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An Ethnomedicinal Study of Medicinal Plants Used By Indigenous People from West District of Tripura, India

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Abstract
Ethnomedicine is concerned with the cultural interpretation of health, disease and illness and also address the health care seeking process and healing practices. Research interest and activities in the area of ethnomedicine have increased tremendously in the last decade (Andrea *et al.,* 2005). A field study of uses of ethnomedicinal plants by indigenous people of West District, Tripura, India found that plants having multiple applications as herbal medicine. A total of 50 of such plants were recorded carefully from the traditional healers and aged villagers of West District, Tripura, with valid scientific name, common English (E) and Kokborok (K) name, family, part(s) used, ailments and mode of preparation and use. Some of the important plants include *Calamus latifolius* Roxb., *Coccinia grandis* (L.) Voigt, *Solanum indicum* L., *Hedychium coronarium* J.Koenig, *Oroxylum indicum* (L.) Kurz, *Molineria capitulata* (Lour.) Herb., *Curcuma aromatica* Salisb., *Ocimum tenuiflorium* L., *Holarrhena antidysenterica* (L.) Wall., *Ageratum conyzoides* (L.), *Cassytha filiformis* (L.).

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INTRODUCTION

"Ethnomedicine" is the study of "traditional medicine" of ethnic communities, their knowledge and practices that transmitted orally over centuries, and evolved over millennia of human existence (Chattopadhyay, 2009). The indigenous people of India till date used their medicaments or "so called medicines" which might be more appropriately defined as the use of plants in the treatment of diseases and should be more accurately termed as "Ethnobotanical medicine" (Fabricant and Farnsworth, 2001). For a considerable period of time, traditional medicine and ethnomedicine were ignored by the clinicians and biomedical practitioners due to a number of factors including the questionable purity, safety, and potency. The raw material to prepare those medicines is not standardized through modern quality control parameters; its chemical profile and their quantification are not known or maintained and thus their purity is in question. Similarly, their toxicity profile at low doses for long term is unknown, so long-term use in tolerable dosage needs to be monitored to rule out the question of long-term toxicity, if any. The traditional medicines are used for generations with limited or no major toxic manifestations, which can be considered as "Proof of Concept" in nature's laboratory.

Tripura is rich in its biological resources and possesses an extremely rich plant biodiversity which is gradually decreasing. Tribal people are the ecosystem people who live in harmony with nature and maintain a close link between man and environment. In India, out of 18, 864 (World Bank Report, 2004, 2007) species of higher plants, over 2000 species are documented and 1,100 species are used in different systems of medicine. The state has four districts, viz. North, South, West Tripura and Dhalai. The aim of the present study is to rejuvenate knowledge about the different ethnomedicinal plants by indigenous people mainly 5 tribes viz. Debbarma, Noatia, Molsom, Rupini, Hrangkhawl of West Tripura. These local tribal medicine men gradually developed themselves as professional local doctors by using different plant parts in the form of juices, pills, pastes, raw or boiled for diverse simple to complex diseases. They also locally called as – Ochai, Kabiraj, Baddya, Ozai and Gunnin etc (Maumdar and Datta, 2007)

MATERIALS AND METHODS

West Tripura is an administrative district in the state of Tripura in India. The district headquarters are located at Agartala which is also the capital of the State. As of 2012 it is the most populous district of Tripura (out of 8). The West Tripura District is bounded by Bangladesh in the north and west and Khowai district in the east and by Sepahijala district in the south. The West Tripura district lies approximately between latitude 23°16' to 24°14'N and longitude 91°09'E to 91°47'E. According to census 2011, West Tripura had population of 1,725,739 of which male and female were 879,428 and 846,311 respectively. West Tripura Block of West Tripura district has total population of 485,036 as per the census 2011. Out of which 243,066 are males while 241,970 are females. In 2011 there were total 121,881 families residing in West Tripura Block. The Average Sex Ratio of West Tripura Block is 995. As per census 2011, all of the population of West Tripura Block lives in rural areas. The average literacy rate in rural area is 94.3% and the sex ratio of West Tripura Block is 995.

