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Medicinal plants used by tribals in Jalpaiguri district, West Bengal, India

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Abstract

An ethnobotanical survey was carried out among tribals of Jalpaiguri district of West Bengal, India. People of all tribal villages mostly rely on ethnomedicinal practices; particularly in treating common physical problems like smaller injuries, cough and cold, skin diseases, stomachache and abdominal disorder, etc. A total of 115 plant species belonging to 103 genera and 62 families were reported to be used for treating 69 various physical ailments. In terms of the number of medicinal plant species, Piperaceae (8 species), Asteraceae (9 species) and Verbenaceae (6 species) are dominant families. Among different plant parts used for the preparation of medicine, the leaves were most frequently used for the treatment of diseases followed by roots and whole plant.

Keywords: Ethnobotany, Medicinal plants, Tribal traditional healing, Jalpaiguri district, West Bengal

1. Introduction

India is known for its rich heritage of the knowledge of natural products, particularly of its herbal medicine. Indian people are using medicinal plants from prehistoric period [1]. Tribal, living mostly in the remote forest areas, still depend to a great extent on the indigenous system of medicine. Indigenous healing practices have been culturally accepted during all phases of human culture and environmental evolution. About 85% of traditional medicines are plant derived [2]. Medicinal plants have a long-standing history in many indigenous communities, and are an integral part for treating various diseases, particularly to cure daily ailments, and this practice of traditional medicine is based on hundreds of years of belief and observations. With enormously diversified ethnic groups and rich biological resources, India represents one of the great emporia of ethnobotanical wealth [3].

In developing countries, there is an increasing attempt to incorporate traditional medicines, especially herbal preparations, in the local health care systems and many modern researchers are involved today to explore the huge potential of ethnobotanical knowledge for treating various diseases [3-6]. However, the ethnomedicinal plants are under threat due to deforestation, overgrazing and their reckless utilization. So, it indicates the urgent need of their conservation. Conservation of biological resources as well as their sustainable use is important in the preservation of traditional knowledge [7].

Covered with dense forest and riverine grassland, Jalpaiguri was the harbour of one of the richest bounties of Wildlife. In Jalpaiguri district, we can see the heavy concentration of all the major Chhotanagpur tribes, the hill tribes and many other tribes like the Mech, toto, Rabha, and some presence of the Garo, Magh, Hajang etc. The later mentioned tribes are the ones, which are usually found in the states in North-east India [8]. All these various tribes brought along with them, their culture and beliefs.

Although Jalpaiguri is known for its rich floristic diversity, no serious scientific research work was done on medicinal plants before 90's. Even those earlier studies either documented all the plants with medicinal value in the wild or tabulated the medicinal plants used by a few tribes in a particular zone of the district [9-10]. So we designed this study to survey the use of medicinal plants among tribal people of entire Jalpaiguri district.

2. Materials and methods

2.1. Study Area

The district of Jalpaiguri in West Bengal is located in the foothill of the Eastern Himalayas. It is the largest district of North Bengal covering an area of 6,245 km². It is situated between

26°16' and 27°0' North latitudes and 88°4' and 89°53' East longitudes. The entire topography is crisscrossed with several rivulets and rivers, and lying between the Sikkim – Darjeeling Himalayas and the Gangetic West Bengal. Main forest cover comprises of Semi-Moist-Deciduous vegetation. Sal forest is predominant with pockets of various other types like evergreen Forest, Savannahs, riverain forest and swamps.

The climate of the district is characterized by a sub-tropical and humid type of climate. The average annual humidity in the district is of 82%. The average maximum temperature is 37 °C and the average minimum temperature is 6 °C. The average annual rainfall of this district is about 3300mm. with an average of more than 100 rainy days.

2.2. Data Collection

A simple but very basic work plan was adopted for this survey work. At first various government departments like Forest Department, Department of Backward Classes, *Panchayet* Offices, etc. were approached for getting information about the checklist of forest villages with relevant demographic information and to get detailed information about tribal population and tribal villages of the district. Relevant information was also collected from internet. On the basis of that information a plan of work was chalked out for our survey. Then extensive survey was conducted during the

period of July, 2007 to December, 2009 and some of the places were revisited again during July to December of 2012.

