucose, tannins, mucilage, betasitosterol
<i>Bidens pilosa</i> L.	Plant, leaf	Cytotoxic	Phenylheptatriyne
<i>Siophytum reinwardtii</i> (Zucc.) Klotzsch	Plant, leaves, root	Anti-inflammatory, diuretic, astringent, antiseptic, anti-diabetic	-
<i>Bixa orellana</i> L.	Root, bark, seed	Astringent, antipyretic, febrifuge, antiperiodic, antidysenteric, blood-purifier	Bixin
<i>Blumea lacera</i> (Burm.f.) DC.	Plant, leaves, root, oil	Antipyretic, astringent, diuretic, febrifuge, deobstruent, anthelmintic, anticholerin, antibacterial, antifungal	Cineol, d-fenchone, citral, campesterol, hentriacontane, hentriacontanol, alpha-amyrin, lupeol, beta-sitosterol
<i>Boerhavia diffusa</i> L.	Root	Diuretic, anti-inflammatory, antiarthritic, antibacterial, spasmolytic, analgesic, anticonvulsant, expectorant, laxative, abortifacient	Xanthone, beta-exdysone
<i>Bombax ceiba</i> L.	Root, bark, fruit, seed, leaves	Astringent, stimulant, diuretic, expectorant, anti-inflammatory	Beta-sitosterol, carotenes
<i>Brassica juncea</i> (L.) Czern.	Plant, seeds	Antidysenteric, stomachic, diaphoretic, anthelmentic, expectorant	-

<i>Brassica rapa</i> L.	Seeds, plant	Stimulant, emetic, diuretic, rubefacient, counter-irritant, antirheumatic, febrifuge	Gluco-napin
<i>Bridelia retusa</i> (L.) A.Juss.	Bark	Astringent	Tanin, beta-sitosterol, gallic acid, ellagic acid
<i>Brugmansia suaveolens</i> (Humb. & Bonpl. ex Willd.) Bercht. & J.Presl.	Leaves, flowers	Toxic, hallucinant, used in the treatment of asthma	Atropine, hyoscyamine, hyoscine
<i>Buddleja asiatica</i> Lour.	Root	Abortifacient, used in skin diseases	-
<i>Bryophyllum pinnatum</i> (Lam.) Oken	Leaves	Antibacterial, disinfectant, antifungal	Glycosides of quercetin, kaempferol, fumaric acid
<i>Butea monosperma</i> (Lam.) Taub.	Bark, flower, seed, leaf	Astringent, styptic, anthelmintic, diuretic, antibacterial, anti-fungal	Butin, butrin, isobutrin, coreospin, palastrin, sulphurein
<i>Caesalpinia bonduc</i> (L.) Roxb.	Seeds, leaves, bark, root	Antirheumatic, antiperiodic, antidiabetic, febrifuge, emmenagogue, anthelmintic, diuretic, anticalculous	Caesalpinine, bonducin, saponins
<i>Caesalpinia pulcherrima</i> (L.) Sw.	Leaves, flowers, root, bark	Antipyretic, laxative, anthelmintic, febrifuge, emmenagogue, abortifacient	Myricitroside, benzoic acid, hydrocyanic acid
<i>Cajanus cajan</i> (L.) Millsp.	Leaves, pulse	Hypocholesterolaemic, used in jaundice	Phenylalanine, riboflavin, pyridoxin, cajanol
<i>Calotropis gigantea</i> (L.) Dryand.	Flowers, roots, leaves	Stomachic, antiasthmatic, bechic, used in leprocy, lupus, tuberculosis, juice of the leaf is poisonous	Akudarin, beta-amyrin, stigmasterol

<i>Camellia sinensis</i> (L.) Kuntze	Leaves	Stimulant, diuretic, astringent, antidysenteric, antidiarrhoeal	Caffeine, xanthines, tannins, quercetin, kaempferol
<i>Canna indica</i> L.	Leaves, inflorescence	Hallucinogenic, hypotonic, sedative, anti-inflammatory, analgesic	delta-9- tetrahydrocannabinol (THC)
<i>Careya arborea</i> Roxb.	Bark, flower, seed, leaf	Demulcent, antipyretic, antipruritic, anthelmintic, antidiarrhoeal	Beta-amyrin, hexacosanol, taraxerol
<i>Carica papaya</i> L.	Fruits, seeds	Digestive, stomachic, carminative, diuretic, galactagogue, antidysenteric, antidiarrhoeal, emmenagogue, abortifacient, vermifuge	Papain, carpaine, chymopapin
<i>Cascabela thevetia</i> (L.) Lippold	Bark, leaves, root	Bitter cathartic, emetic, poisonous	Thevetin, cerberin, cerebroside, peruvoside
<i>Cassia fistula</i> L.	Flower, pod, seed	Purgative, febrifugal, astringent, antibilious	Sennosides A and B, rhein
<i>Catharanthus roseus</i> (L.) G. Don	Plant	Cytotoxic, used in anaemia like diseases	Vincamine, vinblastine and vincristine
<i>Cayratia trifolia</i> (L.) Domin	Leaves, seeds, root, stem	Astringent, diaphoretic, CNS active, hypothermic,	Hydrocyanic acid, delphinidin, cyanidin
<i>Ceiba pentandra</i> (L.) Gaertn.	Gum, flower, fruit	Astringent, laxative, demulcent, diuretic, antidiabetic,	Linarin
<i>Celastrus paniculatus</i> Willd.	Seeds, seed oil, leaves, root	Brain tonic, nervine, diaphoretic, febrifugal, emetic, antidysenteric, emmenagogue	Celastrine, paniculatine

<i>Celosia argentea</i> L.	Flowers, seeds, plant	Antidiarrhoeal, antibacterial, antiscorbutic, cooling, also used in menorrhagia, blood-dysentery	Potassium, vitamin B1 and B6
<i>Centella asiatica</i> (L.) Urb.	Plant	Adaptogen, CNS relaxant, sedative, peripheral vasodilator, antibiotic, detoxifier, blood purifier, laxative, diuretic, emmenagogue, brain tonic	Brahmoside, asiaticoside, thankuniside, hydrocotyline, velarin, asiatic acid
<i>Cheilocostus speciosus</i> (J.Koenig) C.D.Specht	Plant	Astringent, purgative, depurative, anti-inflammatory, anthelmintic, antivermin, maggoticide, antifungal	Dioscin, gracillin, beta-sitosterolbeta-D-glucoside, saponins, steroidal sapogenin, diogenin
<i>Chenopodium album</i> L.	Plant	Anthelmintic, laxative, blood-purifier, antiscorbutic	Ascaridole, saponins, cryptomeridiol
<i>Chlorophytum arundinaceum</i> Baker	Tuber, plant, root	Nervine, general tonic, antirheumatic	Bibenzyl xyloside, steroidal sapogenins, nonacosane, tetracosanoic acid, triacontanoic acid
<i>Cinnamomum camphora</i> (L.) J.Presl	Carminative, stimulant, depressant	Camphor, safrole, linalool, eugenol, terpenol	-
<i>Cinnamomum tamala</i> (Buch.-Ham.) T.Nees & Eberm.	Leaf, bark	Antidiarrhoeal, carminative, antirheumatic, hypoglycemic, fungicidal	Cinamaldehyde
<i>Cinnamomum verum</i> J.Presl	Bark, leaf	Astringent, carminative, expectorant, haemostatic, antispasmodic, antidiabetic, antiseptic	Cinamaldehyde, eugenol
<i>Cissampelos pareira</i> L.	Root	Astringent, antispasmodic, analgesic, antipyretic, diuretic, antilithic, emmenagogue	Hayatine, methiodide, methochloride
<i>Cissus quadrangularis</i> L.	Stem	Alerative in scurvy and irregular menstruation, show good fracture-healing property	Phytogenic steroid, ketosteroids, sitosterol, alphaamyryn, alpha-ampyrone, coloside-A

<i>Citrullus colocynthis</i> (L.) Schrad.	Dried pulp, root, leaves	Cathartic, drastic purgative, irritant, toxic, anti-inflammatory	Cucurbitacin, caffeic acid, quercetin, kaempferol
<i>Citrus limon</i> (L.) Osbeck	Fruits, leaves, stem	Carminative, antiscorbutic, stomachic, antihistaminic, antibacterial, used during coughs, fever, influenza, biliousness, fruit juice used externally for ringworm, antibacterial	Caumarins, psoralins, flavanoids, volatile oils, vitamin C
<i>Citrus maxima</i> (Burm.) Merr.	Fruits, leaves	Cardiotonic, sedative, dermatophytic	Beta-sitosterol, acridone
<i>Citrus medica</i> L.	Fruit, root, flowers, buds	Refregerant, antiscorbutic, astringent, carminative, stomachic, antibacterial, anthelmintic	Caumarins, limetins, beta-sitosterol
<i>Cleome viscosa</i> L.	Seed, leaves, bark, root	Carminative, antiseptic, anthelmintic, sudorific, vasicant, rubefacient (externally), vermifuge	Cleomaldeic acid, cleomeolide, cleomiscosin
<i>Clerodendrum indicum</i> (L.) Kuntze	Root, leaf	Root used for asthma, cough, resin is antirheumatic	scutellarein, hispidulin, hexitol, sorbitol, pectolinarin, oncinotine
<i>Clerodendrum infortunatum</i> L.	Leaves, root	Leaves and roots applied externally for skin diseases, roots are used in cramps and rheumatism	-
<i>Clitoria ternatea</i> L.	Root, root bark, seeds, leaves	Cathartic, diuretic	Cinnamic acid, flavonol glycoside, glycosides of kaempferol
<i>Cocculus hirsutus</i> (L.) W.Theob.	Root, leaves	Laxative, sudorific, alterative, antirheumatic, sedative, anticonvulsant, hyposensitive, cardiotonic, sapsasmolytic	Cocclaurine, magnoflorine, beta-sitosterol, ginnol
<i>Coffea arabica</i> L.	Seeds	Antinarcotic, Diuretic, psychotropic, heart stimulant, charcoal of the outer seed coat is astringent and absorbant	Caffeine, chlorogenic acid,

<i>Coix lacryma-jobi</i> L.	Fruits, seeds, leaves	Anti-inflammatory, diuretic, have use in menstrual disorder	Trans-ferulyl stigmastanol, trans-ferulyl campestanol, coixenolides
<i>Coleus forskohlii</i> (Willd.) Briq.	Root, leaves	Anti-inflammatory, antithrombotic, spasmolytic, lipolytic	Forskolin
<i>Colocasia esculenta</i> (L.) Schott	Petiole, corn	Styptic, rubefacient	Apigenin, luteolin,
<i>Commelina benghalensis</i> L.	Plant	Antileprotic, demulcent, diuretic, emollient, laxative	N-octacosanol, ntriacontanol, n-dotriacontanol, stigmasterol, beta-sitosterol, campesterol
<i>Coriandrum sativum</i> L.	Plant, oil	Stomachic, stimulant, carminative, antispasmodic, diuretic, hypoglycaemic, anti-inflammatory, bactericidal, larvicidal	delta-linalool, alpha-pinene, terpinine, caumarins, coriandrin
<i>Crinum asiaticum</i> L.	Bulb, root, seeds	Laxative, expectorant, antibilious, diaphoretic, emetic, anti-inflammatory, emmanagogue, diuretic	lycorine, crinamine, crinasiatine
<i>Curculigo orchioides</i> Gaertn.	Rhizome	Nervine, sedative, adaptogenic, anticonvulsive, androgenic, diuretic, anti-inflammatory	Curculigosaponin C, F, G, hentriacontanol, sitosterol, stigmasterol, cycloartenol, sucrose, curculin C
<i>Curcuma amada</i> Roxb.	Rhizome	Carminative, stomachic, expectorant, appetizer, antipyretic, anti-inflammatory, antirheumatic	Curcumin