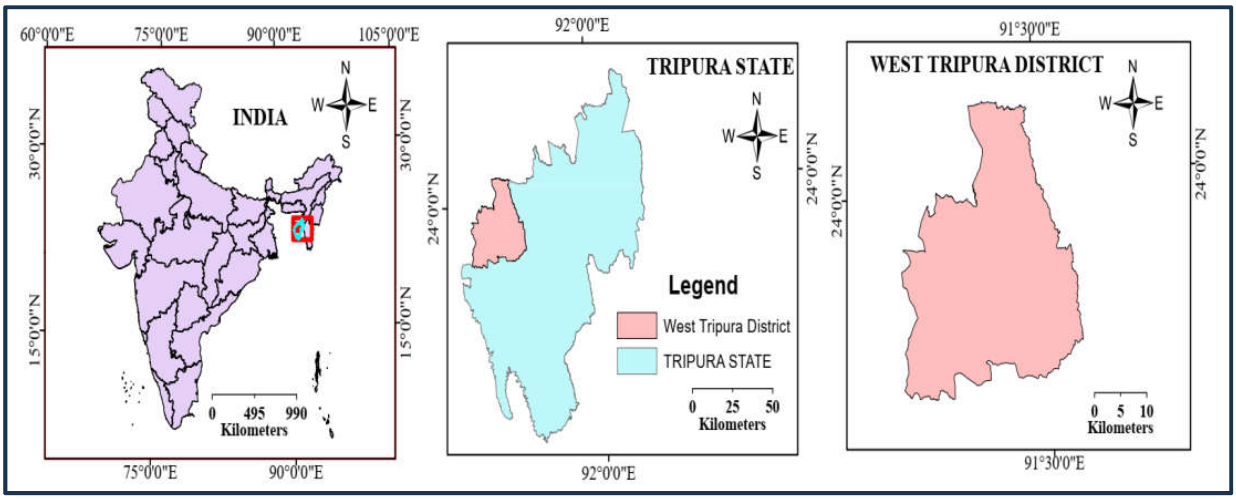


Figure 1: Map of the study area (Source: Shape files from Survey of India, Indian Administrative Boundary Level 3)

The study was conducted in the West district of Tripura, India. During the ethnobotanical survey, several herbalists, medicine men and women of 5 different tribes i.e., Debbarma (Tripuri), Rupini, Hrangkhawl, Molsom, Noatia were identified and visited about 15 times to gather knowledge on practices of medicinal plants. Such study was carried out by adopting the methodology of structured questionnaire where the detailed information on medicinal plants uses, type of medication, diseases treated and mode of treatment were collected. Direct observation, usual interaction and structured interviews were adopted to collect valid information from those herbal practitioners. The interviews were conducted individually as well as in groups with the respondents. However, while interviewing in the groups, participant observation method was also employed to observe the tribal's perceptions and knowledge on importance and utility of different medicinal plants in their society. Several visits in the rural areas were conducted to collect the information and verification of these practices. The name of the selected places visited for the survey were Mandwi Chargharia para (23.85°N, 91.48°E), Birgudas para (23.83°N, 91.50°E), Chengkharu kami (23.47°N, 91.29°E), Bikram Molsom Para (23.76°N, 91.51°E), Kathirambari (23.95°N, 91.31°E).

RESULTS

In the present study a total of 50 medicinal plants, 49 genera and 28 families were determined as being traditionally used for the cure of skin diseases. These medicinal plants were recorded in table 1, each 5 tribes contain 10 medicinal plants with the relevant information. Out the plant studied during the study, 25 belongs to herbs, 11 shrubs, 7 trees, 2 climbers and 2 vines. The families like Asteraceae (4), Zingiberaceae (4), Rutaceae (4), Solanaceae (3) and Araceae (3) represent the most dominant family studied in (Table 2). The other important family in the study include Apocynaceae (2), Mimosaceae (2), Rubiaceae (2) and Cucurbitaceae (2). The least species were observed in 21 families. According to present study result, the most common disease was jaundice, diarrhoea and rheumatic. The information on scientific name, local name, families, plant part used and treatment process to cure recorded diseases of recorded plants were given in (Table 1) and the photographs of some studied medicinal plant species were presented in the photo plates.