During the field survey, detailed information on types, traditional method of preparation, mode of consumption, shelf life and ethnic value of the medicinal plants were collected from elderly persons and traditional healers of tribal communities. Information was collected through well structured pretested questionnaires and discussions among the informants in their local language.

The plant specimens were collected as directed by the resource persons in flowering and fruiting conditions. Digital photographs of the plants were also taken. Collected specimens were dried, chemically treated, and herbarium sheets were prepared for possible identification. Identifications were made using available literature¹¹⁻¹². The herbarium sheets were deposited in the Herbarium of A.C College and in West Bengal State Council of Science and Technology Department

3. Results

In this study 115 plant species of 63 families (Table 1) were found to be used for medicinal purposes by various tribes of Jalpaiguri district. Most of this knowledge was transmitted from one generation to next. The traditional medicine men are integral part of the community and take care of the common ailments of the folk in their home setting.

Table 1: Medicinal plants used by tribal of Jalpaiguri District.

Sl. No.	Local Name	Scientific Name	Family	Medicinal use
1	kalmegh; Chirata (Oraon)	<i>Andrographis paniculata</i> (Brum.f.) Wall. Ex Nees	Acanthaceae	Whole plant or leaf extract used as liver tonic.
2	Kulekhara	<i>Hygrophila schulli</i> (Buch.Ham) M.Ret. et. S.M. Almeida	Acanthaceae	Leaf extract used to treat anemia.
3	Basak	<i>Justicia adhatoda</i> L.	Acanthaceae	Leaf juice used as expectorant to treat chronic bronchitis, cough and cold.
4	Githa (Nepali)	<i>Thunbergia grandiflora</i> Roxb.	Acanthaceae	Whole plant used to treat snake bite.
5	Belkel phang (Rava)	<i>Alangium chinensis</i> (Loureoro) Herms.	Alangiaceae	Leaf juice applied as ointment in pain and inflammation.
6	Apang; Chirchiti (Oraon)	<i>Achyranthes aspera</i> L.	Amaranthaceae	Root is used to treat sex diseases.
7	Chhorachurisag (Oraon)	<i>Deeringia amaranthoides</i> (Lamarck) Merrill.	Amaranthaceae	Root is used to treat jaundice.
8	Lalchita	<i>Gomphrena globosa</i> Linn.	Amaranthaceae	Leaves are used to stop bleeding from wounds.
9	Astachatur (Rava)	<i>Crinum amoenum</i> Roxb. Ex Ker. Gawler	Amaryllidaceae	Root used to treat jaundice and diarrhea.
10	Dhoney	<i>Coriandrum sativum</i> L.	Apiaceae	Fruits used as digestive stimulant and anti vomiting agent.
11	Thankuni; Bengsag (Oraon); Mishinachil (Garo)	<i>Centella asiatica</i> (L.)Urban.	Apiaceae	Leaves used to treat diarrhea, dysentery.
12	Chatim;Loksomfang (Garo); Chatiani (Oraon)	<i>Alstonia scholaris</i> (L.) R.Br.	Apocynaceae	Latex prevents acidity and child constipation.
13	Nyantara	<i>Catharanthus roseus</i> (L.) G.Don.	Apocynaceae	Whole plant or leaf extract used to treat diabetes.
14	Kurchi; Indrajal (Paik)	<i>Holarrhena pubescens</i> (Buch.Ham) Wallex G.Don	Apocynaceae	Bark used to treat dysentery.
15	Sarpagandha; Nagbail (Oraon); Kharkhe (Meich); Maitomol phang (Rava)	<i>Rauwolfia serpentina</i> (L.) Benth ex Kurz.	Apocynaceae	Root extract used to treat fever.
16	Boch; Ghorbat (Oraon)	<i>Acorus calamus</i> L.	Araceae	Leaf extract is used in fever.
17	Akanda; Akwan pata (Oraon); Bhosan pata (Paik)	<i>Calotropis procera</i>	Asclepiadaceae	Leaves used to treat wounds.
18	Uchanti; Bhusuripata (Oraon); Elame (Nepali)	<i>Ageratum conyzoides</i> L.	Asteraceae	Whole plant juice applied to stop bleeding.
19	Kukshima, Kukursonga; Adharbhushi (Rava)	<i>Blumea lacera</i> (Burm.f.) DC	Asteraceae	Whole plant is used to treat muscular pain.
20	Kesuti; Kalaksheshri (Oraon)	<i>Eclipta prostrata</i> (L.) L.	Asteraceae	Leaf is used against skin disease.

