Indigenous Medicinal Plants Used by the Tribal Healers of Chittagong Hill Tracts to Treat Diarrhoea and Dysentery

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More information was gathered about traditional medicine for the treatment of diarrhoea and dysentery by the tribal communities of three hilly districts (Rangamati, Bandarban and Khagrachari) in Chittagong. The tribal communities depend on medicinal plants for treating many difficult diseases. These medicinal plants have been used by them as effective remedy from time immemorial. The present study reveals that, the tribal communities use 56 plant species belonging to 36 families for the prevention as well as treatment of above mentioned diseases. All of the plants were collected from the Chittagong Hill Tracts of Bangladesh. Short diagnostic description of plants, botanical name, family name, Bengali name, English name, Tribal name, systematic position, plant preparation, uses and dosage information are described.

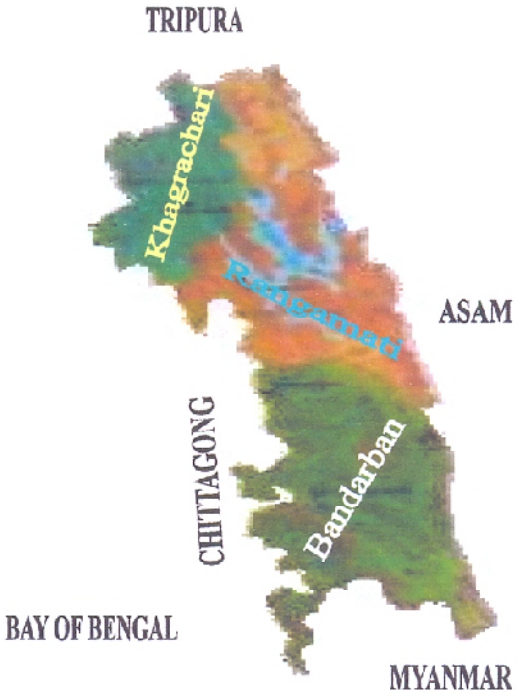
Keywords: Indigenous medicinal plants, Diarrhoea, Dysentery, Information, Tribal healers, Chittagong Hill Tracts, Bangladesh.

Introduction

Chittagong Hill Tracts (Korpos Mohol, the antic name) is situated in south-eastern part of Bangladesh and between 21.35º and 23.45º north latitude and 91.45º and 92.50º east longitude. It is surrounded by Tripura (The Indian state) on the north, Myanmar and Asam on the south and east respectively and west by the Bay of Bengal. There are six valleys formed by the main rivers Chengi, Maini, Rainkhyong, Sangu, Kassalong, Matamuhuri and their distributaries (Shelly *et al.,* 1992). The total area of CHTs is about 13180 sq. kilometer. The region comprise 10 percent of the total land area of Bangladesh.

In 1984, this region was divided into three districts viz. Rangamati, Bandarban and Khagrachari. About 50 percent of the population in these districts is tribes. There are about 13 ethnic tribes viz. Chakma, Marma, Murang, Tanchangya, Khumi, Bawn, Tripura, Lusai, Chak, Ushui, Khiyang, Riyang and Pankho living in this region. They have been using different medicinal plants for hundreds of years as remedy for various diseases.

Diarrhoea (the condition of looseness of bowels) and Dysentery (painful discharge of mucous and bloody stools) are infectious diseases that can affect anybody anytime and may be caused by mainly viral, bacterial or parasitic infection and/or improper as well as overeating of food. Moreover, the other causes of these diseases are functional bowel disorder, reaction to medicine, intestinal diseases etc. Diarrhoea and dysentery are mainly of two types: acute (short term) and chronic (long term). The tribal medicine man (*Kabiraj*) uses many kinds of anti-diarrhoeal and anti-dysenteric medicinal plants in various forms like decoction, infusion, powder, pill, extract, juice etc. [Table C]. But they have no scientific data to support treatment of many diseases. Some medico-botanical studies were done in Bangladesh regarding this field by Khan and Hassan (1986), Mia and Huq (1988), Hassan (1988), Alam (1992), Khan *et al.,* (1994), Alam *et al.,* (1996), Khaisa (1996), Hassan and Khan (1996), Khaisa (1998), Rahman *et al.,* (2000), Uddin *et al.,* (2001), Khan *et al.,* (2002), Chakma *et al.,* (2003), Rahman (2003) and Uddin *et al.,* (2004). But none of these are sufficient to describe indigenous medicinal knowledge of tribes in Chittagong Hill Tracts. The present article aimed to present some new ethno-medical knowledge of the Chittagong Hill Tracts.



The Chittagong Hill Tracts of Bangladesh

Methodology

Ethno-medical data were collected from the 25 different places of three districts in Chittagong Hill Tracts such as Ranirhat, Chimbuk, Kaukhali, Chairmanghata, Tulaban, Balaghata, Marissa, Chengi Square, Betbunia, Upperpayrachara, Kamalchari, Logang, Golabari, Tentultala, Bhaibonchara, Matiranga, Hangsamapara, Lotiban, Dighinala, Panchari, Ghagra, Manikchari, Jaliapara, Rajsthali and Amtali. These data were collected by interviews with 35 tribal healers (*Kabirajes*). The information was reconfirmed in the field by repeated interviews with another healers of the same tribe and the same healers in several times as well as cross-checked at various places with other tribes. If at least 5 informants had similar answer about medicinal plants the data were considered perfect. The plant specimens were taxonomically identified.

Results

Ethno-medical data are shown in Tables A, B and C, on tribal concept. Botanical name, family, Bengali name, English name and Tribal name viz. Chakma (C), Marma (M), Tripura (Tr), Mogh (Mo), Murang (Mu), Tanchangya (T), Santal (S), Garo (G) are mentioned in Table A. Plant description or systematic position, plant parts used, different forms of plant parts such as decoction, infusion, extract, pill etc. and uses are described in Table B. Plant preparation and normal dosage details are presented in Table C.