Table.1: Medicinal uses of the studied plants

E: English, K: Kokborok, H: Hrangkhawl, M: Molsom, N: Noatia

S. No.	Scientific Name	Common Name	Family	Part Used	Medicinal Uses
1	*Calamus latifolius* Roxb.	Globose fruit(E) Raidang(K)	Arecaceae	Young shoot or foliage	Rabies
2	*Houttuynia* cordata Thunb.	Chameleon plant(E) Khum kha(K)	Saururaceae	Roots and Leaves	Malaria
3	*Coccinia grandis* (L.) Voigt	Ivy gourd(E) Tokha thaichumu(K)	Cucurbitaceae	Leaves	Blood Pressure
4	*Tinospora sinensis* (Lour.) Merr.	Moonseed(E)	Menispermaceae	Roots, Stem, Leaves	Dysentery, Bone Fracture, Fever, Asthma, Jaundice, Diabetes
5	*Alstonia scholaris* (L.) R.Br.	Blackboard tree(E) Khum wakhek(K)	Apocynaceae	Latex	Buccal cavity
6	*Ananas comosus* (L.) Merr.	Pineapple(E) Androso(K)	Bromeliaceae	Leaves (Young)	Tapeworm
7	*Solanum violaceum* Ortega	Poison Berry (E) Bolong Khamka (K)	Solanaceae	Fruits	Anticancer, Antibacterial, Antiplasmodial
8	*Christella parasitica* (L) H.Lév.	Cyclosorus parasiticus L. (E) Khum tokha(K)	Thelypteridaceae	Tender fronds	Neurological disease
9	*Aegle marmelos* (L.) Corrêa	Golden apple(E) Bael(K)	Rutaceae	Leaves, latex from fruit, ripe fruit	Gastrointestinal disease
10	*Paederia foetida* L.	Skunkvine(E) Pecharam(K)	Rubiaceae	Leaves	Gastritis, diarrhoea, Abdominal pain, Rheumatic affections, Peptic ulcer disease
11	*Azadirachta indica* A.Juss.	Neem (E); Muchi (H)	Meliaceae	Tender leaves & tree bark	Chicken pox, prickly heat
12	*Mangifera indica L.*	Mango (E) Thwihai(H)	Anacardiaceae	Mango bark, juice	Tooth ache
13	*Tectona grandis* L.f.	Teak (E) Shegun (H)	Lamiaceae	Tender leaves	Oral disease

14	*Stizolobium imbricatum* (Roxb. Ex Lindl.) Kuntze	Monkey tamarind(E) Kosoi bangphai (H)	Fabaceae	Seeds	Lumbago
15	*Alocasia macrorrhizos* (L.) G.Don	Giant Taro (E) Phan (H)	Araceae	Skin of stalks	Toe cracking
16	*Caesalpinia pulcherrima* (L.) Sw.	Peacock flower (E)	Fabaceae	Leaves and shoots	Ringworm
17	*Citrus* × *aurantiifolia* L.	Lime (E) Kawaji(H)	Rutaceae	Fruit juice	Boil disease
18	*Zingiber officinale* Roscoe	Ginger (E) Aithing(H)	Zingiberaceae	Rhizome	Chocked voice
19	*Momordica charantia* L.	Bitter gourd (E)	Cucurbitaceae	Fruits and leaves	Poisonous caterpillar hair
20	*Zanthoxylum armatum* L.	winged prickly ash (E)	Rutaceae	leaves	Convulsion
21	*Leucas aspera* (Willd.) Link	Thumbai(E) Susni (K)	Lamiaceae	Leaves	Soup with fingerlings of Channa punctatus is administered with rice for 15 days in jaundice.
22	*Mimosa pudica* L.	sensitive plant(E) samsunduru(K)	Mimosaceae	Entire plant	Leaf paste is applied on the acne and pimples.
23	*Musa* × *paradisiaca* L.	Banana(E) Thalik(K)	Musaceae	Flower and stolon	Juice of flowers is used in dysmenorrhoea and menorrhagia. Extract of the stolon is administered in dysentery and diarrhoea. Fresh dried rhizomes are used in jaundice.