<i>Curcuma aromatica</i> Sal isb.	Rhizome	Anti-inflammatory, cholagogue, hepatoprotective, blood-purifier, detoxifier, antioxidant, regenerate liver tissues, antiasthmatic, anti-tumour, antiprotozoal, anticutaneous, stomachic, carminative, antifungal, antimicrobial, anthelmintic	Curdione, cerumol, cucurmol
<i>Curcuma caesia</i> Roxb.	Rhizome	Carminative	Essential oil with camphor, camphane, bornylene, sesquiterpene hydrocarbons
<i>Curcuma longa</i> L.	Rhizome	Anti-inflammatory, cholagogue, hepatoprotective, blood-purifier, detoxifier, antioxidant, regenerate liver tissues, antiasthmatic, anti-tumour, antiprotozoal, anticutaneous, stomachic, carminative	Curcumin
<i>Curcuma zedoaria</i> (Christm.) Roscoe	Rhizome	Carminative, stomachic, gastrointestinal stimulant, expectorant, diuretic, demulcent, rubefacient, blood-purifier	Shoti starch, curcumene, curcumenone, curdione, curcumenol, curzerenone, furanogermenone, germacrone, germacrone epoxide
<i>Cuscuta reflexa</i> Roxb.	Plant	Laxative, hepatic, carminative	Cuscutin, cuscutatin, beta-sitosterol, luteolin, bergenin, kaempferol
<i>Cymbidium aloifolium</i> (L.) Sw.	Leaves, root, whole plant	Emetic, purgative; used in treatment of paralysis	-
<i>Cymbopogon citratus</i> (DC.) Stapf	Leaf, essential oil	Stimulant, sudorific, antiperiodic, anticatarrhal, anticholerin, carminative, depressant, analgesic, antifungal, antibacterial, antipyretic	Citral, citronella, geraniol, myrcene
<i>Cynodon dactylon</i> (L.) Pers.	Plant	Astringent, diuretic, antidiarrhoeal, anticatarrhal, styptic, antiseptic	Several phenolic phytotoxin, triclin, flavone-C glycosides, flavonoid sulphate

<i>Cyperus rotundus</i> L.	Plant	Carminative, astringent, anti-inflammatory, diuretic, antirheumatic, hepatoprotective, analgesic, antipyretic, hypopotensive, emmenagogue, nervine tonic	Rich in Cu, Fe, Mg, Ni, beta-sitosterol
<i>Dalbergia sissoo</i> DC.	Root, leaves, bark, wood	Stimulant, anthelmintic, emetic, stomachic, antileprotic, anticholerin, amtringent	Sissotrin,
<i>Dalbergia latifolia</i> Roxb.	Bark	Spasmogenic, stimulant, anthelmintic, appetiser, antidiarrhoeal	Hentriacontane, latifolin, beta-sitosterol, tannins
<i>Datura metel</i> L.	Leaf, corolla, flower, seeds, root	Antirheumatic, antitumour, anti-inflammatory, antiasthmatic, anticatarrhal, febrifuge, antidiarrhoeal, antidermatosis	Hyoscine, hyoscyamine
<i>Datura stramonium</i> L.	Leaves, seeds	Antiasthmatic, spasmolytic, anticholinergic, nerve-sedative, cerebral depressant	Hyoscyamine, hyoscine, atropine
<i>Daucus carota</i> L.	Roots, seeds, carrot, juice	Diuretic, emmenagogue, spasmolytic, antilithic	Beta-carotene, apigenin, chypsin, luteolin, kaempferol, quercetin, furanocoumarins, terpinen-4-ol
<i>Dendrobium aphyllum</i> (Roxb.) C.E.C.Fisch.	Leaves	Used for getting normal shape of deformed head structure in newly born baby	-
<i>Dendrobium densiflorum</i> Lindl.	Leaves	Used in bone fractures	-
<i>Dendrobium nobile</i> Lindl.	Stem, whole plant	Stimulant; used in treatment of eye infection, healing of wounds, soothe burns	-
<i>Desmodium gangeticum</i> (L.) DC.	Root	Diuretic, antipyretic, astringent, anticatarrhal, anthelmintic, laxative, nervine tonic	Gangetin, gangetinin, desmodin, indole-3-alkylamines

<i>Desmodium triflorum</i> (L.) DC.	Leaves, root	Galactagogue, antidiarrhoeal, diuretic, expectorant	Beta-phenylethylamine, tyramine, hypaphorine
<i>Dillenia indica</i> L.	Fruits, bark, leaves	Astringent, laxative, carminative, bechic, febrifuge, antispasmodic	Tannin, arabinogalactan, betulin, betulinic acid, beta-sitosterol, isorhamnetin, naringenin, kaempferol
<i>Dioscorea alata</i> L.	Tubers	Antispasmodic, cholagogue, antirheumatic, anti-inflammatory, diuretic	Anthocyanins, cyanidin, sucrose, D-fructose, D-glucose, sorbitol, glycerol
<i>Dioscorea bulbifera</i> L.	Tubers, leaves	Antidysenteric, febrifuge	Furanoid norditerpenes, D-sorbitol, diosgenin, luccin
<i>Dioscorea deltoidea</i> Wall. ex Griseb.	Tuber, leaves	Antiphthiriatic, febrifuge	Sucrose of diosgenin, steroidal saponins
<i>Dioscorea esculenta</i> (Lour.) Burkill	Tubers	-	Starch
<i>Dioscorea pentaphylla</i> L.	Tubers	Anti-inflammatory	Carbohydrates, albuminoids
<i>Dioscorea prazeri</i> Prain & Burkill	Tubers	Antiphthiriatic	Diosgenin, steroidal saponins, sitosterol glucoside, prazerigenin-A glucoside, prazerigenin-A bioside
<i>Diospyros malabarica</i> (Desr.) Kostel.	Fruit, seed, bark	Astringent, antibacterial, styptic, used in menorrhagia, diarrhoea, dysentery	Betulinic acid, myricyl alcohol, lupeol acid, betulin, gallic acid
<i>Dipterocarpus turbinatus</i> C.F. Gaertn	Resin (Oleo-resin)	Stimulant to genitourinary system, diuretic, spasmolytic, antirheumatic	Humulene, beta-caryophyllene, tannin

<i>Eclipta prostrata</i> (L.) L.	Plant, leaves	Antihepatotoxic, deobstruent, anticatarrhal, febrifuge, promotes hair growth	Wedelolactone, demethylwedelolactone, thiophene acetylenes
<i>Elaeocarpus floribundus</i> Blume	Leaves, fruits, bark	Antirheumatic, antidysenteric, antidiarrhoeal, anti-inflammatory	Vitamin C, myricetin, myricitrin, mearnsetin, ellagic acid, tannin, citric acid
<i>Elaeocarpus serratus</i> L.	Leaf, fruit	Antirheumatic, antidysenteric	Ellagic acid, myricetin, mearnsetin
<i>Elephantopus scaber</i> L.	Plant, root, leaves	Astringent, cardiac tonic, diuretic, mucilaginous, emollient, febrifuge	Molephantin, molephantinin, epifriedelanol, lupeol, stigmasterol
<i>Emilia sonchifolia</i> (L.) DC. ex DC.	Plant, root, leaves	Febrifuge, sudorific, antiseptic, antidiarrhoeal	Senkirkine, doronine, simiaral, beta-sitosterol, stigmasterol, palmitic acid, triacontannic acid
<i>Erydra fluctuans</i> DC.	Leaf	Laxative, antibilious, demulcent, antidermatosis	Beta-carotene
<i>Eryngium foetidum</i> L.	Plant, root, leaves	Galactagogue, diuretic, stomachic	Coumarins, saponins, flavonoids
<i>Erythrina variegata</i> L.	Leaves, bark	Anti-inflammatory, antiseptic, cathartic, diuretic, antibilious, anthelmintic, febrifuge, astringent, expectorant, nervine, sedative, antiasthmatic, antipileptic	Tetracyclic alkaloids
<i>Euphorbia hirta</i> L.	Plant	Antiasthmatic, astispasmodic, pectoral, latex is vermifuge	Shikimic acid, choline

<i>Euphorbia nerifolia</i> L.	Latex	Diuretic, purgative, antiasthmatic, expectorant, rubefacient	Euphol, 24-methylenecycloartenol, euphorbol hexacosonate, taraxerol
<i>Euphorbia royleana</i> Boiss.	Latex	Cathartic, anthelmintic	Euphol, cycloeucalenol, ingenol
<i>Euphorbia tirucalli</i> L.	Plant, latex	Purgative, antiasthmatic, emetic, bechic, antirheumatic	Euphorbinol, cycloeuphordenol
<i>Euryale ferax</i> Salisb.	Seed	Deobstruent, astringent, nerve tonic	-
<i>Ficus benghalensis</i> L.	Bark, milky juice, seed, leaf, bud	Used in dysentery, diabetes, seminal weakness, leucorrhoea, menorrhagia, nervous disorder; milky juice applied to sores, ulcers, cracked soles, rheumatic inflammations; antiemetic	Phytosterolin, bengalenoside, leucocyanidin, leucopelargonidin
<i>Ficus benjamina</i> L.	Leaves, fruits	Diuretic	Bergapten, alpha-amyrin, imperatorin
<i>Ficus hispida</i> L. f.	Syconium, bark, seeds	Galactagogue, purgative, emetic	Beta-sitosterol, beta-amyrin, triacontanyl acetate, gluacol acetate, hispidin, bergapten, psoralen, oleanolic acid
<i>Ficus racemosa</i> L.	Root, fruits, bark	Astringent, antiseptic, carminative, digestive, stomachic, antiemetic, hypoglycaemic, anti-inflammatory	Gluacol, beta-sitosterol, lupeol acetate, friedelin
<i>Ficus religiosa</i> L.	Barks, leaves, twigs	Laxative, astringent, antiseptic, alterative, haemostatic, vaginal disinfectant	Vitamin K, beta-sitosteryl-D-glucoside

<i>Ficus semicordata</i> Buch.-Ham. ex Sm.	Fruits, rot, bark-decotion, syconium, bark	Spasmolytic, antileprotic	-
<i>Flacourtia indica</i> (Bur m.f.) Merr.	Gum, bark, seed, fruit, root	Anticholerin, antidyseric, astringent, diuretic, antirheumatic, stomachic	Flacourtin, vitamin C
<i>Flacourtia jangomas</i> (Lour.) Racusch.	Leaves, fruits, bark	Astringent, stomachic, antidiarrhoeal, used in chronic bronchitis, antibilious	Coumarin, ostruthin, limonoids, jangomolide, limolin
<i>Foeniculum vulgare</i> Mill.	Plant, seeds	Stomachic, carminative, emmenagogue, antispasmodic, anti-inflammatory, diuretic, antifungal, antibacterial	Anethole, limonene, fenchone, coumarins
<i>Gardenia jasminoides</i> J. Ellis	Plant, root, fruits	Antispasmodic, cathartic, anthelmintic, antiperiodic, antidyseric, anti-inflammatory, tranquilizer	Geniposide, genipin, gardenoside, geniposide acid, oleanolic acid, D-mannitol, stigmasterol
<i>Ginkgo biloba</i> L.		Anti-inflammatory, antioxidant, circulatory stimulant, peripheral vasodilator	Ginkgo flavone glycosides, ginkgolides, bilobalide
<i>Girardinia diversifolia</i> (Link) Friis	Leaves	Febrifuge	5-OH-tryptamine, histamine, beta-sitosterol
<i>Gloriosa superba</i> L.	Tuberous root, juice of plant	Alterative, anti-inflammatory, anthelmintic, antileprotic, uterine stimulant	Colchicine
<i>Glycosmis pentaphylla</i> (Retz.) DC.	Stem, root, bark, leaves	Antiinflammatory, antipyretic, astringent, expectorant, vermifuge, bechic, antirheumatic	alphitol, beta-sitosterol, flavonols, tannis

