Journal of Scientific and Innovative Research 2014; 3(5): 500-514
Available online at: www.jsirjournal.com

Research Article

ISSN 2320-4818
JSIR 2014; 3(5): 500-514

Received: 03-09-2014
Accepted: 30-10-2014

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Medicinal plant diversity in Chittagong, Bangladesh: A database of 100 medicinal plants

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Abstract

A database of the medicinal plants of Chittagong was developed by using Microsoft Office Access 2003 program on a windows platform and plant species were arranged following an alphabetic order of scientific names (A-Z) with the attributes like scientific name, vernacular name or local name, family, habit and habitat, parts used and chemical constituent and therapeutic uses for each plant. Database contained 100 medicinal plant species of 52 families covering herb, shrub, climber and tree. Total number of herb species were 53, whereas shrubs, climbers and trees were 28, 3 and 16, respectively. The family Asteraceae contained the highest number of species(8), followed by *Apocynaceae* (7), *Caesalpiniaceae* (6), *Fabaceae* (5), *Liliaceae* (5), *Euphorbiaceae* (3), *Araceae* (3), *Solanaceae* (3), *Poaceae* (3) and others. The highest percentage of usable plant parts were the leaf (41%), whereas other usable plant parts were root (22%), bark (12%), fruit (12%), flower (4%), rhizome (2%), stem (2%), seed (2%), tuber (1%), inflorescence (1%), trunk (0.5%) and whole plant (0.5%).Database are emphasized on the importance of setting up conservation priorities, sustainable development and therapeutic uses of various medicinal plants. Eventually this research work will help to search for simple, sensitive and cost-effective drug principle from natural products.

Keywords: Medicinal plant, Database, Windows platform, Therapeutic uses.

Introduction

Medicinal plants play a significant role in providing primary health care services to the people. They serve as important therapeutic agents as well as important raw materials for the manufacture of traditional and modern medicines. It is estimated that more than 25% of all prescription drugs used in the industrialized countries contain active principles that are still extracted from plants including anticancer drugs.[1-4] About five thousands species of higher cryptogams and phanerogams have been reported to grow in Bangladesh and more than one thousand of these are regarded to have medicinal properties.[5] They constitute important items of drugs or therapeutic agents of various traditional systems of medicine, particularly of Unani, Ayervedic and Homeopathic medicines. A number of studies have shown in details that a good number of the medicinal plants used by the Kavirajes (Herbalists) have found support from modern scientific research when tested for relevant pharmacological activities.[6] It has also been indicated that there are considerable divergences in the plant species used and the formulations prescribed for treatment of a given ailment between Kavirajes of even adjoining villages and in between tribes.[7, 8] A number of individual attempts have been made for enumeration and documentation of the medicinal plants of Bangladesh.[9] However, no exhaustive work and systematic survey of the medicinal plant resource of the country, especially of Chittagong Division have been done yet. Considering the above fact, in the present work, an attempt was made to develop a database of the medicinal plants of Chittagong, Bangladesh.

Materials and Methods

The study was conducted as a part of the analysis of the medicinal plant diversity in the flora and to determine their status in the wild for giving conservation priorities.[10] In the present work, 100 medicinal plant species grow in the Chittagong Division were considered for database development. Information of medicinal plant species included in the present database was derived from the results of personal work as well as from different relevant published literature[11, 12] and wave pages[13, 14]. Taxonomic studies of the herbarium specimens of the medicinal plants available at the Bangladesh National Herbarium.The medicinal plant database was developed by using Microsoft Office Access 2003 program on a windows platform and plant species were arranged following an alphabetic order of scientific names (A-Z). In the database attributes used were: scientific name, vernacular name or local name, family, habit and habitat, parts used and chemical constituent and therapeutic uses.Data is encoded by assigning a bit pattern to each language alphabet character. Digit 1 refers to the record number in the database. For example, the accession number of Abelmoschus moschchatus Linn. is 1, where 1 represents record entry in the database. Keywords provisions were given to search the database for identification of specific plant, chemical constituents, therapeutic use and others. Following searching options were available that is find record, add record, delete record. Photographs were taken by a digital camera (Sony-DSC W510).

Results

Plants of the database were described using the following attributes; serial no, botanical name, local or vernacular name, family, Habit and habitat, locality, part or parts used, chemical constituents, and therapeutic uses. This database contained 100 medicinal plants species belonging to the 52 taxonomic families in the database [Table 1].

The family *Asteraceae* contained the highest number of species (8%), followed by *Apocynaceae* (7%), *Caesalpiniaceae* (6%) , *Fabaceae* (5%), *Liliaceae* (5%), *Euphorbiaceae* (3%),*Araceae* (3%), *Solanaceae* (3%), *Poaceae* (3%) and others[Figure 1].