Total of 56 plant species are used along with their different parts such as bark, leaf, stem, flower, fruit, seed, root, root-bark etc. to cure diarrhoea and dysentery. But it absolutely depends on the type of the plants and users demand. Plant species are decorated alphabetically according to their botanical name Table A. Sequence of the plant species of Table B is followed by Table A and plant pictures are shown in Fig. 1.

TABLE A

No.	Botanical name and family	Bengali	English	Tribal
1.	*Acorus calamus* Linn. (Araceae)	*Bach*	Sweet Flag	*Boj* (C), *Langhingau* (M), *Langkhai* (Tr)
2.	*Aegle marmelos* (Linn.) Cour (Rutaceae)	*Bel*	Bael Tree	*War-e-Apang* (M), *Shepalbupaong* (Tr)
3.	*Alstonia scholaris* R.Br. (Apocynaceae)	*Chhatim*	Devil's Tree	*Sesna* (C), *Chai Lang* (M), *Chaile* (Mo)
4.	*Andrographis paniculata* (Burm.f.) Wall. (Acanthaceae)	*Kalomegh*	The Creat	*Kalameghpada* (C), *Kaeimpameda* (M)
5.	*Annona reticulata* Linn. (Annonaceae)	*Nona Ata*	Bull's Heart	*Nu Nachhi* (M)
6.	*Artocarpus heterophyllus* Lam. (Urticaceae)	*Kanthal Gachh*	Jack Fruit Tree	*Penieh* (M), *Teprong* (G)
7.	*Asclepias curassavica* Linn. (Asclepiadaceae)	*Bon Kapas/ Kakturi*	Wild Ipecacuanha	*Si Gam Da* (M)
8.	*Asparagus racemosus* Willd. (Liliaceae)	*Shatamuli*	Asparagus	*Shaktichara* (C, Tr), *Krachupao* (M), *Mimong Tamache* (G)
9.	*Bombax ceiba* Linn. (Bombacaceae)	*Shimul*	Silk Cotton Tree	*Lakh Pine* (M)
10.	*Borreria articularis* (Linn.f.) Willd (Rubiaceae)	*Jangli Kadu*	Shaggy Button Plant	*Thodargil* (C), *Peichungchha* (M), *Aistogira* (Tr)
11.	*Callicarpa tomentosa* (Linn.) Merr. (Verbenaceae)	*Kojo/Bormala/ Khoja*	Fever Nut/ Molucca Bean	*Jang Gach* (C), *Tara Mah* (M), *Kraru/Turmong* (Mo)
12.	*Cardiospermum halicacabum* Linn. (Sapindaceae)	*Lataphatkari*	Ballon Vine	*Khetafoxa/Kalaboitta* (C), *Grangbaoung/Nala Maiachi* (M)
13.	*Centella asiatica* Linn. (Apiaceae)	*Thankuni*	Indian Pennywort	*Menmeni* (C), *Mrang Khua* (M)
14.	*Curcuma caesia* Roxb. (Zingiberaceae)	*Kalohaldi/ Kalahalud*	Black Zedoary	*Kala Hailla/Muicheya* (C), *Sam Ghattak* (G)
15.	*Curcuma domestica* Val. (Zingiberaceae)	*Halud/Haldi*	Turmeric	*Chith Nu/Ranjan* (M), *Sudai* (Tr)

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No.	Botanical name and family	Bengali	English	Tribal
16.	*Cynodon dactylon* Pers. (Graminae)	*Durbaghas*	Grass/Couch/Bahama Grass/Dhub Grass	*Nimjamrao* (M)
17.	*Desmodium gangeticum* (Linn.) Dc. (Papilionaceae)	*Salpani*	Salpan	*Jarogach* (C), *Kramopai* (M)
18.	*Desmodium triflorum* (Linn.) Dc. (Papilionaceae)	*Kulaliya/ Kodalia*	Creeping Tickfoil	*Ya Re Sur Sah* (Mu)
19.	*Dioscorea bulbifera* Linn. (Dioscoreaceae)	*Ban Alu/ Pesta Alu*	Potato Yam	*Chang Foya/Ta Su Dhui* (M)
20.	*Diospyros peregrina* (Gaertn) (Ebenaceae)	*Gab*	Wild Mangosteen	*Gab Gaith* (T), *Kar Pong* (Mu)
21.	*Elephantopus scaber* Linn. (Compositae)	*Gojialata*	Elephant's Foot	*Hatichada* (C), *Sangkhate/Pro Suang* (M), *Marmai* (Mu)
22.	*Euphorbia hirta* Linn. (Euphorbiaceae)	*Bara Keru/ Ghaopata*	Snake Weed	*Tuthturing Lodi* (C), *Nuchhma/ Sai Ma Mungye* (M), *Aggugola* (Tr)
23.	*Ficus benghalensis* Linn. (Moraceae)	*Bot*	Banyan Tree	*Bot Gaith* (T), *Ramthet/ Gonok* (G)
24.	*Ficus glomerata* Linn. (Moraceae)	*Jagyadumur*	Cluster Fig	*Dhumur Gulo* (C), *Sudayachi/ Sanak* (M), *Khantabopang* (Tr), *Jabuna/Sapai* (Mo)
25.	*Hibiscus cannabinus* Linn. (Malvaceae)	*Kharapata/ Mesta*	Bimlipatam Jute	*Ganjha* (C), *Vhang/Jang Gri Se* (M) *Kan Sur Ka* (Mu)
26.	*Hibiscus rosa-sinensis* Linn. (Malvaceae)	*Joba*	China Rose	*Hindu Ma-pangi* (M)
27.	*Holarrhena antidysenterica* Wall. (Apocynaceae)	*Kurchi*	Tellichery Tree/ Conessi Tree	*Amasadaru/Kuruk Gach* (C), *La to pang/Luk Tuk/ Lakubaoung* (M), *Kuruk* (T)
28.	*Ixora coccinea* Linn. (Rubiaceae)	*Rangan/Ranjan*	Flame of the woods/Jungle Geranium	*Kaya Machaoi* (M)
29.	*Justicia gendarussa* Burm. (Acanthaceae)	*Jagatmadan/ Bishalla*	Black Adusa	*Kambasok* (C)