<i>Gmelina arborea</i> Roxb.	Leaf, root, bark	Demulcent, bechic, stomachic, antibilious, laxative, galactagogue, anticephalagic, febrifuge	Lignan, arborone, paulownin acetate, epieudesmin
<i>Gossypium arboreum</i> L.	Seed, root, plant	Antigonorrhoeic, anticatarrhal, febrifuge, uterine stimulant	Gossypol
<i>Grangea maderaspatana</i> (L.) Poir.	Leaves	Stomachic, sedative, antispasmodic, emmenagogue, deobstruent, antiseptic	Phytol, lupeol, p-hydrobenzoic acid, hardwickiic acid, strictic acid, butenolides
<i>Grewia asiatica</i> L.	Fruit, bark, root bark, eaves	Astringent, stomachic, cooling, demulcent, antirheumatic	Taraxasterol, beta-sitosterol, erythrodiol, lupeol, betulin, lupenone, friedelin, alpha-amyrin, quercetin, kaempferol, vitamin A, C, amino acids
<i>Gymnema sylvestre</i> (Retz.) R.Br. ex Sm.	Leaves, plant, root	Antidiabetic, cardio and circulatory stimulatory, diuretic, antibilious, emetic, expectorant, astringent, stomachic	Gymnemagenin, gymnemic acids
<i>Gynocardia odorata</i> R.Br.	Seeds	Applied proriasis, eczema, scrofula, gout, rheumatic	Ketolactone, odolactone,
<i>Hedychium coronarium</i> J.Koenig	Rhizomes	Anti-inflammatory, antirheumatic, febrifuge, tranquilizer	Hedychenone, alpha-pinene, beta-pinene, limonene, carene, linalool, elemole
<i>Heliotropium indicum</i> L.	Plant, flowers, seeds	Astringent, diuretic, emollient, vulnerary, febrifuge, emmenagogue, abortifacient, stomachic	Indicine, echinatine, supinine, heleurine, heliotrine, lasiocarpine, indicine-N-oxide
<i>Hemidesmus indicus</i> (L.) R. Br. ex Schult.	Root	Blood purifier, antisyphilitic, antileucorrhoeic, antirheumatic, antidiarrhoeal, febrifuge, alterative	Coumarino-lignoids, hemidesmine, hemidesmin-1,2, hemidine, hemidescine, emidine, indicine

<i>Hibiscus mutabilis</i> L.	Flowers, leaves	Expectorant, bechic, anodyne, anti-inflammatory	Quercetin, kaempferol, betulinic acid, hexyl stearate, tetratriacontanol, nonacosane, stigmasta-3,7-dione, stigmasta-4-eneone, beta-sitosterol
<i>Hibiscus rosa-sinensis</i> L.	Flowers, leaves, bark, root	Emmenagogue, laxative, anodyne, emolient, leaves stimulates expulsion of placenta after child birth	Methyl stercolate, methyl-2-hydroxystercolate, 2-hydroxystercolate, malvalate, beta-sitosterol, cyanidin 3-sophoroside
<i>Holarrhena pubescens</i> Wall. ex G. Don	Root, bark, seed	Anthelmintic, astringent, amoebicidal, diuretic, antibilious	Regholarrhenine-A, -B, -C, -D, -E, -F, pubescine, norholadine, pubescimine, kurchinine, holarrifine
<i>Houttuynia cordata</i> Thunb.	Plant	Diuretic, used in treatments of haemorrhoids, acute conjunctivitis, ocular infection by <i>Bacillus</i> sp.	Methanonyl ketone, myrcene, alpha-pinene, p-cymene, linalol, geraniol
<i>Hoya parasitica</i> Wall. ex Wight	Leaf extract	Applied to body to alleviate fever and body pain	-
<i>Hybanthus enneaspermus</i> (L.) F. Muell.	Plant, root	Diuretic, demulcent, antigonorrhoeic, root is used in the treatment of urinary infections	Aurantiamide acetate, iso-arborinol, beta-sitosterol
<i>Hygrophila auriculata</i> (Schumach.) Heine	Leaves, roots, seeds	Diuretic, analgesic, seeds used to promote sexual vigour, arrest abortion, used for arthritis	Lupeol, stigmaterol, hydrocarbons

<i>Hyptis suaveolens</i> (L.) Poit.	Plant	Carminative, antispasmodic, antisporific, antirheumatic, anticephalagic, lactagogue, catarrhal stimulant, epistaxis	Lupeol, lupeol acetate, friedelin, campesterol, fucosterol, beta-sitosterol, oleanolic acid, alpha-peltoboykinolic acids, l-sabinene, l-limonene
<i>Ichmocarpus frutescens</i> (L.) W.T.Aiton	Root	Demulcent, diuretic, alterative, diaphoretic, febrifuge	2-hydroxy-4-methoxybenzaldehyde, n-butylsorbose, kaempferol
<i>Imperata cylindrica</i> (L.) Ræusch.	Root	Diuretic, anti-inflammatory, antibacterial, used in fevers	Graminone A and B, cylindrene, cylindol A and B
<i>Indigofera tinctoria</i> L.	Plant, leaves, root, stem	Antiseptic, hepatoprotective, hypoglycaemic, nervine tonic, anti-inflammatory, diuretic, laxative, expectorant, febrifuge, anticephalgic, antitumour, anthelmintic, used in promoting hair growth	Indicine, apigenin, kaempferol, quercetin, coumarins, saponins, tannins
<i>Ipomoea aquatica</i> Forssk.	Plant	Emetic, purgative, used as an antidote for opium or arsenic poisoning	Minerals, vitamins, beta-carotene, xanthophyll, taraxanthin, hentriacontane, beta-sitosterol
<i>Ipomoea nil</i> (L.) Roth	Seeds	Purgative, blood purifier, antifungal	Lysergol, chanoclavine, peniclavine, elymoclavine, resin
<i>Ipomoea quamoclit</i> L.	Powder of root, leaves	The powdered root is given as sternutatory, pounded leaves are used in bleeding piles	Hydrocyanic acid
<i>Jasminum grandiflorum</i> L.	Flowers, plant, oil, leaves	Calming and sedative, CNS depressant, astringent, mild anaesthetic, diuretic, anthelmintic, emmenagogue, externally, flowers and leaf juice used for tumours	Ascorbic acid, anthranilic acid, jasmnine, salicylic acid, jasmone, linalool

<i>Jasminum sambac</i> (L.) Aiton	Root, flowers, leaves	Lactifuge, emmenagogue, blood purifier, hypotensive, antibacterial, also used in the treatment of indolent and breast tumour	Jasminin, quercitrin, isoquercitrin, rutin, quercitrin-3-dirhamnoglycoside, kaempferol-3-rhamnoglycoside, mannitol, alpha-amyrin, beta-sitosterol, sambacin
<i>Jatropha curcas</i> L.	Seed, nut, plant, stem bark	The seeds are highly toxic, nuts are purgative, the plant is used in the treatments of scabies, eczema, whitlow, warts, syphilis, stem bark is applied to wounds of animal bites, root bark to sores	Albumin curcin
<i>Jatropha gossypifolia</i> L.	Leaves, seeds, bark, seeds	Purgative, antidermatosis, emmenagogue, emetic, used in paralytic affections	Jatropholone A, jatrophatrione, jatrophone
<i>Justicia adhatoda</i> L.	Leaves	Expectorant, Febrifuge, antispasmodic	Vasicine
<i>Justicia gendarussa</i> Bur m.f.	Leaves, bark	Febrifuge, emetic, diaphoretic, emmenagogue	Beta-sitosterol, lupeol, friedelin
<i>Kaempferia galanga</i> L.	Tuber	Stimulant, carminative, expectorant, diuretic	n-pentadecane, ethyl-p-methoxy cinnamate, ethyl cinnamate, carene, camphene, borneol, p-methoxystyrene, p-methoxy cinnamate, vitamin P
<i>Kaempferia rotunda</i> L.	Tuber	Antitumour, used in removing blood clot	Crotopoxide, beta-sitosterol, chavicol, cineole
<i>Lagerstroemia speciosa</i> (L.) Pers.	Seed, root, fruit, leaves, bark	Narcotic, astringent, stimulant, febrifuge, purgative, diuretic, deobstruent, antidiarrhoeal	Colocolic acid, maslinic acid, lageracetal, sitosterol ellagitannins
<i>Lannea coromandelica</i> (Houtt.) Merr.	Bark, resin, seed	Antidysenteric, astringent, antidiarrhoeal, febrifuge, vermifuge	Lansic acid, lansioside A, B, c

<i>Lantana × aculeata</i> L.	Plant, leaves, fruits	Antirheumatic, antimalarial	Lantadenes A, B, lincamarone, lantanine
<i>Lawsonia inermis</i> L.	Leaves	Astringent, antispasmodic, antihæmorrhagic, oxytocic, antifertility, antibacterial, antifungal, used as hair conditioner	Lawsonic acid, coumarins, luteolin
<i>Lippia alba</i> (Mill.) N.E.Br. ex Britton & P.Wilson	Leaves	Stomachic, nervine, fungitoxic	Citral, neral, geraniol
<i>Litchi chinensis</i> Sonn.	Fruit, leaf	Refrigent, applied in animal biting	Levulinic acid, malic acid, citric acid, fumaric acid, malonic acid, friedelin, stigmastanol
<i>Litsea glutinosa</i> (Lour.) C.B.Rob.	Leaf, bark, root, extracted oil	Astringent, antispasmodic, emollient, demulcent, emolient, antidiarrhoeal, anodyne, antifungal, antibacterial, decoction of root used as an emmenagogue	Mucilage, boldine, laurotetanine, actinodaphnine, sebiferine, litseferine
<i>Litsea monopetala</i> (Roxb.) Pers.	Bark, root,	Astringent, stimulant, spasmolytic, stomachic, antidiarrhoeal, root have external application for pains, bruises, contusions	Beta-sitosterol, actinodaphnine
<i>Maesa indica</i> (Roxb.) A. DC.	Leaves, fruits, roots	Anthelmintic, roots are used in syphilis	Sitosterol, quercetin-3-rhamnoside
<i>Magnolia grandiflora</i> L.	Bark, wood, leaf	Stimulant, anti-inflammatory, diaphoretic, fungitoxic, wood is toxic	Magnograndiolide, melampomagnolide, cyclocolorone

<i>Magnolia champaca</i> (L.) Baill. ex Pierre	Flower, leaves, root, root, bark, fruit, oil	Antibacterial, antiarthritic, antioxidant, antipyretic, antispasmodic, astringent, diuretic, detoxicant, expectorant, febrifuge, purgative, stimulant, demulcent	Arachidic acid, liriodenine, sesquiterpene lactone, beta-sitosterol
<i>Mangifera indica</i> L.	Ripe and unripe fruit, leaves, kernel, stem bark	Refrigerant, anti-inflammatory, astringent, antiscorbutic, antibacterial, chloretic, diuretic, antifungal, anthelmintic, antispasmodic	Citric acid, ascorbic acid, beta-carotene, phenolic compounds, flavonoids, indicol, taraxone, taraxerol, friedelin, lupeol, mangiferin
<i>Manilkara zapota</i> (L.) P.Royen	Fruit, seeds, bark	Antibilious, diuretic, febrifuge	Tannin, quercitol
<i>Melastoma melabathricum</i> L.	Leaf, flowers, barks	Antiseptic, antidiarrhoeal, astringent, antileucorrhoeic, bark is applied to wounds	Amino acids, beta-sitosterol, melastomic acid
<i>Melia azedarach</i> L.	Leaf, flowers, bark, stem, root bark, seed oil, gum, heart wood	Diuretic, antilithic, anthelmintic, sedative, febrifuge, emmenagogue, antileprotic, deobstruent, resolvent, antirheumatic, insecticidal, insect repellent	Bakayanin, bakalactone, quercitrin, rutin, salanin, vilasinin, azadrine, meliottannic acid, gedunin, some poisonous compounds
<i>Melilotus albus</i> Medik.	Plant	Astringent, emollient, discutient, also used as poultice for swellings	Fraxidin, herniarin, umbelliferone, scopoletin
<i>Mentha × piperita</i> L.	Leaves, oil	Digestive, carminative, chloretic, antispasmodic, diuretic, antiemetic, mildly sedative, diaphoretic, antiseptic, antiviral, expectorant, antifungal, antibacterial	Menthol, menthone, pulegone, menthofuran, 1,8-cineole, menthyl acetate, isomenthone, eriocitrin, luteolin, hesperidin, diosmin, rosmarinic acid, azulenes, cholene, carotenes
<i>Mentha arvensis</i> L.	Plant	Refrigerant, stomachic, diuretic, stimulant, anthelmintic	l-menthol, menthyl acetate, l-menthone, limonene