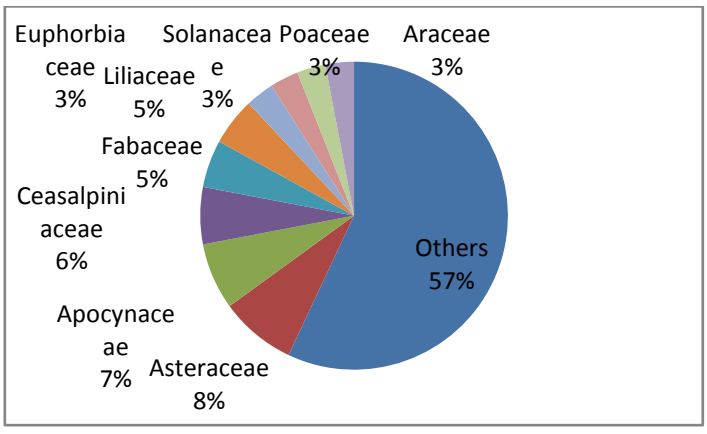

Figure 1: Comparison in percentage of different families of medicinal plants included in the database

In the present work, medicinal plant species were grouped into different life forms as: herbs 53, shrubs 28, climbers 3 and trees 16 and their incidence were: herb 53%, shrub 28%, climber 3% and tree 16%[Figure 2].

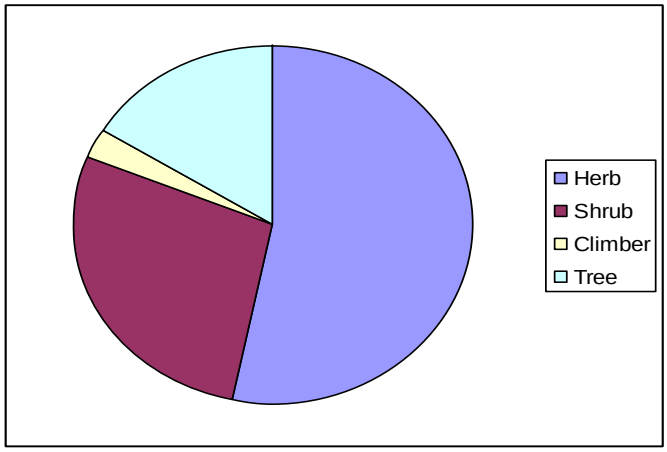

Figure 2: Graphical presentations of life forms of medicinal plant species of the database

Different plant parts used were also categorized as: bulb, endocarp, flower, flower bud, fruit, fruit pulp, latex, leaf, peel, pod, rhizome, root, seed, stem bark, whole plant and their percentage were Leaf 41%, root 22%, bark 12%, fruits 12%, flower 4%, rhizome 2%, stem 2%, seed 2%, tuber 1%, inflorescence 1%, trunk 0.5%, whole plant 0.5% [Figure 3].

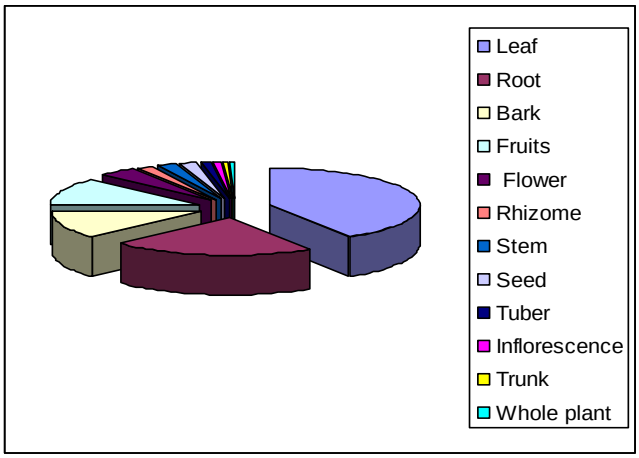

Figure 3: Graphical presentations of different parts of medicinal plant species included in the database

Plant parts used as a source of anticancer drugs were: leaf, flower, flower bud, stem bark, fruit and root, seed in case of organized drug and latex, gum etc. in case of unorganized drug.

Discussion

A medicinal plant database was developed using Microsoft Office Access 2003 program on a windows platform. This database contained 100 plant species, grows naturally or cultivated in Chittagong Division and represented 52 taxonomic families including herb, shrub, climber and tree species of ferns

and angiosperms. Some of these medicinal plants were also known to grow in other Divisions of Bangladesh. Many of them, however, were distributed only in Chittagong Division. Herb species were the highest number in case of therapeutic uses than other life forms i.e. shrub, climber and tree. Climbers were less in uses than other life forms. *Asteraceae* had the highest number of species in the list, followed by *Apocynaceae, Cucurbitaceae, Fabaceae* and others. Each family has some definite forms of use. The family *Asteraceae* had the highest percentage of therapeutic uses than the other families. Plant species of *Asteraceae* is used to treat cephalgia, dyspepsia, fever, dropsy, diarrhea, dysentery, rheumatism, malaria, skin diseases, itching, ulcers, leprosy, asthma, bronchitis, urinary discharges, piles, opthalmia, ascites. Plant products of others families were used as: astringent, stomachic, antispasmodic, antipyretic and diuretic, cures bronchitis, fevers and burning sensation, anthelmintic, febrifuge, stimulant, laxative cure inflammation, leucoderma, emmenagogue, antiperiodic. The family numbers of *Apocynaceae* were found to use in skin diseases, wasp-stings, cures dysentery, diarrhoea, fevers, piles, leprosy, diabetic, ulcer, leukemia etc. Plants were also used as alterative, tonic, febrifuge, antiperiodic and anthelmintic drug antispasmodic and lowers blood pressure, hypotensive, cardiotonic, stomachic, astringent, febrifuge and powerful antidysentric agents. The *Apocynaceae* possesed effective anti-cancer principles vinblastine and vincristine, of *Catharanthus roseus* Linn.[15] Plants parts used as a source of drug were in the range of organized to unorganized sources i.e. root, stem, bark, leaf, flower, fruit, seed etc. as well as latex, gum etc drugs. In most of the cases, leaf possessed the therapeutic properties. It had the highest percentage (41%) of use in therapeutic purposes such as purgative, abortifacient, febrifuge and tonic and remedies for coughs, asthma, bronchitis, jaundice, oral diseases etc. Barks and seeds were cathartic. The therapeutic properties of these medicinal plants were due to the presence of different secondary metabolites like alkaloids, terpenoids, phenolics, glycosides and others.