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No.	Botanical name and family	Bengali	English	Tribal
30.	*Kalanchoe pinnata* (Lam.) Pers. (Crassulaceae)	*Patharkuchi*	American life Plant	*Gois* (C), *Rokkiapumbo* (M)
31.	*Litsea glutinosa* (Lour.) Roxb. (Lauraceae)	*Kukur-Chita*	Tallow Laurel	*Paja* (S)
32.	*Litsea monopetala* (Roxb.) Pers. (Lauraceae)	*Urujja/Bara Kukurchita*	Common Grey Mango Laurel	*Bini Gaith* (T), *Bol-bet/ Bol-bek* (G)
33.	*Mangifera indica* Linn. (Anacardiaceae)	*Aam Gachh*	Mango Tree	*Sarock Apaong* (M), *Tsasat/ Ingsara* (Mo), *Amm Gaith* (T), *Thakachu/Jegachu/Bochu* (G)
34.	*Melastoma malabathricum* Linn. (Melasomaceae)	*Datranga*	Indian Rhododendron	*Magapithongulo* (C), *Koyongobaoung/Koyi ing saw* (M)
35.	*Mimosa pudica* Linn. (Mimosaceae)	*Lajjabati/ Lajwanti*	Sensitive Plant	*Lajariphul/Lajuri Hada/Lajuri Kher* (C), *Srapai/Kak Pine* (M), *Samsonti* (Tr)
36.	*Ocimum americanum* Linn. (Lamiaceae)	*Kalo Tulshi/ Ban Tulshi*	Wild Basil	*Sabrang* (C), *Tuloshio/Nung/ Nung Aprou* (M), *Tuloshikushum* (Tr)
37.	*Ocimum basilicum* Linn. (Lamiaceae)	*Babui Tulsi*	Sweet Basil/ Common Basil	*Sabrang* (C), *Tuloshio* (M), *Tuloshikushum* (Tr), *Junga Ju* (T), *Chang Giroma* (Mu)
38.	*Oroxylum indicum* (Linn.) Vent. (Bignoniaceae)	*Khona/Sona/ Kanak*	Indian Trumpet Flower	*Khona/Bailya/Taita/Krang-sia-bao* (C), *Krangsiobaoung/Kraat Saba/Egaroh* (M), *Khama* (Mo), *Long Kock Sim* (Mu), *Thakurung* (Tr), *Kering/ Kharing* (G)
39.	*Paederia foetida* Linn. (Rubiaceae)	*Gandhabhaduli*	King's Tonic/ Chinese Moon-creeper	*Padbaillodi/Patabansludi* (C), *Kha Bu Noya/Nuyechhi-baou* (M), *Samkhepeing* (Tr), *Ghorbobhai Shak* (T)
40.	*Phyllanthus emblica* Linn. (Euphorbiaceae)	*Amloki*	Indian Gooseberry/ Emblic Myrobalan	*Amloti* (C), *Soi Sha* (M), *Khulu* (Mu), *Ambari* (G)
41.	*Phyllanthus freternus* Wab. (Euphorbiaceae)	*Bhui Amla*	Phyllanthus	*Gru Khri* (M)

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No.	Botanical name and family	Bengali	English	Tribal
42.	*Phyllanthus reticulatus* Poir. (Euphorbiaceae)	*Pankushi/ Panseuli/Chitki*	Black-Honey Shrub/Potato Bush	*Kamboilodi Pata* (C), *Ghung-nel/Gounni* (M), *Bospai* (Tr)
43.	*Rauwolfia serpentina* (Linn.) Benth. (Apocynaceae)	*Sarpagandha/ Choto Chandar*	Snake Root	*Surchan/Bhomra* (C), *Bombaraja* (M), *Badap/ Durakmi* (G)
44.	*Rauwolfia tetraphylla* Linn. (Apocynaceae)	*Bara Chandar*	Wild Snake Root	*Surchan* (C), *Bombaraja* (M)
45.	*Saraca asoca* (Roxb.) Dc Wilde. (Caesalpiniaceae)	*Asok*	Ashoka	*Paillang Moma/Moma/ Pingal* (C), *Prajok* (M,) *Paying* (Mo)
46.	*Scoparia dulcis* Linn. (Scrophulariaceae)	*Chinigura/ Misridana*	Sweet Broomweed	*Midaraissa* (C), *Dumbaoung/ Du-Jhanga* (M), *Sammusha* (Tr)
47.	*Smilax zeylanica* Linn. (Liliaceae)	*Kumarilata/ Kumarica*	Indian Sarsaparilla	*Kumuzzaludi* (C), *Krak Khrow* (M)
48.	*Spondia pinnata* (Linn. f.) Kurz. (Anacardiaceae)	*Amra*	Hog Plum/ Wild Mango	*Thoura* (Mo), *Ambi-Thong* (G)
49.	*Streblus asper* Lour. (Moraceae)	*Sheorha/ Hekra*	Siamese Roughbush	*Sarbo* (C), *Wahnebang/Owah Nai Mraai* (M), *Umgnai* (Mo), *Saola Bipang* (G)
50.	*Syzygium cumini* (Linn.) Skeel. (Myrtaceae)	*Jam/Kalojam*	Java Plum/ Indian Black-berry	*Mojibaong/Musbrisi/Sochi Tobri* (M), *Chaku/Sabri* (Mo)
51.	*Terminalia bellerica* Roxb. (Combretaceae)	*Bohera*	Beleric Myrobalan	*Bora-Gach* (C) *Ka Sing Ba/Cha Ching Ti/Soi Sing Si* (M), *Sacheng* (Mo), *Boya Gula* (T), *Bol-Suiri* (G)
52.	*Tinospora cordifolia* (Willd.) Miers. (Menispermaceae)	*Gulancha Lata*	Tinospora	*Gurach-Ludhi* (C), *Fa Bro Noi/ Kha Bru Nay* (M), *Sam Rupu* (G)
53.	*Triumfetta rhomboidea* Jacq. (Tiliaceae)	*Ban-okra*	Burbush/ Barweed	*Lodiphul* (C), *Pophibaoung* (M)
54.	*Tylophora indica* (Burm.f.) Merr. (Asclepiadaceae)	*Antamul*	Indian Ipecacuanha	*Anantamul* (C), *Kamrau* (M)
55.	*Woodfordia fruticosa* (Linn.) Kurz. (Lythraceae)	*Dhaiphul*	Fire Flame Bush	*Se Be Gra* (M), *Mricha* (Mu)
56.	*Zanthoxylum budrunga* Roxb. Dc. (Rutaceae)	*Kantahorina*	Indian Prickly Ash	*Baruna Sak* (C), *Yureng* (M)