<i>Mentha longifolia</i> (L.) L.	Leaves, flowering top, oil	Carminative, stimulant, antiseptic, digestive, antibacterial	1,8-cineole, piperitone, piperitone oxide, luteolin, ursolic acid, beta-sitosterol
<i>Mesua ferrea</i> L.	Flower bud, flowers	Astringent, haemostatic, anti-inflammatory, stomachic, antidiysenteric, antibacterial, antifungal	Euxanthone, mesuaxanthone, mesuol, manmeigin, mesuone, beta-sitosterol, mesuaferones, mesuanic acid
<i>Mimosa himalayana</i> Gamble	Leaves, root	Astringent, alterative, antiseptic, styptic, blood purifier, antidiarrhoeal, antidiysenteric	Mimosine, turgorin
<i>Mimusops elengi</i> L.	Fruit, flowers, fruits, bark, seeds	Astringent, antidiysenteric, purgative, bark is given for promoting fertility in women	Spinasterol, taraxerol, D-mannitol, beta-stiosterol, mimusopic acid, mimusopic acid, saponin, rhamnase, arabinose
<i>Mirabilis jalapa</i> L.	Leaves, tuber, root	Mild purgative, spasmolytic, anti-inflammatory, used for treating uretine discharge, anti-tumour	Alpha-amyrin, Mirabilis Antiviral Protein, miraxanthins, vulgaxanthins
<i>Momordica charantia</i> L.	Fruits, seeds, leaves, root	Stomachic, laxative, antibilious, emetic, anthelmintic, purgative, abortifacient, astringent	Momordicosides, 5-hydroxytryptamine, charantin, diosgenin, cholesterol, lanosterol, beta-sitosterol
<i>Momordica dioica</i> Roxb. ex Willd.	Tuberous root	Astringent, febrifuge, antiseptic, anthelmintic, spermicidal, the prepared paste of the root of the male plant applied externally for pain in breast, anti-allergic	-

<i>Monochoria vaginalis</i> (Burm.f.) C.Presl	Leaves, root, bark	Leaf juice is used for coughs, root is stomachic, bark is prescribed in asthma	
<i>Morinda angustifolia</i> Roxb.		Febrifuge, stomachic	Morindin
<i>Moringa oleifera</i> Lam.	Plant, pods, flowers, root juice, fruit, root bark	Cardiac and circulatory stimulant, anthelmintic, antipyretic, cholagogue, stimulant, diuretic, cardiogenic, antipileptic, antiparalytic, anti-viral, anti-inflammatory, analgesic, hypoglycaemic, antispasmodic	Spirochin, pterygospermin, niarizin, niazirin
<i>Morus alba</i> L.	Fruit, leaves, root bark, bark	Cooling, laxative, expectorant, diuretic, hyposensitive, anti-inflammatory, emollient, diaphoretic, hypoglycaemic	Phenolics, rutin, moracetin, anthocyanins, atropin, kwanones, sangennons, mulberofurans
<i>Murraya koenigii</i> (L.) Spreng.	Leaf	Stomachic, spasmolytic, antiprotozoal, used in skin infections	Carbazole alkaloids
<i>Murraya paniculata</i> (L.) Jack	Leaves, roots	Astringent, antipyretic	Murrangatin, phebalosin, mexolide
<i>Musa × paradisiaca</i> L.	Fruits, root, flower	Mildly laxative, anti-diabetes, antidiarrhoeal, antidysenteric, anthelmintic, anti-ulcerogenic	Sitoindoside IV, uronic acid
<i>Myristica fragrans</i> Houtt.	Fruits, seeds	Carminative, spasmolytic, antiemetic, orexigenic, anti-inflammatory, stimulant, also narcotic in high doses	Myristicin, licarin-B, dehydro diisoeugenol, resorcinols, malabericones B and C
<i>Naravelia zeylanica</i> (L.) DC.	Plant, stem	Astringent, anti-inflammatory, vulnerary, anthelmintic	

<i>Nelumbo nucifera</i> Gaertn.	Filament, flowers, rhizomes, rhizome- arrowroot, root	Astringent, haemostatic, anticholerin, febrifuge, anti- diarrhoeal, antidysenteric, diuretic, antiemetic, cooling, anticoagulant	Quercetin, luteolin, kaempferol, iso- quercetin, leucoanthocyanidin, nuciferin, nelyumbonin
<i>Neolamarckia cadam</i> Na (Roxb.) Bosser	Stembark, fruits, flowers, root, leaves	Febrifugal, antidiuretic, anthelmintic, hypoglycaemic, blood purifier, analgesic, abortifacient, astringent	
<i>Nicotiana tabacum</i> L.	Leaves	The decoction of leaves is locally applied for muscle relaxation, antirheumatic	Nicotine
<i>Nigella sativa</i> L.	seeds, oils	Stimulant, carminative, diuretic, lactiferous, emmenagogue, febrifuge, the essential oil is used in cold, cough etc.	Nigellone, 2-methyl- 4-isopropyl-p- quinone, carvone, d- limolene, cymene, palmitic acid, stearic acid, oleic acid, linoleic acid, linolenic acid, beta- sitosterol
<i>Nyctanthes arbor-</i> <i>tristis</i> L.	Leaves	Bitter tonic, cholagogue, febrifuge, anti-inflammatory, hypotensive, respiratory stimulant, antirheumatic	Iridoid glycosides, mannitol, beta- amyrin, beta- sitosterol, hentriacontane, benzoic acid, astragalin, nicotiflorin, oleanolic acid, nyctanthic acid, friedelin, lupeol
<i>Nymphaea nouchali</i> Burm.f.	Flowers, rhizomes	Astringent, cardiac tonic, antidysenteric, the rhizomes are used in dyspepsia	Quercetin, kaempferol, apigenin, nymphalin
<i>Ocimum americanum</i> L.	Plant, leaves, oil	Carminative, stimulant, diaphoretic, bechic, febrifuge, expectorant, antifungal, hypoglycaemic, antidiabetic	Citral, methylpeptone, methylketone, camphor, beta- sitosterol, betulinic acid, ursolic acid, nevadensin

<i>Ocimum basilicum</i> L.	Flowers, seeds, juice of the plant, essential oil	Stimulant, carminative, antispasmodic, diuretic, demulcent, antidyenteric, antibacterial, antifungal, insecticidal	Linalool, methyl ether, eugenol, caffeic acid derivatives, thymol, xanthomicol, aesculetin, p-coumaric acid, eriodictyol
<i>Ocimum gratissimum</i> L.	Plant, seeds, oil	The plant is used in treatments of neurological and rheumatic affections, seeds in cephalalgia and neuralgia, oil is antibacterial, antifungal	Eugenol
<i>Ocimum kilimandscharicum</i> Gürke	Plant, oil	Spasmolytic, antibacterial; the decamphorized oil is insecticidal, mosquito repellent	Camphor, pinene, limonene, terpinolene, myrcene, beta-phellandrene, linalool, camphene, p-cymene, borneol, alpha-selinene
<i>Ocimum tenuiflorum</i> L.	Leaves, seeds, root, plant, oil	Expectorant, carminative, stomachic, antispasmodic, antiasthmatic, antirheumatic, stimulant, hepatoprotective, antiperiodic, antipyretic, diaphoretic, adaptogenic, antistress; root is antimalarial; the oil is antibacterial, antifungal	Eugenol, carvacrol, nerol, eugenolmethylether, ursolic acid, apigenin, luteolin, orientin, molludistin
<i>Oenanthe javanica</i> (B lume) DC.	Plant	Strongly antimutagenic and antitumour	Beta-sitosteryl glucoside, stigmasterol glucoside, isorhamnetin, hyperin, phellandrene, myristicin
<i>Oldenlandia corymbosa</i> L.	Plant	Blood purifier, stomachic	Caffeine, fumaric acid, iridiodoglucoisides

<i>Oroxylum indicum</i> (L.) Kurz	Tender fruits, seeds, root bark, bark	Carminative, stomachic, spasmolytic, antidiarrhoeal, astringent, diuretic, antirheumatic	Baicalein, scutellarein, anthraquinone, aloe-emodin, chrysin, oroxylin
<i>Oxalis corniculata</i> L.	Plant, leaves	Antidiarrhoeal, digestive, anti-inflammatory, analgesic, antipyretic, antiscorbutic; leaf paste is used to cure headache applying over forehead	Vitexin, isovitexin, vitamin C, carotene, calcium oxalate, citric and malic acid
<i>Paederia foetida</i> L.	Leaves, root	Carminative, anti-inflammatory, astringent, spasmolytic, antidiarrhoeal, diuretic, antilithic	epi-friedelanol, embelin, beta-sitosterol, sitosterol, stigmasterol, campesterol, ursolic acid, hentriacontane, hentriacontanol, ceryl alcohol, palmitic acid, methyl mercaptan
<i>Pandanus tectorius</i> Parkinson ex Du Roi	Flowers, leaves, root, oil	Carminative, stomachic, cooling, antiseptic, anti-inflammatory, stimulant, antispasmodic, antirheumatic	Methyl-ether of beta-phenylethyl alcohol, diterpene, d-linalool, phenylethyl acetate, citral, piperidine alkaloids
<i>Passiflora edulis</i> Sims	Fruits	Act as good source of ascorbic acid	Ascorbic acid, carotene, sugars
<i>Passiflora foetida</i> L.	Leaves, root, fruits	Emmenagogue, antihysterical, emetic, antibilious, expectorant	C-glycosides of apigenin and luteolin
<i>Passiflora quadrangularis</i> L.	Fruits, leaves, seeds, root	Narcotic (if taken in excess), cyanogenic, poisonous	
<i>Pergularia daemia</i> (Forssk.) Chiov.	Plant, leaves	Uterine stimulant, expectorant, emetic	Betaine, hentriacontane, lupeol, alpha-and beta-amyrin, beta-sitosterol, calactin, calotropin, calotropagenin, uzarigenin, coroglaucigenin