Conclusion

It is a open access database of medicinal plants with broad spectrum attributes and may be useful for the scientific community for getting quick information about the medicinal plants of Chittagong Division, Bangladesh, their useful parts, active drug ingredients and therapeutic use. Therapeutic agents of secondary metabolites origin like alkaloids, terpenoids, phenolics and glycosides were the important chemical compounds.

Acknowledgement

We express our thanks to Dr. Sheikh Boktear Uddin , University of Chittagong. Thanks are also to the tribal people of Chittagong division for their co-operation and help during the Ethno-medico-botanical studies.

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Table 1: A database of 100 medicinal plants in Chittagong, Bangladesh

Serial No.	Botanical Name	Local Name	Family	Habit and Habitat	Locality	Parts Used	Chemical Constituent	Therapeutic Uses
1	*Abelmoschus moschatus* Linn.	Mushakdana	*Malvaceae*	Herb and grows in moist places.	Chittagong	Roots,leaves,Fruits and Seeds	Beta-sitosterol and glycoosides.	Seeds are stomachic,demulcent,antispasmodic,dyspepsiathroat.
2	*Abroma augusta* Linn.	Ulatkambal	*Sterculiaceae*	Shrub and grows in moist places.	Chittagong and throughout the country	Root,leaves,barks,fruits ,seeds	Taraxerol, friedelin and beta-sitosterol.	Stems and leaves are demulcent.Root bark is emmenagogue.
3	*Acalypha indica* Linn.	Muktajhuri	*Euphorbiaceae*	Herb and grows in open places.	Chittagong and all districts	Root,leaves,barks,fruits ,seeds	Cyanogenetic glucoside and an alkaloid,acalyphine.	Plant is expectorent,diuretic and laxative.It is used in bronchitis.
4	*Achyranthes aspera* Linn.	Apang	*Amaranthaceae*	Herb and grows in shady moist places.	Chittagong and all districts	Root,leaves,barks,fruits ,seeds	Allkaloid achyranthine,potash,hormones,ecdysterone.	Plant is purgative ,diuretic,ecbiaolic and piles.
5	*Acorus calamus* Linn.	Boch	*Araceae*	Herb and grows in semi-aquatic condition	Chittagong and hill districts	Rhizome,leaves,roots	Essential oil,aldehyde,choline and flavone.	Rhizome is stomachic and expectorent.
6	*Adenanthera pavonina* Linn.	Raktakanchan, Ranjan	*Mimosaceae*	Tree and grows under cultivation in land.	Chittagong and noahkhali	Leaves,seeds,woods,barks	Robinetin,chalcone,lignoceric acid and stigmasterol.	Powdered seeds hasten suppuration of boils and inflammation.
7	*Adhatoda vasica* Ness.	Basak,Basak pata	*Acanthaceae*	Shrub and grows under wild condition in open places.	Chittagong and all districts	Root,leaves,	Quinazoline alkaloids,l-vasicinone and adhatodine.	Leaves of the plant posseses expectorent and bronchodilator.
8	*Adiantum caudatum* Linn.	Mayurshika	*Adiantaceae*	Herb and grows in the slopes of hill	Chittagong and all districts	Leaves	Triterpenoids and flavonoids,beta-sitosterol and	Leaves are expectorent and antipyretic.

							fernene.	
9	*Aegle marmelos* Linn.	Bael	*Rutaceae*	Tree and grows in the sandy loamy soil.	Chittagong and all districts	leaves,bark,fruits ,seeds	Carbohydrates, an essential oil ,ester and alkaloids.	Fruits are digestive ,stomachic and laxative.
10	*Ageratum conyzoides* Linn	Fulkuri,uchanti	*Asteraceae*	Herb and grows in moist places.	Chittagong and throghout the country	Root,leaves, flowers-buds	Friedelin ,sterols and beta-sitosterol	The plant is used to treat cephalgia,dyspepsia and fever.
11	*Albizia lebbeck* (Linn.) Benth	Shirish,koroi	*Mimosaceae*	Tree and grows in open places.	Chittagong and throghout the country	Root,leaves,barks,fruits ,seeds,pods	Saponins and tannins.	Pods ,seeds and roots posseses hypoglycaemic and anticancer properties.
12	*Allium cepa* Linn.	Piyanz	*Liliaceae*	Herb and grows in plain land.	Chittagong and throghout the country	Leaves,scales	Essential oil mono,di,tri and tetra sulphides.	Onion is antimalarial,antirheumatic and diuretic .
13	*Allium sativum* Linn.	Rashun	*Liliaceae*	Herb and grows in plain land.	Chittagong and all districts	Leaves,scale	Allyl propyl disulphide,cycloallin and ajoeneacids.	It helps to reduce cholesterol and circulatory disorders.
14	*Albizia chinensis* Linn.	Chakua Koroi,	*Mimosaceae*	Tree and grows in shady open places.	Chittagong, Chittagong Hill Tracts,	Root,leaves,barks,fruits ,seeds,pods	Saponins,d-catechin and d-leucocyanidin.	An infusion of the bark is used as a lotion for cuts and scabies.
15	*Alocasia indica (*Roxb.)Schott.	Mankachu	*Araceae*	Herb and grows in wet places.	Chittagong and all districts	Leaf,tubers,petioles	Soluble oxalates and beta glucosides.	Leaf is used against tumours and stings of insects.
16	*Aloe barbadensis* Mill.	Gritakumari	*Liliaceae*	Herb and grows in garden as an ornamental plant	Chittagong and throghout the country	Rhizome	Essential oil,caryophyllene oxide and geraniol.	Rhizome acts as tonic,aphrodisiac and expectorent.
17	*Alstonia scholaris* R.Br.	Chhatim	*Apocynaceae*	Tree and grows	Chittagong and	Root,leaves,bar	Indole	Bark is used in