24	*Psidium guajava* L.	Guava(E) Goyam(K)	Myrtaceae	Fruits and twigs	Young twigs are chewed in empty stomach every morning for 1 week in dysentery and diarrhoea. Fruit is used in anaemia.
25	*Alpinia nigra* (Gaertn.) Burtt	Alpinia nigra(E) Taruku(K)	Zingiberaceae	Stem and Rhizome	Used to cure respiratory troubles and rheumatic pain
26	*Amomum dealbatum* Roxb.	Java cardamom(E) Alachi(K)	Zingiberaceae	Fruits or seed	Used in case of muscular rheumatism
27	*Amorphophallus bulbifer* (Schott) Blume	Devil's tongue(E) Maimorung(K)	Araceae	Petiole, Rhizome	Used in muscular or Joint pain
28	*Molineria capitulata* (Lour.) Herb.	Palm grass(E) Lengdi(K)	Hypoxidaceae	Rhizome	It helps to decreased density in semen and cure vaginal ulcer.
29	*Enydra fluctuans* Lour.	Helencha(E) Titirdoga(K)	Compositae	Whole plant	Hypertension and excess bile secretion
30	*Glycosmis pentaphylla* (Retz.) DC.	Gin berry (E) Blang Jambura(K)	Rutaceae	Whole plant	Jaundice, worms and vomiting
31	*Lasia spinosa* (L.) Thwaites	Geli-geli(E) Gaittara(M)	Araceae	Rhizome and Leaves	Chronic Rheumatism
32	*Litsea glutinosa* (Lour.) C.B.Rob.	Soft bollygum(E) Kukurchik(M)	Lauraceae	Leaves and bark	Vaginal White discharge
33	*Mussaenda roxburghii* Hook.f.	East Himalayan Mussaenda(E) Kuthwikhum(M)	Rubiaceae	Leaves	Use in Bone fracture
34	*Sphagneticola calendulacea* (L.) Pruski	Pilabhamgara(E) Bhimraj(M)	Asteraceae	Whole plant	Hydrophobia
35	*Sterculia villosa* Roxb. Ex Sm.	Hairy sterculia(E) Lambaak Buphang(M)	Malvaceae	Petiole and Bark	Seminal Weakness
36	*Solanum stramoniifolium* Jacq.	Coconilla(E) Ram begun(M)	Solanaceae	Whole plant	Used for chest pain and Asthma
37	*Neptunia oleracea* Lour.	Garden puff(E) Haraisag(M)	Mimosaceae	Young shoot	Acidity, Gastritis and Constipation