<i>Pericampylus glaucus</i> (Lam.) Merr.	Leaves	The leaf infusion is used in the treatment of asthma and high fever; pounded leaves are applied in headache; used for arresting falling of hair	Narcotic alkaloid
<i>Persicaria glabra</i> (Willd.) M.Gómez	Plant juice, rootstock, leaves	Expectorant, febrifuge, antispasmodic; plant juice and root stock is used in pneumonia, consumption, jaundice	Quercetin, rhamnetin, quercitrin, avicularin, rutin
<i>Persicaria hydropiper</i> (L.) Delarbre	Plant	Haemostatic, astringent, anti-inflammatory, diuretic, lithotriptic, emmenagogue, antifungal	Warburganal, polygodial, polygonal, quercetin, kaempferol, isorhamnetin, rhamnesin
<i>Phaius tankervilleae</i> (Banks) Blume	Plant	Anti-dysenteric; used in treatments of boils, bone fractures	
<i>Phlogacanthus thyrsiformis</i> (Roxb. ex Hardw.) Mabb.	Whole plant, fruits, leaves	Plant is used in whooping cough and menorrhagia, fruits and leaves are used in fevers	Diterpene lactone, phlogantholide A
<i>Pholidota articulata</i> Lindl.	Plant	Age-sustaining tonic, restorative	
<i>Pholidota imbricata</i> Lindl.	Pseudobulb, plant	Used for treatment of bone fracture	
<i>Phyllanthus acidus</i> (L.) Skeels	Fruits, root, seeds, root bark	Astringent, tonic to liver, cathartic; fruits improve appetite and are useful in biliousness, constipation, vomiting, bronchitis	Tannin, saponin, gallic acid, beta-amyrin, phyllanthol
<i>Phyllanthus amarus</i> Schumacher & Thonn.	Plant, root, stem, leaves	Diuretic, deobstruent, astringent, anti-inflammatory, styptic; used in the treatment of jaundice	Phyllanthin, hypophyllanthin, niranthin, nirtetralin, phylatetralin, quercetin, quercitrin, astragalol, rutin, kaempferol

<i>Phyllanthus emblica</i> L.	Fruit, seed, bark, leaf	Antianaemi, anabolic, bechic, antiemetic, astringent, antihaemorrhagic, antidiarrhoeal, carminative, antioxidant, used in jaundice, dyspepsia, eye problem, antibilious, antiasthmatic, used in bronchitis	Zeatin, phyllembin, gallic acid, vitamin C
<i>Phyllanthus fraternus</i> G.L. Webster	Plant, root, stem, leaves	Diuretic, deobstruent, astringent, anti-inflammatory, styptic; used in the treatment of jaundice	Phyllanthin, hypophyllanthin, niranthin, nirtetralin, phylatetralin, quercetin, quercitrin, astragalin, rutin, kaempferol
<i>Phyllanthus urinaria</i> L.	Plant, root, stem, leaves	Diuretic, deobstruent, astringent, anti-inflammatory, styptic; used in the treatment of jaundice	Quercetin, astragalin, quercitrin, isoquercitrin, rutin
<i>Physalis minima</i> L.	Fruits	Aperient, diuretic and alterative	Potassium nitrate, physalindicanols, withaminimin
<i>Pimenta dioica</i> (L.) Merr.	Berry oil, leaf oil	stimulant, carminative, pain reliever, anaesthetic	Eugenol
<i>Pinus kesiya</i> Royle ex Gordon	Bark, resin	Spasmolytic, antimicrobial	Tannin, alpha-pinene, beta-pinene, longifoline, sesquiterpenes, abetic acid
<i>Piper betle</i> L.	Leaves, fruits	Stimulant, carminative, astringent, antiseptic, antispasmodic, antiseptic, bechic	Beta- and gamma- sitosterol, hentriacontane, pentatriacontane, n-triacontanol, stearic acid, chavicol, carvacrol, eugenol

<i>Piper longum</i> L.	Fruits	Sedative, cholagogue, emmenagogue, digestive, appetizer, carminative, tonic, haematinic; fruits are used for cough, bronchitis, asthma; applied locally on muscular pains and inflammations	Aristolactams, dioxoaporphines, isobutyl amide, longamide, guineensine, pluviatilol, methyl pluviatilol, sesamin and asarinine
<i>Piper nigrum</i> L.	Fruits	Stimulant, diuretic, carminative, anticholerin, sialagogue, bechic, antiasthmatic, rubifacient, externally stimulant	Piperine, piperatine, piperidine, amides, piperylene, piperoleines A, B
<i>Pistia stratiotes</i> L.	Whole plant, root, leaves, ash	Diuretic, antitussive, demulcent, antidysenteric; the ash is applied to ringworm of the scalp	Vitexin, orientin
<i>Platycladus orientalis</i> (L.) Franco	Leaves	Diuretic, insecticidal, antipyretic	Rrhodoxanthin, amentoflavone, hinokiflavone, quercetin, myricetin, carotene, xanthophyll, ascorbic acid
<i>Plumbago zeylanica</i> L.	Root	Digestive stimulant, intestinal flora normalizer; cold infusion is used for influenza, black-water fever	Plumbagin
<i>Pogostemon cablin</i> (Blanco) Benth.	Plant, leaves	Insecticidal; infusion of leaves is given in menstrual troubles	
<i>Polygonum plebeium</i> R. Br.	Plant	Galactogenic, antidiarrhoeal; powdered herb is used in pneumonia	Tannin, oxymethylantraquinone, oleanolic acid, betulinic acid, epifriedelanol, beta-sitosterol, quercetin
<i>Pongamia pinnata</i> (L.) Pierre	Oil, leaves, root, stem bark, seed, pod,	Cholagogue, antileprotic, antirheumatic	coumarones, karanjin, pongamol, pongapin, kanjone

<i>Portulaca oleracea</i> L.	Plant, seeds	Refrigerant, mildly spasmodic, diuretic, antiscorbutic, antidyenteric	l-nor-adrenaline, catechol
<i>Pothos scandens</i> L.	Leaves, root	Antiseptic, anti-inflammatory, antimicrobial; root is applied to abscesses after bruised and fried in oil	
<i>Psidium guajava</i> L.	Fruits, leaves, flowers	Anthelmintic, anidarrhoeal	Linoleic acid, vitamin C
<i>Punica granatum</i> L.	Fruits, leaf, bark, root bark, buds	Digestive, stomachic, astringent, refrigerant, cosive, antiemetic, anthelmintic, febrifuge, antidiarrhoeal	Ellagitannin, punicalagin, punicalin, ellagic acid
<i>Putranjiva roxburghii</i> Wall.	Leaves, seeds, fruits	Refrigerant, analgesic, antipyretic, anti-inflammatory, antirheumatic, laxative, diuretic, aphrodisiac	Glucoputranjiv, glucocochlearin, glucocleomin
<i>Rauvolfia tetraphylla</i> L.	Roots	Sedative, hypotensive	Rouvolscine, ajmalicine
<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	Roots	Antihypertensive, sedative, antianxiety, antipsychotic, hypotonic, antifungal, antimicrobial	Reserpine, reserpiline, serpentine, ajmaline, ajmaciline
<i>Rhododendron arboreum</i> Sm.	Leaves, flowers, stem-bark	Anticephalalgic, spasmolytic, antidiarrhoeal, anti-dysenteric	Ericolin, Cyanidin-3-galactoside, cyanidin-3-arbinoside
<i>Rhynchosyilis retusa</i> (L.) Blume	Plant	Antirheumatic, anti-dysenteric, emollient; used for healing wounds, epilepsy, cramps, kidney - stone, palpitation, tuberculosis, vertigo	
<i>Ricinus communis</i> L.	Seeds, leaves, root, bark	Purgative; oil is used in dermatosis and eczema, anti-inflammatory, laxative	Ricin, ricinine, ricinoleic acid, stearic acid, oleic acid

<i>Rosmarinus officinalis</i> L.	Leaves, flowering tops, oils	Anti-inflammatory, astringent, antiseptic, stomachic, carminative, diuretic, emmenagogue	Apigenin, diosmetin, diosmin, rosmarinic acid, rosmarinic acid, ursolic acid, oleanolic acid
<i>Rubus ellipticus</i> Sm.	Root, young stem	Used in colic pain	Rubitic acid
<i>Rumex dentatus</i> L.	Plant	Astringent; used in cutaneous disorders	Vitamin C, A, rutin, avicularin, quercitrin, quercetin, chrysophanic acid, emodin
<i>Rumex maritimus</i> L.	Leaves, seeds, root	Cathartic, aphrodisiac; leaves are externally applied to burns, purgative	Rumarin, rutin, hyperin, chrysophanic acid, saccharose, tannin
<i>Rungia pectinata</i> (L.) Nees	Leaves, root	Aperient, febrifuge, refrigerant, anti-inflammatory, febrifuge	
<i>Ruscus aculeatus</i> L.	Rhizome	Deobstruent, anti-inflammatory, haemostatic	Steroid saponins
<i>Saccharum spontaneum</i> L.	Cane juice	Restorative, cooling, laxative, demulcent, diuretic, antiseptic	Sucrose, glucose, fructose, asparagine, glutamine, thiamine, riboflavin, niacin, pantothenic acid, biotin, vitamin D
<i>Salix tetrasperma</i> Roxb.	Dried leaves, bark	Anti-inflammatory, antirheumatic, febrifuge	Tannin, salicin A, fragilin, picein, salicin, salicortin, triandrin, vimalin
<i>Sansevieria hyacinthoides</i> (L.) Druce	Leaves, rhizome, tender shoots	Mucilaginous (used for cough), diuretic, diaphoretic, expectorant; leaves and rhizomes are applied externally in high fever	Aconitic acid, sansevierine

<i>Santalum album</i> L.	Bark	Diuretic, expectorant, cooling, diaphoretic, antiseptic, antibacterial. Antifungal	Urs-12-en-3 butyl-palmitate, alpha- and beta-santalol, alpha-, beta-santalene, dihydroagarofura
<i>Saraca asoca</i> (Roxb.) Willd.	Bark, flowers	Antitoxic, antiseptic, anti-maenorrhagia, anti-microbial, astringent, anti-oxytotic, analgesic, cardiac tonic, diuretic	Tanin, catechin, quercetin, kaempferol
<i>Sauropus androgynus</i> (L.) Merr.	Plant	Show good amount of vitamin content; febrifuge, diuretic	Carotene, thiamine, riboflavin, nicotinic acid, vitamin C
<i>Schima wallichii</i> Choisy	Bark, all ariel parts	Anthelmintic, rubefacient, antifungal	
<i>Scoparia dulcis</i> L.	Leaves, stem, plant	Antidiabetic, antimalarial, antipyretic	Amellin, scutellarein
<i>Senna alata</i> (L.) Roxb.	Leaves	Antiseptic, laxative	Rhein, anthraglucosides, chrysopanic acid
<i>Senna occidentalis</i> (L.) Link	Plant, root, leaves, seeds	Bitter, thermogenic, purgative, expectorant, febrifuge, diuretic, inflammatory, digestive, stomachic, tonic, acrid	Chrysopanol, emodin, physcion, 7-rhamnoside, crude protein and fibre, calcium phosphate, ascorbic acid
<i>Senna sophera</i> (L.) Roxb.	Leaves, seeds, bark	Cathartic, spasmolytic, intestinal and bronchial muscle relaxant	Flavone glycoside, sennoside, anthraquinones, chrysophanol, physcion, beta-sitosterol, sopheranin, emodin
<i>Senna tora</i> (L.) Roxb.	Leaves, seeds	Anthelmintic, laxative, antiperiodic, purgative	Chrysophanol, aloe-emodin, rhein, emodin