TABLE B

No.	Botanical name and family	Plant description	Plant parts used	Forms and uses
1.	*Acorus calamus* Linn. (Araceae)	A hygrophytic perennial herb with about 60 cm long lush green coloured leaves and underground branching rhizome. The yellow coloured flowers born on the terminal parts of a stalk	Rhizome	Decoction (Diarrhoea and Dysentery)
2.	*Aegle marmelos* (Linn.) Cour (Rutaceae)	A medium sized tree with 4-7 m high, leaves ovate, aromatic, sharp axillary thorn, fruits round in shape, greenish white, flowers have a nice fragrant	Unripe or half riped fruit	Water extract (Diarrhoea and Dysentery)
3.	*Alstonia scholaris* R.Br. (Apocynaceae)	An evergreen tree grows to about 20-25 m in height with furrowed trunk and small lanceolate leaves. Flowers are greenish, borne in cymes	Bark	Decoction (Diarrhoea and Dysentery)
4.	*Andrographis paniculata* (Burm.f.) Wall. (Acanthaceae)	An erect, bitter branched, annual herb with 4 sided stem, up to about 1 m high. Leaves opposite, elliptic up to 3 inches long. Small white flowers in axillary spikes. Capsules subcylindric, 18 mm long	Leaf and root	i. Decoction of dried root (Dysentery) ii. Pill made from leaves (Dysentery and Diarrhoea)
5.	*Annona reticulata* Linn. (Annonaceae)	It is a small deciduous tree, 5-8 m in height, leaves 15-20 cm long and 4-6 cm wide. Flowers subglobose, yellowish. The heart shaped fruits are smooth, 12-15 cm diameter.	Bark and unripe fruit	Infusion or decoction (Diarrhoea and Dysentery)
6.	*Artocarpus heterophyllus* Lam. (Urticaceae)	An evergreen tree grows to a height of 15 m or more with deep green ovate-oblong leaves and many heavy branches. The round shaped fruits are yellow, 35-60 cm long and covered with spiny epicarp	Root	Decoction (Diarrhoea)
7.	*Asclepias curassavica* Linn. (Asclepiadaceae)	A large perennial weed grows to 2 m in height. Leaves opposite, narrow lanceolate in shape, flowers orange and yellow in colour	Leaf	Fresh juice (Dysentery)
8.	*Asparagus racemosus* Willd. (Liliaceae)	A beautiful climbing plant with filiform leaves and tuberous roots. Flowers are white in colour	Root	Decoction (Dysentery)
9.	*Bombax ceiba* Linn. (Bombacaceae)	It is a large-sized spiny branched deciduous tree with palmate leaves and yellow to bright red flowers	Bark	Decoction (Diarrhoea and Dysentery)
10.	*Borreria articularis* (Linn.f.) Willd (Rubiaceae)	An annual procumbent herb grows to about 30 cm in height, leaves opposite, flowers small and white or bluish in colour	Seed	Decoction (Dysentery and loose motion)

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No.	Botanical name and family	Plant description	Plant parts used	Forms and uses
11.	*Callicarpa tomentosa* (Linn.) Merr. (Verbenaceae)	A medium-sized evergreen tree with ovate to narrowly oblong and about 15 cm long leaves. Flowers small, purple in axillary cymes	Stem	Water extract (Diarrhoea)
12.	*Cardiospermum halicacabum* Linn. (Sapindaceae)	A small climbing plant, 2-3 m in height. Leaves alternate, 3-7 cm long, divided into three parts and each having three leaflets. The small flowers bisexual as well as unisexual and white in colour	Leaf and stalk	Infusion (Diarrhoea and Dysentery)
13.	*Centella asiatica* Linn. (Apiaceae)	A common creeping herbaceous herb, rooting at the nodes. Kidney shaped leaves are mildly-toothed and palmately nerved. Flowers are small, greenish white, bearing 3-4 inches cluster	Whole plant	Juice (Blood Dysentery)
14.	*Curcuma caesia* Roxb. (Zingiberaceae)	It is a rhizomatous perennial plant. Leaves lanceolate, 0.4-0.7 m long. Flowers 0.1-0.2 m long, pale yellow and outer border reddish in colour	Rhizome	Juice and paste (Diarrhoea and Dysentery)
15.	*Curcuma domestica* Val. (Zingiberaceae)	Turmeric is a perennial herb with under-ground orange yellow rhizome which produces lanceolate, long, smooth and green coloured leaves. The pale yellow flowers are 0.1-0.2 m long	Rhizome	Decoction (Diarrhoea and Dysentery)
16.	*Cynodon dactylon* Pers. (Graminae)	A perennial glabrous grass with slender stems. Leaves very narrow, deep green in colour and 1-5 inches long	Leaf	Fresh juice (Chronic dysentery and Diarrhoea)
17.	*Desmodium gangeticum* (Linn.) Dc. (Papilionaceae)	A herbaceous perennial plant, up to 1.5 m high. Leaves ovate, oblong and acute. Flowers white or violet, borne on terminal racemes	Root	Decoction (Loose motion and Dysentery)
18.	*Desmodium triflorum* (Linn.) Dc. (Papilionaceae)	A much branched trailing under shrub with slender stems, grows to a height of about 20-40 cm, leaves 3 foliolate, leaflets obovate, flowers small and white in colour	Fresh leaf	Juice (Diarrhoea and Dysentery)
19.	*Dioscorea bulbifera* Linn. (Dioscoreaceae)	A climbing tree with small potato-like aerial tubers. Stem twines to the left around the support. It produces long thick underground tubers. Leaves alternate, ovate, 12-15 cm long	Tubers	Slice (Diarrhoea and Dysentery)
20.	*Diospyros peregrina* (Gaertn) (Ebenaceae)	A medium to large sized tree. Leaves crowdy, 10-30 cm long. Flowers small, bell shaped. Fruits round, yellow in colour	Bark, root-bark and seed	Infusion (Dysentery and Diarrhoea)