38	*Curcuma aromatica* Salisb.	Wild Turmeric(E) Swtwi(M)	Zingiberaceae	Rhizome	Anticancer, Tumours
39	*Chrysanthemum indicum* L.	Indian Chrysanthemum(E) Sotrobongol(M)	Asteraceae	Leaf and flower	Used to treat eyes ailments, migraine and inflammation at the throat
40	*Ocimum tenuiflorum* L.	Holy basil(E) Tulsi(M)	Lamiaceae	Leaf	Used to treat mouth ulcers and infections, kidney stones
41	*Phyllanthus niruri* L.	Gale of the wind(E) Amali(N)	Phyllanthaceae	Whole plant	Used to treat Ringworm, urinary discharge anuria, scabies
42	*Holarrhena pubescens* Wall. ex G.Don	Kurchi(E) Kuichwma Buphang(N)	Apocynaceae	Bark	Malaria, Piles
43	*Ageratum conyzoides* (L.)	Billy goat weed(E) Saam Berama(N)	Asteraceae	Leaf	Snake bite
44	*Amaranthus spinosus* L.	Pigweed(E) Dalok Busu(N)	Amaranthaceae	Leaf	Gall Stone
45	*Terminalia arjuna* (Roxb. ex DC.) Wight & Arn.	Arjun Tree(E) Arjun Buphang(N)	Combretaceae	Bark	Leucorrhoea
46	*Cyperus longus* L.	Nutsedges(E) Baosa Chwla(N)	Cyperaceae	Stem	Jaundice
47	*Alternanthera ramosissima* (Mart.) Chodat & Hassl.	Little Ruby(E) Dalok Rimi(N)	Amaranthaceae	Leaf	Over bleeding after abortion, Menstrual, Miscarriage Bleeding
48	*Cassytha filiformis* L.	Love-vine(E) Mui Kamchwlwi(N)	Lauraceae	Leaf	Pneumonia
49	*Physalis minima* L.	Cape gooseberry(E) Bolong moso(N)	Solanaceae	Leaf	Infections between the fingers of legs from working long hours in water
50	*Acmella uliginosa* (Sw.) Cass.	Marsh para cress(E) Khum kormo(N)	Asteraceae	Whole plant	Used as pain killer

Table 2: Number of plants belongs to families

Serial no.	Family	No. of plants
1	Arecaceae	1
2	Asteraceae	4
3	Saururaceae	1
4	Cucurbitaceae	2
5	Menispermaceae	1
6	Apocynaceae	2
7	Bromeliaceae	1
8	Solanaceae	3
9	Thelypteridaceae	1
10	Rubiaceae	2
11	Zingiberaceae	4
12	Meliace	1
13	Lamiaceae	3
14	Rutaceae	4
15	Anacardiaceae	1
16	Combretaceae	1
17	Malvaceae	1
18	Phyllanthaceae	1
19	Amaranthaceae	2
20	Cyperaceae	1
21	Lauraceae	2
22	Araceae	3
23	Fabaceae	2
24	Compositae	1
25	Mimosaceae	2
26	Musaceae	1
27	Myrtaceae	1
28	Hypoxidaceae	1