<i>Sesamum indicum</i> L.	Seeds, leaves	Protein source, nourishing, lactagogue, diuretic, laxative, emollient, antidiarrhoeal, antidyenteric	Thiamine, niacine, sesamin, sesamolin, sesamol, pedaline, pinoresinol, riboflavin, nicotinic acid, folic acid, biotin pyridoxin, insitol, other vitamins, fatty acids
<i>Sesbania grandiflora</i> (L.) Pers.	Plant	Astringent, antihistaminic, febrifuge	Nonacosan-6-one, kaempferol-3-rutinoside, galactomannan, saponin, grandiflorol, gum, tannin
<i>Sesbania sesban</i> (L.) Merr.	Seeds, bark, leaves, oil	Astringent, emmenagogue, anti-inflammatory, cardiac depressant, antibacterial	Cholesterol, campesterol, beta-sitosterol, cyanidin, delphinidin glucosides, alpha-ketoglutaric acid, olaxoacetic acid, pyruvic acids
<i>Shorea robusta</i> Gaertn.	Fruit, resin, essential oil	Astringent antidiarrhoeal, antidyenteric, antiseptic, detergent	Tanin, oleanolic acid, dammarenolic acid
<i>Sida acuta</i> Burm.f.	Root, leaves	Cooling, astringent, stomachic, febrifuge, diuretic, demulcent, hypotensive, antimicrobial	Phenethylamine, ephedrine, siephedrine, vasicinol, vasicinone, vasicine, choline, hypaphorine, betaine, alpha-amyrin, ecdysterone, cryptolepine
<i>Sida cordifolia</i> L.	Juice of the plant, root, leaves	Spermatopietic, invigorating, nervine tonic, antirheumatic, febrifuge, demulcent, antidyenteric	Ephedrine, si-ephedrine, steroids, phytosterol, resin, mucin, beta-phenethylamine, hypaphorine, vasicinone, vasicine, vasicinol, choline, betain

<i>Sida rhombifolia</i> L.	Plant, leaves, stem mucilage	Demulcent, emollient, diuretic, febrifuge	Ephedrine, si-ephedrine and cryptolepine, beta-phenethylamine, vasicinol, vasicinone, vasicine, choline, betaine
<i>Simarouba amara</i> Aubl.	Bark, leaves	Antidysenteric, antimalarial, diaphoretic, analgesic, smebicide, antipyretic, antibacterial, antiprotozoal	Simarolide, simaroubidin, , simarubolide, sitosterol, ailanthone, melianone, benzoquinone
<i>Smilax ovalifolia</i> Roxb. ex D.Don	Root	The root is used in the treatment of venereal diseases, urinary infection, rheumatism, dysentery	-
<i>Solanum americanum</i> Mill.	Plant, berries, flowers, leaves	Antispasmodic, anti-inflammatory, laxative, sedative, diuratic, antiseptic, antidiarrhoeal, antipyretic,	Solasonine, alpha- and beta-solanigrine, solasonine, sapogenins, diosgenin, tigogenin
<i>Solanum torvum</i> Sw.	Plant, leaves, fruits, root	Digestive, diuretic, sedative, haemostatic, expectorant	Solasoline, chlorogenin, sitosterol-D-glucoside
<i>Sonchus asper</i> (L.) Hill	Plant	Emollient	Rubber, alpha- and beta-lactuceros, ceryl alcohol, mannitol, acetic acid, ascorbic acid
<i>Spathodea campanulata</i> P.Beauv.	Bark, leaves	Anti-dysentery, stomachic, anti-inflammatory (urethral)	Oleanolic acid, tannin, caffeic acid, chlorogenic acid, quercetin-3-galactoside, malvidin
<i>Spinacia oleracea</i> L.	Seeds	Cooling, laxative, potherb	Rutin, hyperoside, astragaline, caffeic acid, chlorogenic acid, neochlorogenic acid, hexomine, spirasaponin

<i>Spondias pinnata</i> (L. f.) Kurz	Fruits, leaves, bark, root	Astringent, antidysenteric, antisepitic, antiscorbutic, antirheumatic, root is used for regulating menstruation	
<i>Stachytarpheta indica</i> (L.) Vahl	Plant, bark	Anti-inflammatory, febrifuge, antirheumatic	Friedelin, stigmasterol, ursolic acid, hispidulin, scutellarein, choline, tarphetalin
<i>Stellaria media</i> (L.) Vill.	Plant	anti-inflammatory, antirheumatic, astringent, refrigent, antipruritic, demulcent, vulnerary	Saponin glycosides, coumarins, rutin, carboxylic acid, vitamin C
<i>Stephania glabra</i> (Roxb.) Miers	Tubers	Used in pulmonar diseases, asthma, intestinal disorders, hyperglycaemia; antibiotic, anti- inflammatory, hypotensive, sedative, spasmolytic, hypoglycaemic, CNS active	Palmitine, stepharine, cycleanine, hyndarine, tetrahydropalmatine
<i>Stephania japonica</i> (Thunb.) Miers	Root	Used in skin diseases, pruritus, inflamed piles, internal abscesses, urinary diseases, vomiting, diarrhoea, respiratory disorders	epi-stephanine, hernandifoline, aknadinine, magnoflorine, fangchinoline
<i>Streblus asper</i> Lour.	Bark, root, latex	Antidiarrhoeal, febrifuge, anti- inflammatory	Asperoside, strebloside, alpha-amyrin acetate, lupeol, beta-sitosterol
<i>Strychnos nux- vomica</i> L.	Seed, bark, root	Nervine tonic, CNS stimulant, antidysenteric, antidiarrhoeal, antiparalytic febrifuge	Strychnine, brucine, colubrine, icajne, novacine etc.

<i>Swertia chirayita</i> (Roxb. ex Flem.) Karst.	Plant	Blood purifier, bitter tonic, anti-inflammatory, hypoglycaemic, astringent, stomachic, antimalarial, anthelmintic; antiasthmatic, bechic, liver tonic	Decussatin, mangiferin, swerchirin, swertianin, isobellidifolin, gentianine, gentiocrucine, enicoflavine, glycosylflavones
<i>Syzygium jambos</i> (L.) Alston	Fruits, bark, leaves	astringent, antidiarrhoeal, antidysenteric, anti-inflammatory	amino acids, dl-alpha-pinene, l-limonene
<i>Syzygium cumini</i> (L.) Skeels	Fruit, bark, seeds, leaves	Stomachic, carminative, diuretic, antidiarrhoeal, hypoglycaemic, antidysenteric, antibacterial	Bergenin, gallic acid, ethyl gallate, citric acid, malic acid, tannin, ellagic acid
<i>Tabernaemontana divaricata</i> (L.) R.Br. ex Roem. & Schult.	Leaves, flowers, root	Anti-inflammatory, acrid, anodyne, vermicide, antihypertensive, diuretic	Voacristine, voacangine, coronaridine, vobasine, tabernaemontanine, dregamine, iIsovoacristic hydrochloride, tabersonine
<i>Tacca integrifolia</i> Ker Gawl.	Tuber	Nutritive, digestive	Gamma-amino-butyric acid, glycine, leucine, valine, quercetin-3-arabinoside, D (-)-ribose, betulinic acid, castanogenin, taccalin
<i>Tagetes erecta</i> L.	Plant, flowers, leaves	Expectorant, antirheumatic, alterative, stypic, emengagogue, diuretic, vermifuge	Quercetagetin, tagetiin, limonene, ocimene, linalyl acetate, linalool, tagetone

<i>Tamarindus indica</i> L.	Fruits, seeds, leaves, root, bark	Cooling, digestive, carminative, laxative, antiscourbic, antibilious, anti-inflammatory, antipyretic, astringent, antidiarrhoeal, stimulant	Carbohydrates, tartaric acid, malic acid, tamarindial
<i>Taxus baccata</i> L.	Leaves, bark, fruits	CNS depressant, reduces motor activity, analgesic, anticonvulsant, antispasmodic, sedative, emmenagogue	Taxol, taxine, sequoiflavone, ginkgetin, kayaflavone, amentoflavone, beta-sitosterol
<i>Tectona grandis</i> L.f.	Flowers, root, wood, bark, nut oil	Antibilious, diuretic, expectorant, anti-inflammatory, anthelmatic, astringent	Tectoleafquinone, tannin, linoleic acid, organic acids
<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Bark, fruits	Cardioprotective, cardiotonin, diuretic, deobstruent	arjunolic acid, terminic acid, arjunetin, arjunosides I-IV, flavones, tannins
<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Ripe and unripe fruits	Astringent, purgative, antipyretic, antidiarrhoeal, antibilious, antiallergic	Beta-sitosterol, chebulagic acid, bellaricanin, ellagic acid, gallic acid,
<i>Terminalia chebula</i> Retz	Fruits, bark	Purgative, astringent, laxative, stomachic, antibilious, alterative, diuretic	Shikimic acid, gallic acid, triacontanic acid, palmitic acid, beta-sitosterol, chebulic acid, terchebulin, chebupentol, arjunolic acid
<i>Terminalia myriocarpa</i> Van Heurck & Müll. Arg.	Bark	Cardiac stimulant, mild diuretic	Beta-sitosterol, tannins, ellagic acid, gallic acid, chebulinic acid, chebulagic acid
<i>Tetragium serrulatum</i> (Roxb.) Planch.	Aerial parts	Anticancer	-

<i>Theobroma cacao</i> L.	Seeds, leaves	Stimulating, diuretic, local anaesthetic	Methylxanthine, cocaine, caffeine
<i>Thunbergia grandiflora</i> (Roxb. ex Rottl.) Roxb.	Leaves	Used against snake bites	Amino acids, apigenin 7-glucoronide, luteolin, anthocyanin
<i>Tinospora sinensis</i> (Lour.) Merr.	Plant, stem, starch	Antipyretic, anti-inflammatory, antiperiodic, antirheumatic, spasmolytic, hypoglycaemic, hepatoprotective, febrifuge, antacid, antidiarrhoeal, antidyenteric	Berberine, columbin, chasmanthin, palmarin, tinosporon, tinosporic acid, tinosporol
<i>Tragia involucrata</i> L.	Root	Febrifuge, diaphoretic, alterative, blood purifier; the fruits are used for baldness	-
<i>Trema orientalis</i> (L.) Blume	Root, bark	Astringent, styptic, antidiarrhoeal, analgesic	Tannin, simiarenol, tremetol, simiurenone, octacosanoic acid, 1-octacosanyl acetate
<i>Trichosanthes dioica</i> Roxb.	Aerial parts, fruits, leaves, root	Hypoglycaemic, febrifuge, cathartic	Nnicotinic acid, riboflavin, vitamin C, thiamine, 5-hydroxytryptamine, cucurbita-5-dienol, colocynthin, trichosanthin, hentriacontane, saturated fatty acids
<i>Trichosanthes lepiniana</i> (Naudin) Cogn.	Fruits	Cathartic, anthiasthmatic, anti-inflammatory	Trichotetrol
<i>Tridax procumbens</i> (L.) L.	Leaves	Stypic, antidiarrhoeal, antidyenteric, antiseptic	Fumaric acid, dotriacontanol, beta-amyrin, beta-amyrone, lupeol

<i>Trigonella foenum-graecum</i> L.	Seeds	Anti-hyperglycaemic, pancreas stimulant, anti-inflammatory, analgesic, nervine tonic, antioxidant, digestive stimulant, carminative, lactagogue	Trigonelline, gentianine, carpaine, diosgenin, yamogenin, gitogenin, tigogenin, vitexin, luteolin, fenugreekine
<i>Triumfetta rhomboidea</i> Jacq.	Leaves, bark, root, flowers	Astringent, anticholerin, demulcent, styptic, diuretic, galactogenic	
<i>Tylophora indica</i> (Burm f.) Merr.	Leaves	Antiasthmatic, antiallergic	Tylophorine, tylophorinine, desmethyltylophorine, kaempferol, tylophorinidine, alpha- and beta-amyrin, beta-sitosterol, stigmasterol, campesterol, phenylalanine, quercetin, ceryl alcohol
<i>Typha elephantina</i> Roxb.	Rhizomes, pollen	Astringent, diuretic, antidysenteric; the pollen is used for internal and external bleeding	Isorhamnetin, pentacosane, plant sterol
<i>Typhonium trilobatum</i> (L.) Schott	Plant, tuber	Stimulant, analgesic, anti-inflammatory	Carotene, folic acid, niacin, thiamine, sterols, beta-sitosterol
<i>Uraria picta</i> (Jacq.) DC.	Root, leaves, plant	Expectorant, febrifuge, antiseptic	
<i>Urena lobata</i> L.	Root, flowers	Emollient, diuretic, antispasmodic, antirheumatic, expectorant	Magniferin, quercetin, alkanes, stigmasterol, beta-sitosterol, mucilage
<i>Urtica dioica</i> L.	Plant	Astringent, diuretic, antihemorrhagic, blood detoxifier, haemostatic	Acetylcholine, histamine, betaine, choline
<i>Urtica parviflora</i> Roxb.	Root, leaves, inflorescence	The root is used in the treatment of fractures and dislocations; tonic	-