21	Helencha; Muchrisag (Oraon)	<i>Enhydra fluctuans</i> Lour.	Asteraceae	Leaves taken in digestion problem.
22	Asam lata (Oraon, Munda); Tetram phang (Rava)	<i>Eupatorium odoratum</i> L.	Asteraceae	Leaf sap stops bleeding.
23	Taralata, Josura lata; Mekanilata (Nepali)	<i>Mikania micrantha</i> H.B.K.	Asteraceae	Leaf sap prevents bleeding.
24	Not known	<i>Sonchus asper</i> Vill.	Asteraceae	Whole plant extract used to treat wounds and boils.
25	Rasun/Usni sag (Oraon); Harerphang (Rava)	<i>Spilanthes calva</i> DC.	Asteraceae	Cooked young leaves are taken to increase lactation. It is also used in cough and cold as well as glossitis.
26	Genda	<i>Tagetes erecta</i> L.	Asteraceae	Leaf juice applied on cuts, wounds to stop bleeding.
27	Jongli dopati	<i>Impatiens trilobata</i> Colebrook.	Balsaminaceae	Root used to treat migraine pain.
28	Puin sak	<i>Basella alba</i> Stewart.	Basellaceae	Root used to treat tuberculosis.
29	Sona, Kanaidingi; Hatipanjara, Totala (Oraon);dagduya (Munda);Jamblophang (Rava); Kharukhandai (Meich).	<i>Oroxylum indicum</i> Vent.	Bignoniaceae	Paste of hydrated fruit or seed or bark applied in stomach pain, chest pain, used as appetizer, and also against jaundice.
30	Simul; Panchu phang (Rava); Simal (Nepali)	<i>Bombax ceiba</i> L.	Bombacaceae	Root used in bone fracture and blood dysentery. Latex is used in amoebiasis.
31	Koss phang (Rava)	<i>Ehretia laevis</i> Roxb.	Boraginaceae	Bark paste applied to treat painful limbs.
32	Hatisur; Nimplosunti phang (Rava)	<i>Heliotropium indicum</i> L.	Boraginaceae	Root sap is used in eye treatment.
33	Anaras	<i>Ananas comosus</i> (L.) Merr.	Bromeliaceae	Leaf extract to kill worms. Fruit juice used against scurvy.
34	Jum, Tinn, Kharpat, Nil bhadi; Rosuni (Rava)	<i>Garuga pinnata</i> Collebr.	Burseraceae	Bark is used in jaundice.
35	Chimjera (Dukpa); Niltos (Oraon); Masing (Paik)	<i>Drymaria diandra</i> (Blume.) Duke	Caryophyllaceae	Leaves and whole plant used to treat cough and cold, and pain.
36	Arjun	<i>Terminalia arjuna</i> (Roxb. Ex. DC) Wt. & Arn	Combretaceae	Bark decoction taken in empty stomach to treat cardiac trouble.
37	Bahera; Bauraiphang (Rava)	<i>Terminalia bellirica</i> (Gaertn) Roxb.	Combretaceae	Dried fruit used to treat dyspepsia and also used as cooling agent.
38	Haritaki	<i>Terminalia chebula</i> (Gaertn) Retz.	Combretaceae	Fruit used against stomach disorder.
39	Not known	<i>Murdannia japonica</i> (Thurnburg) Faden	Commelinaceae	Root used to treat jaundice.
40	Golsadapata gachh (Oraon); Kathkeawa (Munda)	<i>Argyreia roxburghii</i> Choisy.	Convolvulaceae	Latex used in eye disease.
41	Keu; Betlahari and Debkewa (Nepali)	<i>Costus speciosus</i> (Koen. Ex retz) Smith	Costaceae	Rhizome used to treat stomach problem, blood in urine, diabetes.
42	Chiminphang (Rava)	<i>Melothria indica</i> Lour.	Cucurbitaceae	Whole plant is used in the treatment of hydrocele.
43	Mohaboli; Karmanphang (Rava)	<i>Trichosanthes cordata</i> Roxb.	Cucurbitaceae	Whole plant sap mixed with mastered oil used to treat rheumatism.
44	Swarnalata; Alokzori (Oraon)	<i>Cuscuta reflexa</i> Roxb.	Cuscutaceae	Whole plant juice used to treat jaundice.
45	Ban-alu; Kukrala; Gachh-alu; Githa (Nepali)	<i>Dioscorea bulbifera</i> L.	Dioscoreaceae	Tubers used against asthma and snake bite.
46	Sal	<i>Shorea robusta</i> Gaertn. F.	Dipterocarpaceae	Stem-bark is consumed to treat dysentery.
47	Nagmoni (Rava)	<i>Dracaena angustifolia</i>	Asparagaceae	Leaves are used in insect bite.
48	Ashalj; Noljor and Barjor (Oraon); Teregunch (Rava)	<i>Equisetum debile</i> Roxb.	Equisetaceae	Whole plant used to treat fractured bone.
49	Barokheruie; Sijusij phang (Rava); Dudhgach (Oraon)	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Latex used to treat eye problem.
50	Lal bharanda	<i>Jatropha gossypifolia</i> L.	Euphorbiaceae	Root paste used to treat tuberculosis.
51	Amlaki, amla	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Powder of male flower used as snuff to cure nasal haemorrhage. Paste of ripe fruit given to children to treat diarrhea. Infusion of fruit with common salts (3:1) given to children as gripe. Unripe fruit taken as cooling agent and laxative. Fresh fruit and root paste used to treat jaundice. Seed paste used to treat eye inflammation.
52	Rerhi, Bherenda; Bagrandi, erandi (Oraon); Jara (Pike)	<i>Ricinus communis</i> L. (BM)	Euphorbiaceae	Seed oil used as pain killer.
53	Arhar; Tauri kalai (Koch); Jehu	<i>Cajanus cajan</i> (L.)	Fabaceae	Leaf decoction beneficial for jaundice