				in shady places.	throghout the country	ks	alkaloids and phenolic acids.	skin diseases and as alterativeand tonic.
18	*Andrographis paniculata* (Burm.f.)Wall.	Kalomegh	*Acanthaceae*	Herb and grows wild in waste place.	Chittagong and all districts	Root,leaves,fruits ,seeds	Kalmeghin ,andrographiside and andrographolide	The plant used in liver and spleen.
19	*Annona squamosa* Linn.	Ata,Sarifa	*Annonaceae*	Tree and particularly grows in waste places.	Chittagong and different parts of the country	Root,leaves,fruits ,seeds	Alkaloids and essential oil	Leaves and fruits are used for treating tumors.
20	*Argemone mexicana* Linn.	Shialkanta	*Papaveraceae*	Herb and grows in waste places.	Chittagong and all districts	Root,leaves,fruits ,seeds	Alkaloids are protopine,allocryptonine and berberine.	The plant is alterative and possesses antifugal properties.
21	*Asparagus racemosus* Wild.	Shatamuli	*Liliaceae*	Herb and grows as wild in forests	Chittagong and throghout the country	Root,leaves,barks,fruits ,flowers.	Steroidal glycosides,bitter glycosides,asparagin and flavonoids.	The plant is useful for a variety of urinary problems.
22	*Azadirachta indica* A.Juss.	Neem	*Meliaceae*	Tree and grows in shady moist places.	Chittagong and all districts	Root,leaves,barks,fruits ,seeds	Ttriterpenoid ,saponins,flavonoids,tannins and alkaloid.	Plant are used in inflammation of sores,fevers and cholera.
23	*Bacopa monniera* (Linn.)Pennel.	Brahmishak	*Scrophulariaceae*	Herb and grows wild in waste places	Chittagong and Dhaka	Root,leaves,fruits ,seeds	Steroidal saponins and hersaponinstigmasterol.	The plant is bitter, diuretic and laxative.
24	*Bambusa arundinaceae* (Retz.)Wild.	Kanta Bansh	*Poaceae*	Herb and grows wild in the hilly areas.	Chittagong and all districts	Shoots,stems,leaves	Cholin,benzoic acid and a cyanogenetic glycoside.	The stem and leaves are cooling and laxative.
25	*Barringtonia acutangula (Linn.)Gaertin.*	Hijal, Kumia.	*Barringtoniaceae*	Tree and grows in low lying areas.	Chittagong and all districts	Root,leaves,barks	Acutangulic acidtangulic and oleanolic acids.	The leaves is given in diarrhoea and dysentery.

26	*Bauhinia acuminita* Linn.	Kanchan, Shet Kanchan	*Caesalpiniaceae*	Tree and grows in sandy loam soils.	Chittagong and chittagong hill tracts	Root,leaves,barks,fruits ,seeds	Tannic acid, glucose and gum.	Decoction of the bark or leaves is used in biliousness and bladder stone.
27	*Bauhina purpurea* Linn.	Kanchan,Rakta kanchan	*Caesalpiniaceae*	Tree and grows in textured soils.	Chittagong and all districts	Root,leaves,barks,fruits ,seeds	Tannic acid, glucose , gum and amino acids.	The roots are carminative and the flowers laxative.
28	*Benincasa hispida* (Thunb.)Cogn.	Chalkumra	*Cucurbitaceae*	Climber and aerial in habitat.	Chittagong and all districts	Leaves,fruits ,seeds	Lupeol, β-sitosterol, n-triacontanol and glucose.	Fruits are laxative and demulcent. Seeds are diuretic.
29	*Blumea lacera* (Burn.f.)DC.	Kukursunga,Shialmutro	*Asteraceae*	Herb and grows in moist shady places.	Chittagong and throghout the country	Root,leaves	Essential oil containing cineol, fenchone and Blumea camphor.	Plant is astringent, stomachic and antispasmodic.
30	*Boerhaavia diffusa* Linn.	Punnarnava	*Nyctaginaceae*	Herb and grows in waste places.	Chittagong and throghout the country	Root,leaves,fruits ,seeds	Two quinolizidine alkaloids,punarnovine -1 and punarnovine-2.	Plant is bitter stomachic and laxative.
31	*Brassica nigra Linn.*	Kalo sarisha	*Cruciferae*	Herb and grows in the plain land.	Chittagong and most of the areas of the country	Root,leaves,fruits ,seeds	Oleic,stearic and brassic acids.	Leaves are digestive and stomachic.
32	*Caesalpinia pulcherrima* (Linn.)Sw.	Radachura,krishnochura	*Caselpiniaceae*	Shrub and grows in wide variety of soils.	Chittagong and throghout the country	leaves,barks,flower	Diterpene,x-caselpin,querci meritin and leucodelphidin.	Leaves are used as purgative and tonic.
33	*Cajanus cajan (*Linn.)Huth	Arhar	*Papilionaceae*	Shrub and grows in plain lands.	Chittagong and throghout the country	Root,leaves,fruits ,seeds	Phytoalexins,sterols and triterpenes.	Leaf juice is given in jaundice and disesaes of the mouth.
34	*Calotropis gigantea* (Linn.)Ait.f.	Boro akanda	*Asclepiadaceae*	Shrub and grows in waste land	Chittagong and throghout the country	leaves,fruits ,seeds	Calotropain FI,calotropin FII,calotoxin	Roots and leaves are used against piles