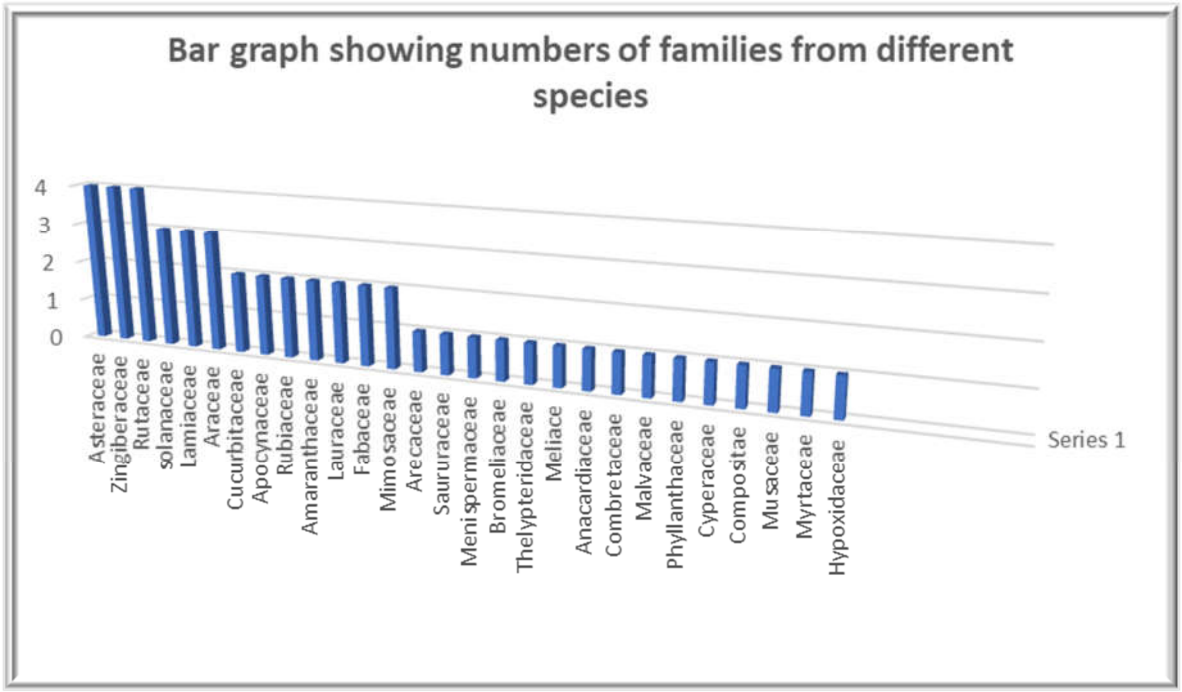


Table 3: List of Disease and the Plant Part Used

Serial no.	Name of disease	No. of plants used
1	Rabies	1
2	Malaria	2
3	Blood pressure	3
4	Jaundice	6
5	Bone fracture	2
6	Fever	3
7	Asthma	3
8	Diabetes	2
9	Buccal cavity	2
10	Tapeworm	1
11	Cancer	1
12	Bacterial	2
13	Nasal haemorrhage	1
14	Gastritis	2
15	Diarrhoea	5
16	Abdominal pain	2
17	Rheumatic	4
18	Ringworm	1
19	Tumour	2
20	Skin disease	2
21	Eye troubles	3
22	Gall stone	2
23	Menorrhagia	2

24	Hydrophobia	1
25	Leukoderma	2
26	Anaemia	1
27	Acne pimples	1
28	Seminal weakness	2
29	Chicken pox	1
30	Prickly heat	1
31	Mouth ache	1
32	Lumbago	1
33	Boil	1
34	Chocked voice	1
35	Convulsion	1

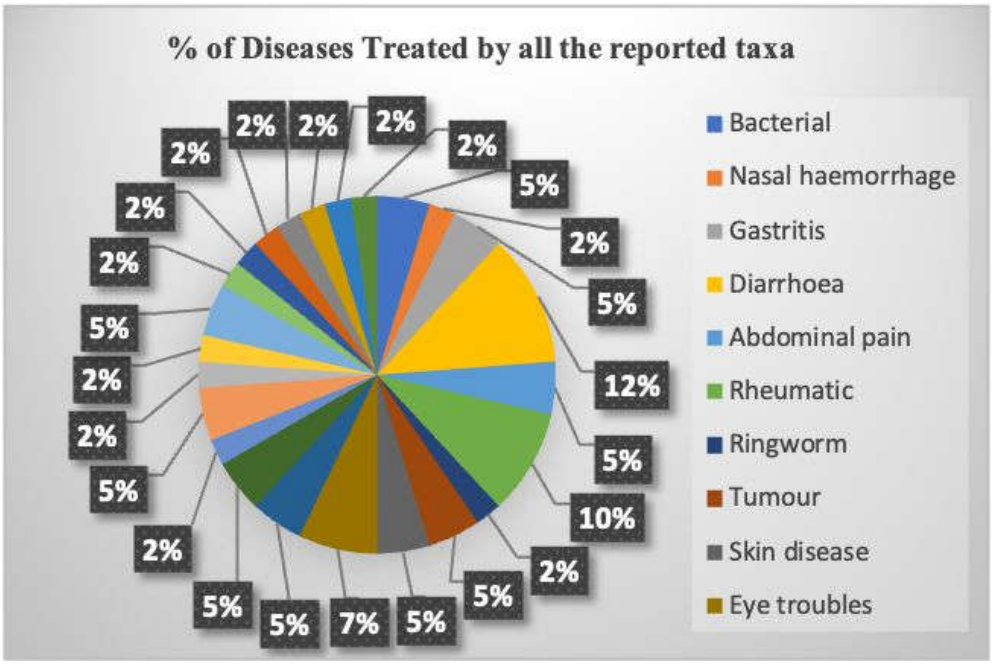
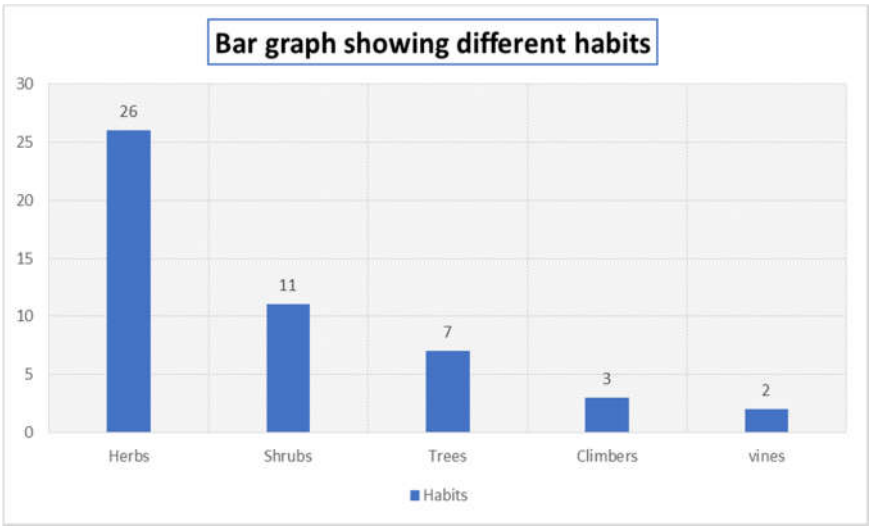