	(Garo); Kokhleng (Mech)	Millsp.		
54	Chakora (Munda, Oraon)	<i>Cassia alata</i> L.	Fabaceae	Leaf pest is used to treat skin disease. Seed oil is used against body pain.
55	Tentul	<i>Tamarindus indica</i> L.	Fabaceae	Ash of stem bark used to cure wounds.
56	Dandakalash; Khangkhisha (Meich); Dhurup (Santhal); Dhulpi (Baid); Parbola phang (Rava)	<i>Leucas plukenetii</i> (Roth) Spreng.	Labiatae	Root used to treat fever. Leaf paste used in pneumonia. Whole plant paste ingested in treatment of snake bite.
57	Tulsi	<i>Ocimum sanctum</i> L.	Labiatae	Leaves are used in cough and cold.
58	Dulaltulsi	<i>Ocimum basilicum</i> L.	Labiatae	Seed paste applied against stings of wasps, bees and other venomous insects. Fresh leaf juice used as drops to treat earache.
59	Pachroli, Jui lata; Rudhilo (Nepali)	<i>Pogostemon plectranthoides</i> Desf.	Labiatae	Young apical leaves used to treat running nose.
60	Paik; Kumbhi (Oraon)	<i>Careya arborea</i> Roxb.	Lecythidaceae	Bark extract used in blood dysentery.
61	Kukur-jhiwa; Hatubhanga (Rava)	<i>Leea indica</i> (Burman) Merrill.	Leeaceae	Root paste used in treatment of bone fracture.
62	Piyanj	<i>Allium cepa</i> L.	Liliaceae	Fleshy scale juice used as antiseptic.
63	Satamul; Kaisalgo (Oraon); Kuriol (Nepali)	<i>Asparagus racemosus</i> Willdenow.	Liliaceae	Root used against stomach disorder.
64	Bhut raj; Musinto (Rava)	<i>Lygodium pinnatifidum</i> (L.) Sw.	Lygodiaceae	Rhizome and leaf used to treat redness of urine and other urinary problem.
65	Sweat barela, Kureta; Jangalparshing phung (Rava); Jharu, Mircha (Nepali); Boriari (Oraon)	<i>Sida acuta</i> Burm. f.	Malvaceae	Leaf prevents blood urea, boils and nephritis.
66	Jaba	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	Leaves used to treat burning sensation, fatigue, skin diseases. Root extract used to treat cough and fever. Flower bud used to treat blood dysentery.
67	Lankajoba; Ratophul (Nepali)	<i>Malvaviscus arboreus</i> Car.	Malvaceae	Flower is taken to treat stomach problem.
68	Barokuchichak phang (Rava)	<i>Angiopteris evecta</i> Hoffm.	Marattiaceae	Rhizome sap with <i>Talmishri</i> consumed to cure leucorrhoea.
69	Futki	<i>Melastoma malabathricum</i> L.	Melastomataceae	Leaf paste used against boils.