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No.	Botanical name and family	Plant description	Plant parts used	Forms and uses
21.	*Elephantopus scaber* Linn. (Compositae)	An erect much branched rigid herb, grows to a height of 30-40 cm. leaves ovate. Flowers small and violet in colour	Leaf and root	Decoction (Diarrhoea and Dysentery)
22.	*Euphorbia hirta* Linn. (Euphorbiaceae)	It is a small, annual, much branched herb with slender stems and opposite, ovate-lanceolate leaves; grows to 20-50 cm in height. Flowers tiny, in dense round clusters	Whole plant	Decoction (Diarrhoea and Dysentery)
23.	*Ficus benghalensis* Linn. (Moraceae)	A very large evergreen tree with aerial roots that grow into the ground from branches. Leaves ovate, thick and deep green	Bark and bud	i. Young buds ii. Infusion of barks (Diarrhoea and Dysentery)
24.	*Ficus glomerata* Linn. (Moraceae)	A moderate to large sized tree with spreading crown and white latex; grows to a height of 15-20 m, leaves ovate or ovate-lanceolate. Fruits round in shape, found in clusters on the trunk and branches	Latex, leaf, dried fruit and root leaves	i. Dried fruits, powdered and root juice (Dysentery) ii. Latex (Diarrhoea)
25.	*Hibiscus cannabinus* Linn. (Malvaceae)	It is an erect herbaceous annual with straight glabrous stems, grows to 3-4 m in height. Lower leaves heart shaped and upper palmate, 6-7 lobes. Flowers axillary, crimson or purple, 8-10 cm in diam. Fruits capsule, round in shape, covered with a calyx	Leaf	Infusion (Dysentery)
26.	*Hibiscus rosa-sinensis* Linn. (Malvaceae)	One of the most common evergreen garden shrubs, 2-3 m in height, leaves bright green, ovate-lanceolate, coarsely toothed towards the top. Flowers axillary, solitary, corolla, red, 10-15 cm diam.	Flower	i. Flower juice with banana (Chronic dysentery) ii. Fresh flower juice (Blood dysentery)
27.	*Holarrhena antidysenterica* Wall. (Apocynaceae)	A deciduous small tree, leaves opposite, ovate, 6-12 inch long. Flowers white in colour. Follicles in pairs, 10-15 inch long	Bark, seed and root	i. Decoction of barks and seeds (Diarrhoea and Dysentery) ii. Pills made from roots (Diarrhoea)
28.	*Ixora coccinea* Linn. (Rubiaceae)	A small much branched tree with opposite, sessile, elliptic ovate leaves, grows to a height of 1 inch. Flowers numerous, in dense corymbose cymes	Leaf, flower and root	i. Infusion of leaves (Diarrhoea) ii. Root juice (Dysentery)
29.	*Justicia gendarussa* Burm. (Acanthaceae)	A shrub grows to 1.2 m in height with lanceolate leaves. White flowers in interrupted spikes from uppermost leaf and often forming a terminal panicle	Root	Decoction of roots boiled in milk (Dysentery)