Table 4: Habit of the studied plants

Habit	No of plants
HERBS	25
SHRUBS	11
TREES	7
CLIMBERS	2
VINES	2


Bar graph showing different habits
30
25
20
15
10
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11
7
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Herbs
Shrubs
Trees
Climbers
vines
Habits

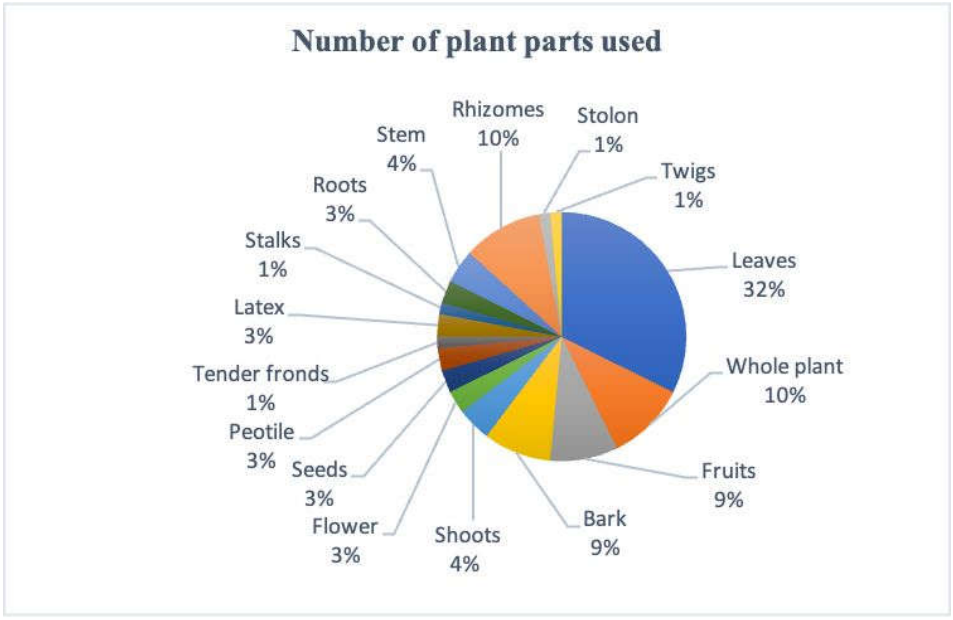
Number of plant parts used
Rhizomes 10%
Stolon 1%
Stem 4%
Twigs 1%
Roots 3%
Stalks 1%
Leaves 32%
Latex 3%
Whole plant 10%
Tender fronds 1%
Peotile 3%
Seeds 3%
Fruits 9%
Flower 3%
Shoots 4%
Bark 9%