70	Neem	<i>Azadirachta indica</i> A. Juss.	Meliaceae	Leaf sap used to treat fever and acidity.
71	Kurdadra (Rava)	<i>Parabaena sagittata</i> Miers.	Menispermaceae	Leaves used in headache.
72	Nimuka; Tambarki (Nepali)	<i>Stephania hernandifolia</i> Walp.	Menispermaceae	Root used to treat urinary diseases.
73	Akundi; Debaul bedet, Bidargumu (Meich)	<i>Stephania japonica</i> (Thumb.) Miers	Menispermaceae	Rhizome used to treat insomnia.
74	Gulancha; Gurjalong (Oraon)	<i>Tinospora cordifolia</i> (Willd) Micrs. Ex Hook. F. & Thoms.	Menispermaceae	Stem sap used against acidity and helminth infection.
75	Kuchuli and Thupak phang (Rava)	<i>Ficus hispida</i> Linn. f.	Moraceae	Fried fruit reduce blood sugar level.
76	Piyara; Ombok (Oraon)	<i>Psidium guajava</i> L.	Myrtaceae	Bark used to prevent child dysentery.
77	Lal saluki, Nal; Raktahola (Rava)	<i>Nymphaea rubra</i> Roxb. ex Andr.	Nymphaeaceae	Rhizome used in treatment of female diseases.
78	Not known	<i>Natsiatum herpeticum</i> Buch. Ham ex. Arn.	Olacaceae	Whole plant with other ingredients like ginger, black piper, leaf of lemon, leaf of <i>Vitex</i> , <i>Eupatorium</i> , is used to treat head ache.
79	Dinshabalindo (Meich); Nagdhup (Rava)	<i>Helminthostachya zeylanica</i> Hook.	Ophioglossaceae	Rhizome used to treat jaundice.
80	Not known	<i>Peristylus constrictus</i> (Lindl) Lindl.	Orchidaceae	Whole plant used against jaundice.
81	Golmorich	<i>Piper nigrum</i> L.	Piperaceae	Decoction of seed taken for a few days to treat cough and cold.
82	Luchipata; Dayoi (Rava)	<i>Peperomia pellucida</i> Kunth.	Piperaceae	Whole plant paste used against boils.
83	Pipla (Toto)	<i>Piper chaba</i> Hunter.	Piperaceae	Seed is used in cough and cold.
84	Pipla (Toto)	<i>Piper longum</i> L.	Piperaceae	Seed is used in cough and cold.
85	Pipla (Toto)	<i>Piper thomsonii</i>	Piperaceae	Seed is used in cough and cold.
86	Pipla (Toto)	<i>Piper nepalens</i>	Piperaceae	Seed is used in cough and cold.
87	Pipul	<i>Piper peepuloides</i> Roxb.	Piperaceae.	Fruits used in cough and cold.
88	Pipul	<i>Piper sylvaticum</i> Roxb.	Piperaceae.	Fruits used in cough and cold.
89	Pankhiraj	<i>Drynaria quercifolia</i>	Polypodiaceae	Rhizome is used in treatment of bone fracture
90	Kubronten (Rava)	<i>Naravelia zeylanica</i> D.C.	Ranunculaceae	Root crushed and inhaled in case of