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No.	Botanical name and family	Plant description	Plant parts used	Forms and uses
30.	*Kalanchoe pinnata* (Lam.) Pers. (Crassulaceae)	A tall erect glabrous herb grows to about 30-80 cm in height. Leaves thick, crenate, 8-15 cm long. Flowers pendulous, reddish purple, about 5 cm long	Leaf	Infusion (Dysentery)
31.	*Litsea glutinosa* (Lour.) Roxb. (Lauraceae)	A small evergreen shrub, up to about 25 m high. Leaves scented elliptic-ovate or oblong-lanceolate. Flowers white, borne in axillary cymes	Bark and Leaf	Decoction or Infusion (Diarrhoea and Dysentery)
32.	*Litsea monopetala* (Roxb.) Pers. (Lauraceae)	A small to moderate sized evergreen tree, about 10 m in height. Leaves elliptic-oblong. Flowers small, soft, pale greenish yellow, borne in corymbs	Bark	Decoction (Diarrhoea and Dysentery)
33.	*Mangifera indica* Linn. (Anacardiaceae)	A small to large sized evergreen tree with much spreading branches. Leaves deep green in colour, oblong-lanceolate. Flowers small, yellow, borne in long panicles. Fruits fleshy, various shapes and sizes	Bark, young leaf, dried flower, dried fruit and kernel of seed	i. Decoction of bark or dried flowers (Diarrhoea, and Chronic dysentery) ii. Immature green leaves and kernel of seeds (Diarrhoea); iii. Infusion of dried fruits (Chronic dysentery)
34.	*Melastoma malabathricum* Linn. (Melasomaceae)	It is a bushy shrub much branched. The ovate-oblong or lanceolate leaves are 6-12 cm long. Flowers purplish-pink, in terminal corymbs	Leaf and flower top	i. Infusion of leaves (Diarrhoea and Dysentery) ii. Fresh leaves and flower tops (Chronic diarrhoea)
35.	*Mimosa pudica* Linn. (Mimosaceae)	A common diffused prickly herb, grows to 60-80 cm in height. Leaves sensitive, bipinnate, pinnae 2-4, leaflets 20-40. Flowers soft, numerous, bisexual and unisexual, borne in pink globose head. Pods flat, small, curved, about 1 inch	Leaf and root	i. Water extract of roots (Dysentery) ii. Infusion of leaves (Diarrhoea)
36.	*Ocimum americanum* Linn. (Lamiaceae)	An aromatic shrubby herb grows to a height of 0.2-0.7 m. Leaves opposite, elliptic-lanceolate. The white flowers in terminal and axillary racemes	Leaf	Infusion (Diarrhoea and Dysentery)
37.	*Ocimum basilicum* Linn. (Lamiaceae)	An annual herbaceous erect much branched aromatic plant, up to about 1 m high. Leaves ovate-lanceolate, variable. Flowers pink or purplish in whorls, 12-15 cm long	Leaf, seed and aerial part	i. Decoction of leaves and seeds (Dysentery and Diarrhoea) ii. Infusion of aerial parts (Chronic dysentery)

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No.	Botanical name and family	Plant description	Plant parts used	Forms and uses
38.	*Oroxylum indicum* (Linn.) Vent. (Bignoniaceae)	A small to moderate-sized, soft wooded, deciduous tree with long opposite leaves. Flowers numerous, purple, in long terminal racemes. Pods large, flat, woody, 0.3-1 m long	Root bark	Decoction or dried powder (Diarrhoea and Dysentery)
39.	*Paederia foetida* Linn. (Rubiaceae)	A climbing herb emit a bad odour. Leaves opposite, ovate-lanceolate. Flowers violet, in panicles	Leaf and root	i. Infusion (Dysentery and loose motion) ii. Leaf juice (Children's diarrhoea)
40.	*Phyllanthus emblica* Linn. (Euphorbiaceae)	A small or moderate-sized, deciduous, much branched tree with compound leaves. The greenish yellow small flowers in axillary clusters. Fruits pale yellow, globose, contain a hard seed inside	Dried fruit	Infusion (Diarrhoea and Dysentery)
41.	*Phyllanthus freternus* Wab. (Euphorbiaceae)	A small, much branched, smooth, annual herb with alternate compound leaves of small leaflets. Flowers tiny, solitary in the axils. Fruits fleshy, globose	Whole plant	i. Infusion of whole plant (Dysentery and Diarrhoea) ii. Tender shoots (Chronic dysentery)
42.	*Phyllanthus reticulatus* Poir. (Euphorbiaceae)	It is a large, scandent shrub with 2 to 5 cm long elliptic, acute leaves. Flowers small, axillary, male and female	Leaf and root	i. Root juice (Dysentery) ii. Infusion of leaves (Diarrhoea in children)
43.	*Rauwolfia serpentina* (Linn.) Benth. (Apocynaceae)	A small, erect, herbaceous plant which grows to about 90 cm in height. Leaves in whorl of three, bright green, lanceolate or obovate, oblique and 8-18 cm long. Flowers white or pinkish, about 2.5 cm long. Drupes purplish black, 1.2 cm long	Root	Water extract or Decoction (Diarrhoea and Dysentery)
44.	*Rauwolfia tetraphylla* Linn. (Apocynaceae)	A branching woody shrub, up to 1.2 m tall with elliptic whorled leaves and greenish white flowers in umbellate cymes. Drupes oblong, ovoid, deep purple	Root	Water extract (Diarrhoea and Dysentery)
45.	*Saraca asoca* (Roxb.) Dc Wilde. (Caesalpiniaceae)	A medium-sized, spreading, evergreen tree. Leaves alternate, peripinnate, 10-20 cm long, leaflets opposite, 6-12, oblong-lanceolate. Flowers orange or orange-yellow, borne in dense axillary corymbs. Pods fleshy, oblong, about 15-25 cm long	Bark and flower	i. Infusion of flowers (Dysentery) ii. Decoction of barks (Diarrhoea and Dysentery)
46.	*Scoparia dulcis* Linn. (Scrophulariaceae)	A small, much-branched, erect, perennial herb. Leaves ovate-elliptic, three in a whorl in each node. Flowers white, axillary and capsules tiny, subglobose	Root and Leaf	Infusion (Diarrhoea and Dysentery)

Contd.....