							and calactin.	and rehumatism.
35	*Camellia sinensis (*Linn.) O.kuntze	Cha	*Theaceae*	Shrub and grows in hilly areas	Chittagong	Mainly leaves,stem and twigs	Caffeine, theobromine,xanthine and nicotine.	Leaves are excellent CNS stimulent,diuretic and astringent.
36	*Carica papaya* Linn	Pepe	*Caricaceae*	Herb and grows in wastelands	Chittagong and all districts	Fruit,seed	Chymopapin and alkaloids.	Plants are used in dyspepsia.
37	*Carissa congesta* Wight.	Karamcha	*Apocynaceae*	Shrub and grows in sandy soils.	Chittagong and all districts	Root,leaves	Carrissone,beta-sitosterol,triterpene and carindone.	Roots are histamine -releasing and paste of bark is diabetic ulcer.
38	*Canscora diffusa(*Vahl.)R.Br.	Dankuni	*Gentianceae*	Herb and grows on waste land	Chittagong	Leaves,fruits ,barks,seeds	Beta-amyrin,friedelin and gentianine.	Plani is alterative,tonic and laxative.
39	*Capparis zeylanica* Linn	Kalokera	*Capparidaceae*	Shrub and grows as wild in the land.	Chittagong	Root,leaves,barks,fruits ,seeds	Thioglucosides ,glucocapparin, phytosterol and alkaloid.	It is used in pain,rheumatism and piles.
40	*Capsicum frutescens* Linn.	Marich	*Solanaceae*	Herb and grows in cultivated land	Chittagong and all districts	Root,leaves,barks,fruits ,seeds	Homocapsaicin and norhydrocapsaicin.	Capsicum is a powerful warming stimulent and carminative.
41	*Carthamus tinctorius* Linn	Kajjrah,kushum	*Asteraceae*	Herb and grows in cultivated condition.	Chittagong and some districts	Root,leaves,fruits ,seeds	Carthamone ,ligans and polysaccharide.	It is useful in rheumatism and paralysis.
42	*Cassia fistula* Linn	Badar lati	*Caesalpiniaceae*	Tree and grows in road side areas.	Chittagong and throghout the country	Leaves,root ,barks,flower,seeds	Rhein,sennosides A and B.	The plant is hypoglycaemic ,antiviral and anticancer.
43	*Cassia occidentalis* Linn	Kalkasunda	*Caesalpiniaceae*	Shrub and grows in wasteland.	Chittagong and all districts	Root,leaves,pods,barks,fruits, seeds.	Anthraquinones and anthraquinone glycosides.	The specific action of the plant is sedative and alterative.

44	*Cassia sophera* Linn	Choto kalkasunda	*Caesalpiniaceae*	Shrub and grows in wasteland.	Chittagong and throghout the country	Root,leaves,barks,,seeds	Flavonol -c-glycoside and sennosides.	Leaves are used in coughs,asthma, bronchitis and hiccup.
45	*Catharanthus roseus* (Linn).G.Don.	Nayathara	*Apocynaceae*	Herb and grows as an ornamental plant in garden	Chittagong and throghout the country	Root,leaves,bark	100 indole alkaloids vinblastine and vincristine	Plants alkaloids posseses effective anti-cancer properties.
46	*Centella asiatica* (Linn.)Urban.	Thankuni	*Apiaceae*	Herb and grows commonly in damp places.	Chittagong and throghout the country	Root,leaves,fruits ,seeds	Alkaloids,glycosides,sterols,tannins and sugars.	It is used to treat leprosy and digestive disorders.
47	*Cissus quadrangularis* Linn	Hadjorha Lata	*Vitaceae*	Herb and grows in mangrove area and ocassionaly in garden	Chittagong and sundarbans region	Stem,leaves,young shoots	Oxo-steroid and 3-ketosteroid.	Root is used as a specific for fractures of bones.
48	*Citrus auranthifolia* (Chist.)Sw.	Lebu,pati lebu	*Rutaceae*	Shrub and grows in garden.	Chittagong and all districts	Leaves,fruits ,seeds	Aascorbic,citric and malic acids and their salts.	Fruit juice possesses stomachic and anthelmintic properties.
49	*Cleome viscosaLinn*	Hurhuria	*Capparidaceae*	Herb and grows in moist places.	Chittagong and throghout the country	Root,leaves,fruits ,seeds	Glycoflavanone and the diterpene lactone.	Leaves are useful in feve,dysentry and bronchitis.
50	*Clerodendrum viscosum* vent.	Ghetu	*Verbenaceae*	Shrub and grows in moist shady places..	Chittagong and throghout the country	Root,leaves	Protein,reducing sugar and a sterol.	It has hypotensive property.
51	*Coccinea cordifolia* (Linn.)Cogn.	Telakachu	*Cucurbitaceae*	Herb and grows commonly in jungles. and on hedges.	Chittagong and throghout the country	Leaves,flowers	Protein ,fat,carbohydrates,mineral and vitamin c.	Leaves are useful in diabetes in human patients.
52	*Colocasia esculenta* (Linn.)Schott.	Mukhi kachu	*Araceae*	Herb and grows both in wild and cultivated in	Chittagong and all districts	Rhizome,leaves	Sterols,HCN and oxalic acid.	Plant are used in atrophy and emaciation.