				vertigo and weakness.
91	Panbolang phang (Rava)	<i>Coffea bengalensis</i> Roxb.	Rubiaceae	Flower is used in child birth and conjunctivitis.
92	Dhobi (Nepali)	<i>Mussaenda roxburghii</i> Hook. f.	Rubiaceae	Leaf juice taken with hot water to reduce the body pain.
93	Surangi, Bartundi; Chilonchak Phang (Rava)	<i>Morinda citrifolia</i> L.	Rubiaceae	Leaf sap used to treat fungal infection of feet during monsoon.
94	Gandhabhadali, Gandhal pata	<i>Paederia scandens</i> (Lour.) Merr.	Rubiaceae	Fresh root decoction used to treat rheumatism. Leaf paste used to treat leucorrhoea. Leaf juice used to treat dysentery and blood dysentery. Leaf decoction used to treat night blindness.
95	Bel	<i>Aegle marmelos</i> (L.) corr ex. Roxb.	Rutaceae	Fruit and seed used in stomach problem.
96	Ashshewra	<i>Glycosmis arborea</i> (Roxb.)DC.	Rutaceae	Root powder used to treat fever, hepatopathy, eczema, skin diseases, wounds, liver disorder.
97	Lataphatkari; Sibjhul; Bhado (Rajbanshi)	<i>Cardiospermum halicacabum</i> L.	Sapindaceae	Leaves used to treat snake bite.
98	Astapata	<i>Houttuynia cordata</i> Thunberg.	Saururaceae	Whole plant used in stomach disorder.
99	Mithapata; Chinipata (Oraon)	<i>Scoparia dulcis</i> Roxb.	Scrophulariaceae	Leaf is used against boils and tumors as well as pneumonia.
100	Not known	<i>Selaginella semicordata</i>	Selaginellaceae	Plant juice with black piper used to treat leucorrhoea.
101	Dhatura	<i>Datura stramonium</i> L.	Solanaceae	Seed used to treat dog bite.
102	Kantikari, Teetbegun; Kantabejri (Oraon)	<i>Solanum khasianum</i>	Solanaceae	Fruit extract used in toothache.
103	Not known	<i>Helicteres isora</i> L.	Sterculiaceae	Whole plant used to treat jaundice.
104	Chiloni;	<i>Schima wallichii</i> Choisy.	Theaceae	Bark used to treat gonorrhoea.
105	Jingsing Phang (Rava)	<i>Clerodendron fragrans</i> Vent.	Verbenaceae	Root bark prevents the stomachache.
106	Ghentu, Bhat Ghato (Munda, Nepali and Orong):	<i>Clerodendrum viscosum</i> Vent.	Verbenaceae	The root paste is used against pain. The leaf paste is used against skin disease.
107	Gamari	<i>Gmelina arborea</i> Roxb.	Verbenaceae	Bark used to treat vomiting and diarrhea.
108	Yuetory Gach; Gaipokna (Munda)	<i>Lippia alba</i> (Mill.) N E Br. Ex. Britton and Wilson	Verbenaceae	Leaf is used Against skin disease.
109	Segoon; Tiksal (Oraon)	<i>Tectona grandis</i> L.f.	Verbenaceae	Leaf sap used to treat irregular menstrual cycle.
110	Nishinda	<i>Vitex negundo</i> L.	Verbenaceae	Leaves prevent whitening of hair and increase memory.
111	Harjora	<i>Cissus quadrangularis</i> L.	Vitaceae	Stem extract is used to treat broken bone.
112	Nilkantha(Maich) Kaloholud.: Haldai	<i>Curcuma caesia</i> Roxb.	Zingiberaceae	The rhizome is used in bone fracture.
113	Soti.: Kalodungai (Rava)	<i>Curcuma zedoaria</i> Roscoe.	Zingiberaceae	The rhizome is used in bone fracture.
114	Halud	<i>Curcuma longa</i> L.	Zingiberaceae	Rhizome paste applied to treat skin diseases and inflammation.
115	Aada; Haigeng (Meich)	<i>Zingiber officinale</i> Rosc.	Zingiberaceae	Rhizome paste used to treat bone fracture and is digestive and stimulant.