Fig 1: *Zingiber officinale Roscoe*

Fig 2*: Chrysanthemum indicum L.*

Fig 3: *Curcuma aromatica Salisb.*

Fig 4: *Ocimum tenuiflorum L.*

Fig 5: *Amaranthus spinosus L.*

Fig 6: *Tectona grandis L.f*

Fig 7: *Houttuynia cordata Thunb.*

Fig 8: *Citrus aurantiifolia L*

Fig 9: Tinospora sinensi (Lour.)

Fig 10: *Paederia foetida L*

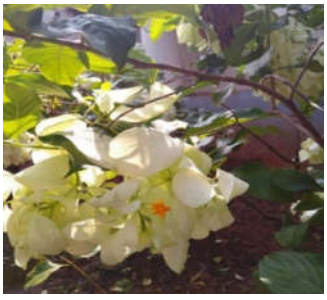

Fig 11: *Mussaenda roxburghii Hook.f.*

Fig 12: *Enhydra fluctuans* DC.

Fig 13: Interaction with Debbarma (Tripuri) tribe during survey

Fig 14: Interaction with Molsom Tribes

Fig 15: Interaction with Hrangkhawl Tribes

Fig 16: Interaction with NoatiaTribes

Fig 17: Interaction with Rupini Tribe

DISCUSSION

The present study shows that almost all plant parts are used as medicine. The most used plant parts for curing diseases are leaf, whole plant, rhizome, bark, stem, fruit, root, latex, seed, nuts, flower, bulb (Table1). The maximum utilization of leaves may be due to presence of more active chemical compounds in them. Generally fresh part of the plant used for the preparation of medicine. When fresh plant part are not available dried parts also used. This study revealed that traditional wisdom about medicinal plants still play a vital role in primary health care of people. During the survey it was observed that there is an urgent need to protect this vast and traditional knowledge forever. Similar plant use is recorded earlier in different parts of India. The plants are used to cure a number of several diseases. Maximum numbers of plant are used to cure Jaundice disease (Table 1). It is observed that different plants can be used to cure one ailment. During the survey, it was also observed that younger generation does not have knowledge about medicinal plants due to their inclination towards allopathic system of medicine. The old people above 45 years of age are quite familiar with these medicinal plants and the use them for curing several diseases like Rabies, malaria, jaundice, cancer, boil, lumbago and tumour etc. Traditional healers were consulted in preparation of medicines and prefer to collect the desired plant parts from wild. But due to over exploitation of these valuable resources, there is a tremendous pressure on some of the plants species which is resulting in the dwindling of their population.

From this detailed survey of ethnomedicinal plants, it can be concluded that plants which are traditionally used in rural areas of West district of Tripura may have important roles in the treatment of various skin diseases. These ethnomedicinal plants need further evaluation of their therapeutic efficacy, side effects, and toxicity.

CONCLUSION

The present findings are the record of traditional medicinal plants used in the treatment of different diseases of West district of Tripura of 5 local tribes, using different standard research protocols. A total of 50 plant species belonging to 28 different families which are used directly (Table 1) for the treatment of different types of diseases. Jaundice was the highly cured disease observed in (Table 3). Herbal formulations are usually made with fresh or dry dehydrated form plant parts. Ethnomedicinal plants have great potential to treat different kinds of diseases. Compared to synthetic drugs, they have relatively low cost and can be very beneficial to general and financially vulnerable people. In villages where medical facilities are inadequate, the traditional healers play a great role by using ethnomedicines for the treatment of various types of diseases. These indigenous practices and knowledge about the` sustainable utilization of plant resources must be documented and preserved for future generations, also it should be encouraged and valued for its worth and spread to all the masses to protect the medicinal plants from over exploitation and unsustainable and promote the use of traditional medicine and also to identify the important medicinal plant for their conservation and efficient utilization.

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