				wet region.				
53	*Commelina bengalensis* Linn	Kanchira	*Commelinaceae*	Herb and grows in shady places.	Chittagong and throghout the country	Leaves,fruits ,seeds	Anthocyanins ,triterpene and alkanols.	Plants are used in oitis media suppurative,sores and snakebite.
54	*Dalbergia sisso* Roxb.	Sissoo gach	*Fabaceae*	Tree and grows in garden. and roadsides area.	Chittagong and all districts	Root,leaves,barks,fruits ,seeds	Sissotrin and an isoflavone-O-glycoside.	Bark and fresh leaves are used as a local astringent.
55	*Datura metel* Linn.	Dhutura	*Solanaceae*	Shrub and grows wild in waste places and roadsides.	Chittagong and all districts	Root,leaves,fruits ,seeds	Hyoscyamine, hyoscine and various tigloyl esters of tropine.	Leaves are used for rheumatic swellings of the joints.
56	*Derris trifoliata* Lour.	Panlata, Pangota, Kalilata	*Fabaceae*	Climber and grows in muddy seacoast.	Chittagong	Stem,bark	Tannic acid, resins and minerals.	The plant is used as stimulant, antispasmodic and counter irritant.
57	*Desmodium gangeticum* (Linn.)DC.	Salpani, Chalani	*Fabaceae*	Herb and grows as wild in a variety of land.	Chittagong and all districts	Root,leaves	Alkaloids and N, N-di-methyl-tryptamine.	Roots are alterative, tonic and anthelmintic.
58	*Desmodium triflorum*(Linn) DC.	Kulaliya	*Fabaceae*	Shrub and grows as wild in a variety of land.	Chittagong and throghout the country	Leaves,barks	β-phenylamine (major) and indole-3-acetic acid.	Plants are used in blindness, eye diseases and sores.
59	*Dillenia indica* Linn.	Chalta	*Dilleniaceae*	Tree and grows in terrestrial condition.	Chittagong and all districts	Fruits and leaves	Tannins, malic acid, arabinogalactan and glucose.	The fruits are tonic and laxative; used in diarrhoea.
60	*Dioscorea alata* Linn.	Chupri Alu	*Dioscoreaceae*	Climber and grows as wild condition.	Chittagong and throghout the country	Tuber	Anthocyanins, steroidal glycosides and cholesterolalkaloid.	The plant is used in constipation.
61	*Dipterocarpus turbinatus Gaertn.*	Teli-garjan	*Dipterocarpaceae*	Tree and grows in open places.	Chittagong and hill tracts	Trunk	Oleoresin, known as garjan balsam.	The oleo-resin of the trunk is stimulant to the

								mucous surface ringworms.
62	*Eclipta alba* (Linn) Hassk	Kesuti, Kesraj	*Asteraceae*	Herb and grows in moist places.	Chittagong and eastern parts of the country.	Leaves,flowers	An alkaloid, ecliptine and saponins.	Plant is tonic, antipyretic and stomachic.
63	*Emilia sonchifolia* (Linn.) DC	Sadimodi, Mechitra	*Asteraceae*	Herb and grows in moist places.	Chittagong and throghout the country	Leaves,flower	β-sitosterol, stigmasterol, palmitic acid and triacontanoic acid.	Decoction of plant is febrifuge and antipyretic.
64	*Enhydra fluctuans* Lour.	Helencha, Hinchashak	*Asteraceae*	Herb and grows in aquatic place	Chittagong and throghout the country	Leaves with stem	Saponins, myricyl alcohol, kaurol, cholesterol and sitosterol.	Plant is used in ascites, dropsy and anasarca.
65	*Eupatorium triplinerve* Vahl.	Ayapan, Ayapana.	*Asteraceae*	Herb and grows in waste places.	Chittagong and hill tracts region.	Leaves	Essential oil,coumarins,ayapanin and ayapin.	The herb is stimulant and tonic diaphoretic.
66	*Ficus hispida* Linn.f.	Kakdumur	*Moraceae*	Tree and grows in shady places.	Chittagong and throghout the country	Root,leaves,barks,fruits	Tannins and saponin glycosides.	All parts of the plant are cooling and astringent.
67	*Foeniculum vulgare* Mill.	Mouri, Sop	*Apiaceae*	Herb and grows in cultivated condition.	Chittagong and throghout the country	Fruits and seeds	Essential and fixed oils.	The plants are carminative, diuretic, stomachic and anthelmintic.
68	*Gardenia jasminoides* Ellis.	Gandharaj	*Rubiaceae*	Herb and grows as ornamental plant in garden and homesteads.	Chittagong and throghout the country	Leaves,fruits ,seeds.	Iridoid glucosides, gardenoside and geniposide.	The plant is considered antispasmodic and antiperiodicare .
69	*Gloriosa superba* Linn.	Ulatchandal, Bishlanguli	*Liliaceae*	Herb and grows in shaddy places.	Chittagong and all districts	Tuber ,seeds,flowers.	Colchicines and neutral phenolic substances.	The tubers are tonic, stomachic and anthelmintic.