The reported plants were arranged according to their scientific name, family, vernacular names (as recorded during the field work), local status on availability, parts used, therapeutic uses and method of usage of herbal preparations. However, we were not able to collect information about method of usage of herbal preparations in all cases; because many of the traditional healers believe that upon disclosure of the knowledge (particularly to urban people) the effect of the medicine will diminish.

They use these one hundred fifteen species of medicinal plants to treat 69 various types of physical ailments. Most of the plants reported in this study were collected from natural vegetation (76%) and few of them from home gardens (24%). Asteraceae is represented by the highest number of species (nine species), followed by Piperaceae (eight species), Verbenaceae (six species), Acanthaceae, Apocynaceae, Euphorbiaceae, Menispermaceae, Rubiaceae Labiatae and

Zingiberaceae each having four species and three species each from family Amaranthaceae, Fabaceae, and Malvaceae. Eight families (Apiaceae, Boraginaceae, Combretaceae, Cucurbitaceae, Liliaceae, Rutaceae and Solanaceae) contained two species each and forty two families represented by only one species.

Among different plant parts used for the preparation of medicine (Figure 1 & 2), leaves (33.9%) were found to be the most frequently used plant parts followed by roots (18.2%), whole plant (14.7%), seed (10.4%), rhizome (9.5%), fruit (9.5%), latex (3.4%), flower (3.4%), and only in rare occasion each by, fleshy scale, flower bud, root bark and stem. One medicinal plant may have a more than one plant part that is medicinally important. An important example of such plant is *Oroxylum indicum* Vent.

Most of the ethnobotanical studies confirmed that the leaves are the major portion of the plant used in the treatment of

diseases [13-17]. The methods of preparation fall into four categories, viz. plant parts applied as a paste, juice extracted from the fresh parts of the plant, and plants used to prepare a decoction in combination with water and powder made from fresh or dried material.

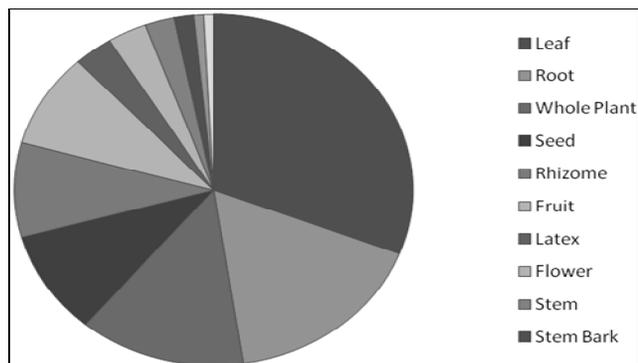


Fig 1 & 2: Plant parts used for the preparation of medicine.

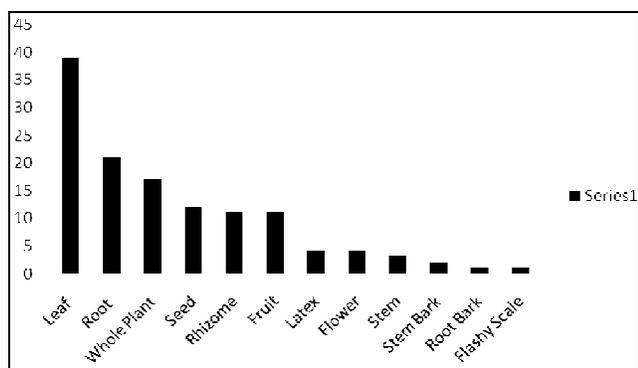


Fig 2:

4. Conclusion

Almost in every corner of the Jalpaiguri district plants were found to be used as medicine. The herbal preparations made from the traditional medicinal plants were mostly used to treat common ailments prevalent in this region like cut and wounds (nine species), cough and cold (twelve species), skin diseases (twelve species), pain and inflammation (nine species), bone fracture (eight species) and stomachache and abdominal disorder (fifteen species), for treatment of jaundice and liver problems (thirteen species), and fever (six species). The study showed that a good number of the collected plants were used for the treatment of multiple diseases. *Glycosmis arboroea* (Roxb.) DC. (= pentaphylla) are used for the treatment of six diseases; *Hibiscus rosa-sinensis* L. for the treatment of four diseases; *Sida acuta* Burm. f., and *Vitex negundo* L. are for the treatment of three diseases; and 14 other plants are used to treat two diseases.

Use of medicinal plants among tribal of Jalpaiguri district in treatment of various diseases has definitely been out numbered today by the allopathic treatment. But still their dependence on plants of their surroundings to get relieved from day to day ailments is unquestionable. However, all persons, who are using plants as medicine, are complaining about the gradual fading out of many of the medicinal plants from their surroundings. It is presumable that availability of such plants in the vicinity may increase the use of plants as medicine. So the possibilities of propagation and cultivation of these plants in this area should be explored to achieve the goal of sustainable development. Also further research on the medicinal plants mentioned in this study might provide some

potential leads to fulfill the needs of search for bioactive compounds and the discovery of new drugs to fight diseases.

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