No.	Botanical name and family	Plant description	Plant parts used	Forms and uses
47.	*Smilax zeylanica* Linn. (Liliaceae)	A large woody climbing tree with a few prickles. Leaves alternate, ovate, petiole stout. Flowers small, greenish in colour	Root	Decoction (Dysentery)
48.	*Spondia pinnata* (Linn. f.) Kurz. (Anacardiaceae)	A small to moderate-sized deciduous tree, grows to about 8-12 m in height with imperipinnate compound leaves. Flowers small, yellowish green, in terminal spreading panicles. Fruits oblong, fleshy, 1.5-2.5 inches long	Bark	Decoction (Dysentery and Diarrhoea)
49.	*Streblus asper* Lour. (Moraceae)	A small, evergreen tree with milky juice and alternate elliptic leaves. Flowers axillary and fruits subglobose, 5 mm diameter.	Bark and seed	Infusion or decoction (Diarrhoea and Dysentery)
50.	*Syzygium cumini* (Linn.) Skeel. (Myrtaceae)	A large evergreen tree with much branches and elliptic-oblong, lanceolate leaves; grows to a height of about 8-12 m. Flowers small and white in colour. Fruits black, ellipsoid, juicy, 2-2.5 cm long	Bark and leaf	i. Bark juice (Diarrhoea and Dysentery) ii. Infusion of leaves (Blood dysentery)
51.	*Terminalia bellerica* Roxb. (Combretaceae)	A large-sized deciduous tree, up to about 20 m high. Leaves alternate, ovate, clustered at the end of branch-lets. The unpleasant scented flowers in simple axillary spikes, greenish-yellow in colour. Fruits hairy brown, round or oval in shape	Fruit	i. Decoction (Diarrhoea) ii. Pulp (Diarrhoea and Dysentery)
52.	*Tinospora cordifolia* (Willd.) Mers. (Menispermaceae)	A large twiner with succulent stems and warty light grey coloured bark. Leaves cordate, membranous. Flowers white, in axillary racemes. Fruits tiny, ovoid, pea-sized and red in color	Root and stem	Water extract (Chronic diarrhoea and Chronic dysentery)
53.	*Triumfetta rhomboidea* Jacq. (Tiliaceae)	A weedy perennial herb, up to 1.5 m tall with cordate, ovate, irregularly lobed leaves. Flowers small, bright yellow in colour, borne in dense cymes. Capsules ovoid or glubose with smooth hooked spines, 4 mm in diameter.	Leaf and bark	Infusion (Diarrhoea and Dysentery)
54.	*Tylophora indica* (Burm.f.) Merr. (Asclepiadaceae)	It is a small twining perennial with numerous fleshy long roots and smooth or hairy elongated stems. Leaves opposite, ovate-lanceolate, 5-10 cm long. Flowers greenish yellow, in axillary umbellate cymes. Fruits or follicles lanceolate, sharp pointed, 3-4 inches long. Seeds flat and hairy	Leaf and root bark	i. Infusion (Dysentery) ii. Pills made from leaves (Dysentery)

Contd.....

No.	Botanical name and family	Plant description	Plant parts used	Forms and uses
55.	*Woodfordia fruticosa* (Linn.) Kurz. (Lythraceae)	A large shrub grows to about 3.6 m in height. Leaves opposite, stalkless, ovate-lanceolate. Flowers small, bell-shaped, bright red, in paniculate cymes on axillary peduncles. Capsules membranous	Leaf, bark and flower	i. Infusion of leaves or Powder of dried flowers (Dysentery and Loose motion) ii. Decoction of bark (Dysentery)
56.	*Zanthoxylum budrunga* Roxb. Dc. (Rutaceae)	A medium deciduous fragrant spreading branched tree with corky bark. Leaves pari or imparipinnate, leaflets 10-40, ovate to lanceolate. Flowers small yellow, round berries in bunches. Fruits small, glubose	Bark	Decoction (Diarrhoea)

TABLE C

No.	Plant preparation	Normal dosage
1.	**Decoction:** About 20 g of fresh or 10 g of dried and grinded plant parts such as stems, roots, bark, rhizome, seeds etc. are boiled gently in 1000 ml of water for about 25-30 minutes and then strained	a. Adult : 2 cups two times in a day b. Children (Above 10 years) : 2 cups daily c. Children (6 to 9 years) : 1 cup daily d. Children (1 to 5 years) : Half cup is taken twice a day e. Child : ¼ cup twice a day.
2.	**Infusion:** About 25 g of fresh leaves and flowers and/or 10 gm of dried powder form of plant parts like bark, root, fruit, seeds, buds etc. are steeped in hot or cool water. Allowed to stand for about 4-6 hours and strained before use	a. Adult : 2 or 3 cups two times in a day b. Children (Above 10 years) : 1 cup 2 times daily c. Children (6 to 9 years) : 1 cup daily d. Children (1 to 5 years) : Half cup is taken two times in a day e. Child : ¼ cup twice a day.
3.	**Powder:** The dried plant parts are ground with a pestle in a mortar and then sieved with fine cotton cloth. It may be also used to make pills and capsules	a. Adult : 1 Tablespoon daily b. Children (Above 10 years) : ¾ Tablespoon daily c. Children (Below 10 years) : ½ Tablespoon in a day d. Child : ¼ Tablespoon daily.
4.	**Extract:** The different plant parts are steeped into boiling water and allowed to stand for 4 to 5 hours. Then strained and the liquid is boiled gently until all the moisture has been evaporated	a. Adult : 2 Dessert-spoons 2 times daily b. Children (Above 10 years) : 1-1½ Dessert-spoon in a day c. Children (Below 10 years) : 1 Dessert-spoon daily d. Child : ½ Dessert-spoon daily.
5.	**Juice:** The whole plant or plant parts are chopped and crushed. Then squeezed to extract the juice. A fine cotton cloth is used to strain the juice	a. Adult : ½ Teaspoon of juice in 3 table-spoons of water is taken three times in a day b. Children (Above 10 years) : 8 Drops of juice in 3 tablespoons of water, 3 times daily c. Children (Below 10 years) : 5 Drops of juice in 3 tablespoons of water, 3 times in a day d. Child : 2 Drops of juice in 4 tablespoons of water should be taken every six hours. (Only fresh juice should be taken as a remedy and never use the prepared juice on the next day)