70	*Glycosmis pentaphylla* Corr.	Ashshaora	*Rutaceae*	Shrub and grows in jungles by roadsides	Chittagong and throghout the country	Leaves	Two furoquinoline bases, kokusaginine and skimmianine.	The plant is used for cough, anaemia and jaundice.
71	*Helianthus annus* Linn.	Surjamukhi	*Asteraceae*	Herb and grows in cultivated land.	Chittagong and many parts of the country.	Leaves,seeds,flowers.	Hydrocarbons, sterols, stigmasterol and β-sitosterol.	Leaves are emetic; applied in lumber pain.
72	*Heliotropium indicum* Linn.	Hatishur	*Boraginaceae*	Shrub and grows in waste places and sides of ditches.	Chittagong and all districts	Root,leaves	Pyrrolizidine alkaloid ,indicine (principal) and echinitine.	Plants are astringent, emollient and diuretic.
73	*Hibiscus rosa sinensis* Linn.	Jaba	*Malvaceae*	Shrub and grows as ornamental flower in garden	Chittagong and throghout the country	Leaves,flowers	β-sitosterol, stigmasterol and taraxeryl acetate.	The flower buds are cooling and astringent.emmenagogue.
74	*Holarrhena antidysenterica* Wall.	Kurchi; Kuruj, Karach	*Apocynaceae*	Shrub or small tree and grows in the forest area.	Chittagong, Chittagong Hill Tracts	Leaves,barks	Holarrhenine, holarrhine, holarrhetine, conkurchine, kurchicine.	The bark is stomachic, astringent, and anthelminticdiarrhoea.
75	*Hyptis suaveolens* (Linn.) Poit.	Tokma	*Lamiaceae*	Herb and grows in fallow land areas.	Chittagong and Chittagong Hill Tracts	Leaves,twigs,flowers.	β-caryophyllens, cineol and anti-A haemagglutinin.	The plant is stimulant, carminative and lactagogue.
76	*Impatiens balsamina* Linn.	Dupati	*Balsaminaceae*	Herb and grows as ornamental in garden.	Chittagong and throghout the country	Flowers and seeds	Anthocyanins and 2-hydroxy-1,4-napththoquinone.	Plant is emetic, cathartic and diuretic.
77	*Imperata cylindrica* Rausch.	Ulu.	*Poaceae*	Herb and grows in fallow lands and barend hills.	Chittagong and throghout the country	Inflourescence and root	Arundoin, cylindrin, fernecol, isoarborinol and simiarenol.	Roots and inflorescence are used as diuretic and tonic.

78	*Ipomea aquatica* Forsk.	Kalmi, Kalmi Shak.	*Convolvulaceae*	Herb and grow in ponds lakes and swamps.	chittagong and many parts of the country.	Root,leaves	lutein and β-carotene.	Plants are used in leucoderma, bronchitis and liver complaints.
79	*Jatropha curcus* Linn.	Bagh Verenda, Ban Verenda	*Euphorbiaceae*	Shrub and grows wild in waste places.	Chittagong and throghout the country	Leaves and seeds	Oleic, linoleic , myristic, palmitic, stearic and arachidic acids.	Roasted seed and seed oil is purgative.
80	*Kalanchoe pinnata* (Lam.)Pers.	Patharkuchi; Koppata	*Crassulaceae*	Herb and grows in garden.	Chittagong and throghout the country	Leaves	P-coumaric, ferulic, syringic, caffeic and p-hdroxybenzoic acids.	Leaves are diuretic, antilithic and insecticidal.
81	*Lablab purpureas* Linn.	Shim, Ushi	*Fabaceae*	Herb and grows in crop land area.	Chittagong and throghout the country	Leaves and seeds	Starch,proteins and amino acids.	Seeds are considered laxative and diuretic.
82	*Lagenaria siceraria* (Mol.)Stan.	Lau, Kadu	*Cucurbitaceae*	Herb and grows in cultivated land area.	Chittagong and throghout the country	Fruit and seed	Vitamin B and ascorbic acid and amino acids.	The juice of the plant and leaves are powerful laxative.
83	*Lawsonia inermis* Linn.	Mehedi,Mendi, Mundi	*Lythraceae*	Shrub and grows in cultivated area	Chittagong and throghout the country	Leaves and barks	Terpenoids, sterols and naphthoquinone derivatives.	The bark is used to cure in jaundice and enlarged spleen.
84	*Leucus aspera* (Wild.)Link.	Donkolos, Shetadrone	*Lamiaceae*	Herb and grows in waste places.	Chittagong and all districts	Root,leaves	Glucosides, tannins, saponins,sterols and α and β-sitosterol.	The plants are believed to be antidote for snake venom; used as an insecticide.
85	*Limnophila indica* (Linn.)Bruce.	Karpur, Ambuja.	*Scrophulariaceae*	Herb and grows as a weed in swamps.	Chittagong and throghout the country	Leaves and stem	D-limonene and d-perillaldehyde.	Plant is beleived to be antiseptic.
86	*Lygodium flexuosum* Sw.	Bhut -raj ,Dheki shak	*Lygodiaceae*	Herb and grows in the	Chittagong and Chittagong	Root	Flavonoids, quercetin and	Plant is expectorant