<i>Vallis solanacea</i> (Roth) Kuntze	Latex, bark, seeds	Astringent, cardiac tonic; the latex is applied to wounds and sores	Acoschimperoside P, mono-O-acetylvalloside, mono-O-acetylsolanoside, valloside, vallosolanoside, solanoside, palmitic acid, oleic acid, linoleic acid, beta-sitosterol, beta-amyrin, ursolic acid
<i>Vitex negundo</i> L.	Seeds, leaves, flowers, plant	Bitter, acrid, thermogenic, anthelmintic, expectorant, carminative, digestive, stomachic, anti-inflammatory, antiseptic, cephalic, alterate, antipyretic, diuretic	Nishindine, hydrocotylene
<i>Withania somnifera</i> (L.) Dunal	Root, ash	Anti-inflammatory, sedative, hepatoprotective, antibacterial, diuretic, hypotonic, antibacterial, antitumour	Nicotine, somnine, somniferine, somniferinine, withanine, withanianine
<i>Wrightia arborea</i> (Dennst.) Mabb.	Bark	Anthelmintic, astringent, amoebicidal, diuretic, antibilious	Conessine, holarrhine, kurchicine, konkurchine, beta-sitosterol, lupeol, alpha-amyrin, wrightiadione
<i>Xanthium strumarium</i> L.	Plant, root, leaves, fruits	Narcotic, diuretic, diaphoretic, sedative, antitumour, plant extract is used locally for ulcers, boils, abscesses	Xanthinin, xanthumin, xanthanol, isohexacosane, chlorobutanol, stearyl alcohol, beta-sitosterol, palmitic acid
<i>Zanthoxylum budrunga</i> DC.	Fruits, pericarp, bark, root, essential oil	Antiasthmatic, antirheumatic, astringent, digestive, stimulant, disinfectant, cholinergic, diuretic, hypoglycaemic, spasmolytic, emmenagogue, febrifuge	Chelerythrine, evodiamine

<i>Zingiber montanum</i> (J. Koenig) Link ex A. Dietr.	Rhizome	Carminative, stimulant, antispasmodic	Terpinen-4-ol, alpha- and beta-pinene, sabinene, myrcene, terpinene, limonene
<i>Zingiber officinale</i> Roscoe	Rhizome	Antiemetic, antifatulent, hypocholesterolaemic, anti-inflammatory, antispasmodic, expectorant, circulatory stimulant, diaphoretic	Geranial, neral, beta-sesquiphellandrene, betabisabolene, ar-curcumene, alphazingiberene, gingesulphonic acid, gingerol, shogaol
<i>Zingiber zerumbet</i> (L.) Roscoe ex Sm.	Rhizome, oil	Expectorant, anthelmintic, antiseptic	Curcumin, humulene, zerumbone, camphene
<i>Ziziphus jujuba</i> Mill.	Fruit, seed, kernel, bark	Antiallergia, tonic, emollient, antitussive	Quercetin, rhamnetin, eriodictyol, sativanines, frangulanine, nummularine B
<i>Ziziphus oenopolia</i> (L.) Mill.	Fruits, root	Stomachic, anthelmintic, diuretic, hypotensive	Zizyphines, zizyphinine

Threatened plant resources of the garden

Among all these plants there are several plants listed under rare and threatened plant category.

Some of the RAT plants are listed below (Table 3).

Table 3. Rare and threatened plant resources of the garden.

Species Name	Species Name
<i>Tylophora indica</i> (Burm. f.) Merr.	<i>Gymnema sylvestre</i> R.Br.
<i>Celastrus paniculatus</i> Willd.	<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz
<i>Swertia chirayita</i> (Roxb. ex Flem.) Karst.	<i>Helminthostachys zeylanica</i> (L.) Hook.
<i>Aristolochia saccata</i>	<i>Mucuna pruriens</i> (L.) DC.
<i>Gloriosa superba</i> L.	<i>Dioscorea prazeri</i> Prain & Burkill
<i>Toona ciliata</i> M.Roem.	<i>Asparagus racemosus</i> Willd.
<i>Mesua ferrea</i> L.	<i>Gynocardia odorata</i> R.Br.
<i>Codariocalyx motorius</i> (Houtt.) H. Ohashi	<i>Drosera burmanni</i> Vahl
<i>Commiphora mukul</i> (Hook. ex Stocks) Engl.	<i>Stevia rebaudiana</i> (Bertoni) Bertoni
<i>Gnetum gnemon</i> L.	<i>Bacopa monnieri</i> (L.) Wettst.
<i>Gnetum ula</i> Brongn.	<i>Nepanthes khasiana</i> Hook. f
<i>Ginkgo biloba</i> L.	<i>Magnolia grandiflora</i> L.
<i>Hibiscus fragrans</i> Roxburgh	<i>Taxus baccata</i> L.
<i>Psilotum nudum</i> (L.) P. Beauv.	<i>Cinnamomum bejolghota</i> (Buch.-Ham.) Sweet
<i>Rhododendron arboreum</i> Sm.	<i>Tacca integrifolia</i> Ker Gawl.
<i>Phaius tankervilleae</i> (Banks) Blume	<i>Cyathea spinulosa</i> Wall. ex Hook.
<i>Pinus kesiya</i> Royle ex Gordon	<i>Acorus calamus</i> L.

Conclusion

Presently each and every taxon needs conservation and protection against heavy destruction. The NBU MAPs' garden not only provides conservation and great resource for MAPs but the huge green area provide eye pleasant scenario to us. The garden also serves shelter & foods for several insects, birds, amphibians and reptiles. Medicinal gardens are mandatory steps towards the *ex-situ* conservation. Along with providing conservation and protection this Centre for Conservation & Utilization of Medicinal and Aromatic Plant along with other such centre are act as germplasm bank and also provide raw materials to fulfill the present day demand.

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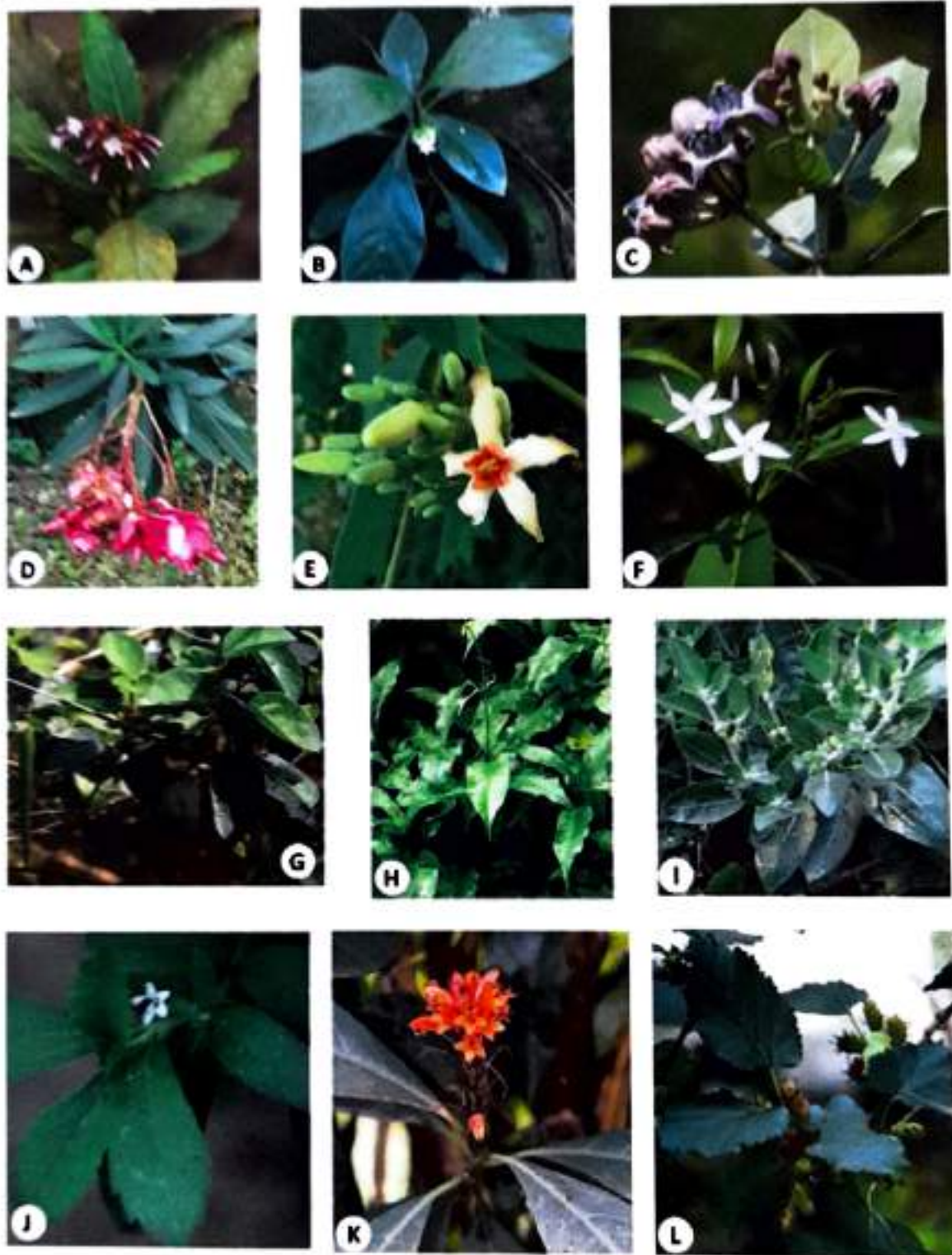


Figure 3. A, *Pauwolfia serpentine*; B, *Carapichea ipecacuanha*; C, *Calotropis gigantean*; D, *Nerium oleander*; E, *Wrightia arborea*; F, *Alstonia neriifolia*; G, *Gymnema sylvestre*; H, *Vallaris solanacea*; I, *Withania somnifera*; J, *Stevia rebaudiana*; K, *Phlogacanthus thyriformis*; L, *Morus alba*