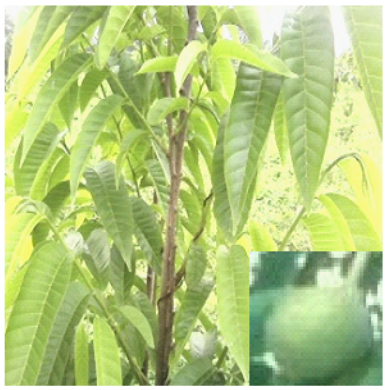
Figures

Acorus calamus

Aegle marmelos

Alstonia scholaris

Andrographis paniculata

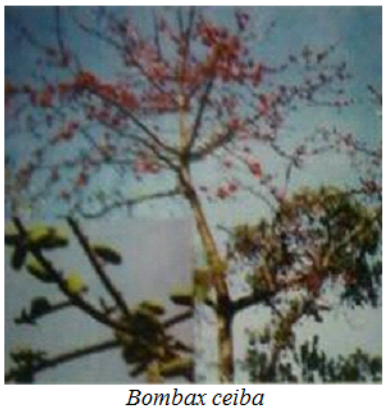


Annona reticulata

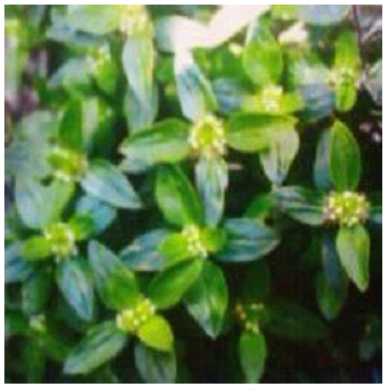
Artocarpus heterophyllus

Asclepias curassavica

Asparagus racemosus



Bombax ceiba



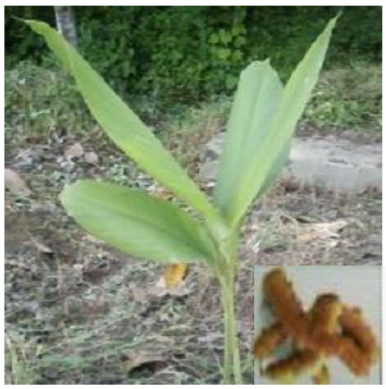
Borreria articularis

Callicarpa arborea

Cardiospermum halicacabum

Centella asiatica

Curcuma caesia



Curcuma domestica

Cynodon dactylon

Desmodium gangeticum

Desmodium triflorum

Dioscorea bulbifera

Diospyros peregrina

Elephantopus scaber

Euphorbia hirta

Ficus benghalensis

Ficus glomerata

Hibiscus cannabinus

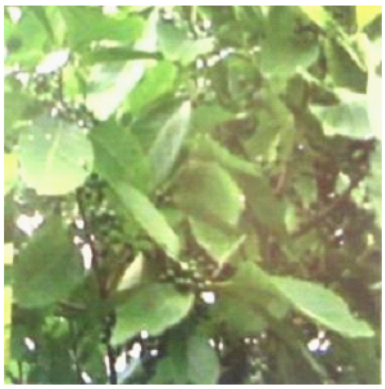
Hibiscus rosa-sinensis

Holarrhena antidysenterica

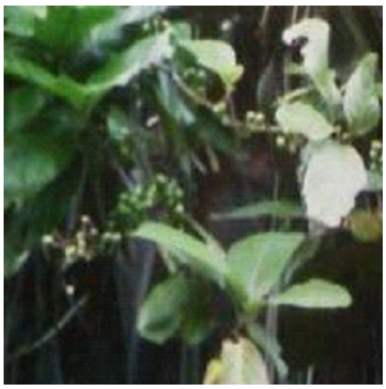
Ixora coccinea

Justicia gendarussa

Kalanchoe pinnata



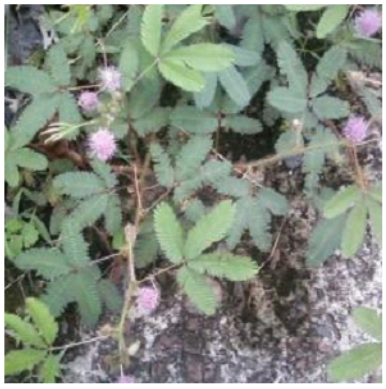
Litsea glutinosa



Litsea monopetala

Mangifera indica

Melastoma malabathricum



Mimosa pudica

Ocimum americanum

Ocimum basilicum

Oroxylum indicum

Paederia foetida

Phyllanthus emblica

Phyllanthus freternus

Phyllanthus reticulatus

Rauwolfia serpentina

Rauwolfia tetraphylla

Saraca asoca

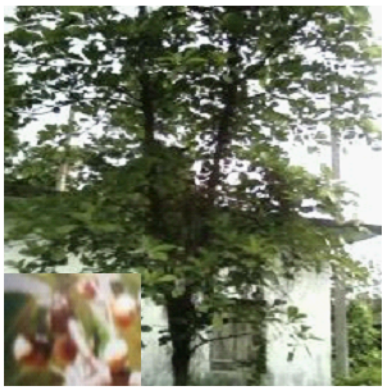
Scoparia dulcis

Smilax zeylanica

Spondias pinnata

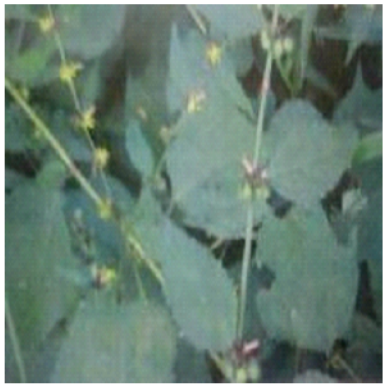
Streblus asper

Syzygium cumini



Terminalia bellerica

Tinospora cordifolia



Triuimfetta rhomboidea

Tylophora indica

Woodfordia fruticosa

Zanthoxylum budranga

Conclusion

Traditional knowledge of Chittagong Hill Tracts is going to abolish day by day due to newly discovered large number of synthetic medicines as well as modern culture changes. Nevertheless, it is expected that the medicinal plants will be properly utilized with background of scientific research to develop modern efficacious herbal drugs which will be helpful to enjoy healthy life for next generation. Therefore, necessary steps should be taken to document and preserve valuable indigenous knowledge on medicinal plants and plant resources.

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