				plain and hilly areas.	Hill Tracts.		pentahydroxyflavone-3-O-rutinoside.	and antibacterial.
87	*Maesa indica* Wall.	Sain Khuing Trang, Thah Mong Su (Marma).	*Myrsinaceae*	Shrub and grows in forest area	Forests of Chittagong and Chittagong Hill Tracts.	Leaves	Sitosterol and quercetin-3-rhamnoside.	The roots are given in syphilis.
88	*Nelumbo nucifera* Gaertn.	Poddo, Padma.	*Nymphaeaceae*	Herb and grows in aquatic places.	Chittagong and throghout the country	Leaves,flowers ,filament,seeds ,rhizome	Nelumbine , nupharine, nuciferine and nornuciferine.	Roots are diuretic; useful in cough.
89	*Nerium indicum* Mill.	Rakta korobi	*Apocynaceae*	Shrub and grows in garden.	Chittagong and throghout the country	Root,leaves	Cardioactive glycosides including oleandrin and neriodin.	Leaf decoction is used to reduce swellings.
90	*Nigella sativa* Linn.	Kalojira, Kalijira	*Ranunculaceae*	Herb and grows in cultivated land.	Chittagong and all districts	Seed	Linolenic and palmitic acids, proteins and amino acids .	The seeds are stimulant and diuretic.
91	*Ocimum basilicum* Linn.	Babui Tulshi	*Lamiaceae*	Herb and grows in moist places	Chittagong, Chittagong Hill Tracts, Cox's Bazar.	Leaves,flowers ,seeds	Essential oil containing linalool.	The plant is carminative, alexipharmac and stomachic.
92	*Ocimum sanctum* Linn.	Tulshi	*Lamiaceae*	Herb and grows in moist places.	Chittagong and all districts	Root,leaves,barks,fruits ,seeds	Alkaloids, glycosides, flavonoids and triterpene.	The leaves are demulcent, expectorant and antipyretic.
93	*Pavetta indica* Linn.	Kukurchura, Falda	*Rubiaceae*	Shrub and grows as wild in the forest.	Chittagong	Root,leaves	Resin, starch, an organic acid and a bitter glycoside.	Roots are aperient and tonic.
94	*Rauvolfia tetraphylla* Linn.	Bara Chadar, Sarpagandha.	*Apocynaceae*	Shrub ang grows in moist places.	Chittagong nd Rajsahi	Root	Alkaloid rauvolscine,N(a)-Demethylaccedine.	Roots are sedative, tonic and febrifuge.
95	*Ricinus communis* Linn.	Reri, Bherenda	*Euphorbiaceae*	Shrub and grows naturally and wild condition in shady	Chittagong and throghout the country	Seeds	Glycerides of ricinoleic, stearic and dihydroxystearic acids.	Seed oil is a strong purgative.The leaves are used as

				places.				galactagogue.
96	*Solanum torvum* Swartz.	Tit Begun, Gotha Begun	*Solanceae*	Shrub and grows in the open places.	Chittagong and all districts	Leaves,fruits.	Sterolin and gluco-alkaloid solasonine.	The plant is sedative, diuretic and digestive.
97	*Tabernaemontana divaricata* (L.)R.Br.	Tagor	*Apocynaceae*	Shrub and grows in garden and house yards	Chittagong and throghout the country	Root	Coronaridine (cytotoxic) and voacristine.	Roots are emmenagogue, aphrodisiac, tonic and purgativesplee n.
98	*Vitex negundo* Linn.	Nishinda, Bara Nishinda	*Verbenaceae*	Shrub and and grows naturally in the fertile soils.	Chittagong and all districts	Leaves,Root	Hentriacontane , sterols, β-sitosterol and β-sitosterol acetate.	Leaves are tonic, vermifuge, antiparasitic, alterative and anodyne.
99	*Zingiber officinale* Rose	Ada,Adrak	*Zingiberaceae*	Herb and grow as cultivated plant in the plain land or slope of hills	Chittagong and throghout the country	Rhizome	Acrid oleoresin, essential oil, starch, protein, lipids and sugars.	Rhizome is carminative, digestive and stimulant.
100	*Zea mays*	Bhootta	*Poaceae*	Herb and grows in plain land.	Chittagong and throghout the country	inflorescence(c ob). (cobs)	Carbohydrates ,protein, fat , minerals and fibres.	The grains are appetizer and fattening; cures biliousness.