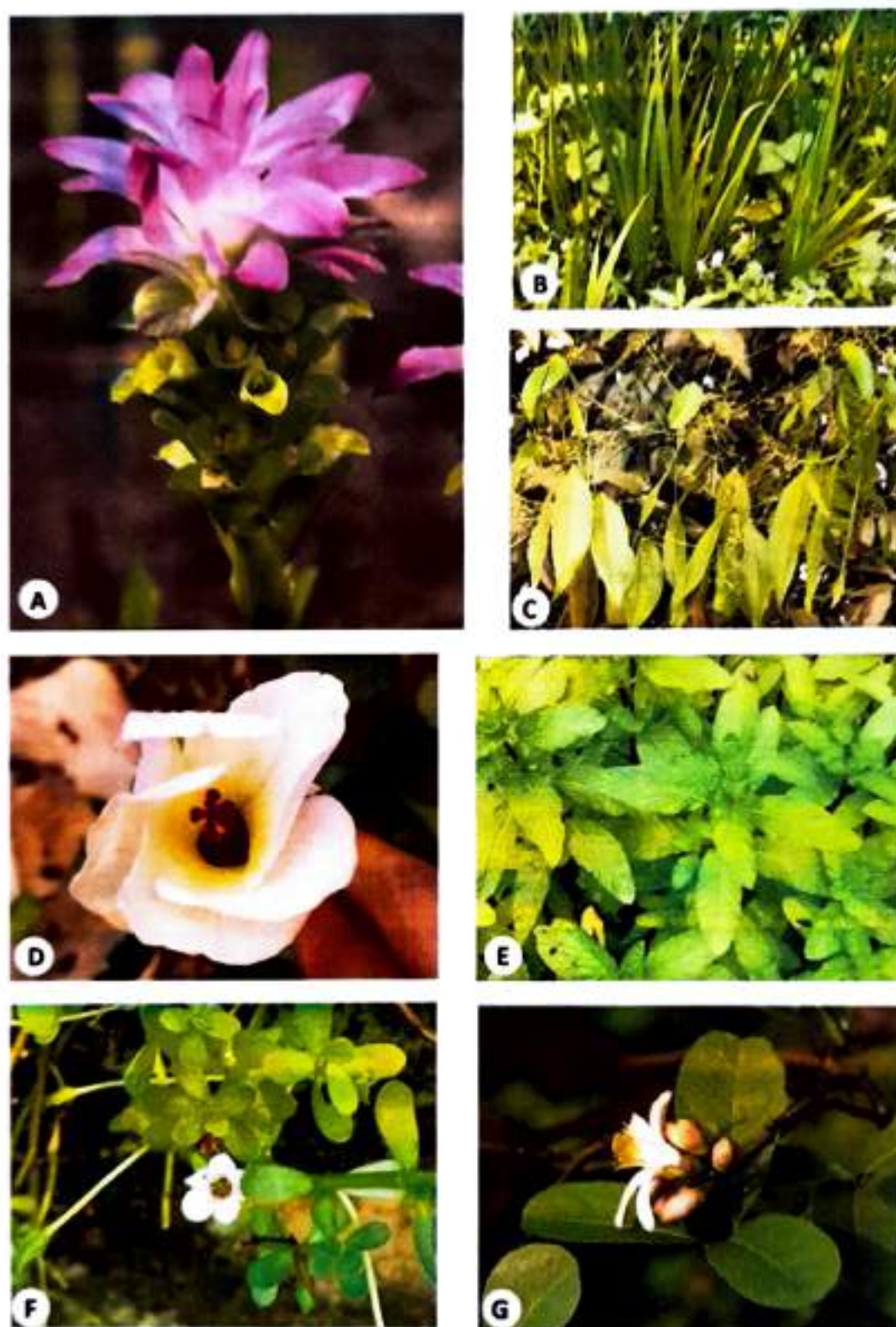


Figure 4. A, *Curcuma longa*; B, *Acorus calamus*; C, *Cinnamomum tamala*; D, *Abelmoschus moschatus*; E, *Mentha longifolia*; F, *Bacopa monnieri*; G, *Citrus sp.*

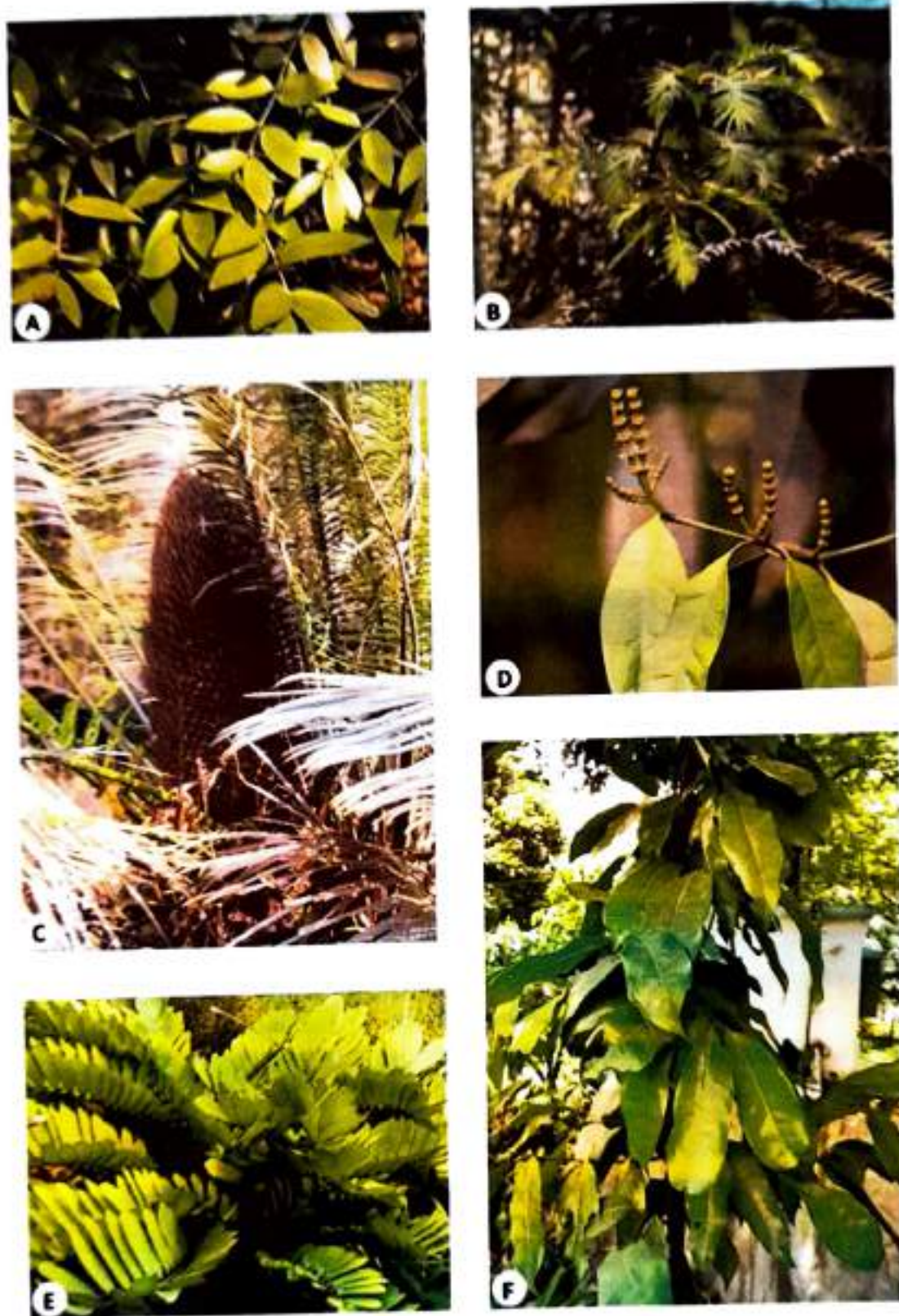


Figure 5. A, *Agathis robusta*; B, *Taxus baccata*; C, *Cycas sp.*; D, *Gnetum gnemon*; E, *Zamia sp.*; F, *Gnetum ula*



Figure 6. A, *Ascocentrum ampullaceum*, B, *Aerides multiflora*; C, *Dendrobium anceps*; D, *Dendrobium aphyllum*; E, *Dendrobium farmeri*; F, *Dendrobium fugax*; G, *Dendrobium fimbriatum*; H, *Eria lasiopetala*; I, *Panisea uniflora*; J, *Papilionanthe teres*; K, *Phaius tankervilleae*; L, *Pinalia bractescens*.

References

Basak M, Dutta S & Chowdhury M. 2018. Wild raspberry: Antioxidant fruits from

Eastern Himalaya. *Journal of Food Biochemistry*...

Chowdhury, M 2014. Preliminary screening of Medicinal plants growing in different

- habitats of Maldah district of West Bengal, India. NBU J. Pl. Sc.* 8(1) 37-51.
- Mondal S, Chowdhury A, Basu, SK and Chowdhury M. 2016. *In vivo* seed germination and seedling morphology of *Phoenix dactylifera* L. and *Phoenix sylvestris* (L.) Roxb. *NBU Journal of Plant Sciences.* 10 (1). 45-48.
- Chowdhury, A., Sarkar, S., & Chowdhury, M. (2016). Diversity, Ecology and Utilization of Tea Garden Pteridophytes at Duars in West Benal, India. *Int. Res. J. Biological Sci.* 5, 47-53.
- Choudhuary D & Das AP, 2014. Propagation of *Ginkgo biloba* L. Through air-layering in tropical condition of West Bengal, India. *NBU journal of Plant Sciences.* 8(1):1-4.
- Das, A. P., & Chandra, G. (2009). *Germplasm collection in Garden of Medicinal Plants.* University of North Bengal, Siliguri, West Bengal, 8.
- Grierson AJC & Long DG (1991). *Flora of Bhutan, vol. 2 Part 1.* Edinburgh: Royal Botanic Garden.
- Grierson AJC & Long DG (1991). *Flora of Bhutan, vol. 2 Part 2.* Edinburgh: Royal Botanic Garden.
- Grierson AJC & Long DG (2001). *Flora of Bhutan, vol. 2 Part 3.* Edinburgh: Royal Botanic Garden.
- Grierson AJC & Long DG (1984). *Flora of Bhutan: including a record of plants from Sikkim, vol. 1 Part1.* Edinburgh: Royal Botanic Garden.
- Grierson AJC & Long DG (1984). *Flora of Bhutan: including a record of plants from Sikkim, vol. 1 Part 2.* Edinburgh: Royal Botanic Garden.
- Grierson AJC & Long DG (1987). *Flora of Bhutan: including a record of plants from Sikkim, vol. 1 Part 3.* Edinburgh: Royal Botanic Garden.
- Joy, P.P., Thomas, J., Mathew, S., & Skaria, B.P. (2001). *Medicinal Plants.* Tropical Horticulture Vol. 2. pp. 449-632
- Khare, C. P. (2008). *Indian medicinal plants: an illustrated dictionary.* Springer Science & Business Media.
- Kirtikar, K. R., & Basu, B. D. (1918). *Indian medicinal plants.* Indian Medicinal Plants.
- Maiti, S., & Geetha, K. A. (2008). *Medicinal and Aromatic Plants in India.*
- Noltie, H.J. (1994) *Flora of Bhutan: including a record of plants from Sikkim and Darjeeling,* Vol. 3 Part 1. Royal Botanic Garden, Edinburgh.
- Noltie, H.J. (2000) *Flora of Bhutan: including a record of plants from Sikkim and Darjeeling,* Vol. 3, Part 2. The Grasses of Bhutan. Royal Botanic Garden, Edinburgh.
- Pearce, N.R. & Cribb, P.J. (2002). *Flora of Bhutan: including a record of plants from Sikkim and Darjeeling,* Vol. 3, Part 3. The Orchids of Bhutan. Royal Botanical Garden, Edinburgh.
- Petrovska, BB. 2012. Historical review of medicinal plants' usage. *Pharmacognosy reviews,* 6(11), 1.
- Prain, D. (1903). *Bengal plants, vols I & II.* W. Newman, London.
- Rawat, G. S. (2008). Special habitats and threatened plants of India. *ENVIS Bulletin: Wildlife and Protected Areas,* 11(1), 239.
- Ved, D. K., & Goraya, G. S. (2007). Demand and supply of medicinal plants in India. NMPB, New Delhi & FRLHT, Bangalore, India, 18.
- The Plant List (2013). Version 1.1. Published on the Internet; <http://www.theplantlist.org/> (accessed 1st May).
- Flowers of India. Retrieved August 23, 2016, from <http://www.flowersofindia.net>
- *eFloras (2008). Published on the Internet <http://www.efloras.org> [accessed 22 February 2018]*' Missouri Botanical Garden, St. Louis, MO & Harvard University Herbaria, Cambridge, MA.
- www.ipni.org
- www.tropicos.org