

Practice Pattern of Traditional Pharmaceutical Formulations by the Tribes of Tripura, Northeast India

Koushik Majumdar and B.K. Datta

Department of Botany,
Tripura University, Suryamaninagar-799022, Tripura, India

Abstract: The present paper deals with 50 ethnomedicinal plant species of 46 genera belonging to 36 families used for traditional herbal formulation by different tribes in Tripura. Information on traditional herbal formulations were documented carefully with valid scientific name, vernacular name(s), part(s) used, availability status, ailments and mode of administration. The source of information is based on the personals interviews with local folklore herbalist (*Ochai, Kabiraj and Baidhya*), aged tribal men and women.

Key words: Folklore Herbal Formulation • Ethnobotany • Tripura

INTRODUCTION

Today ethnobotany is a well-established branch of science. It has recently received much attention in the USA, UK, France, Mexico and in several other parts of the world and is receiving wide recognition by several international bodies and authorities. Till about sixth decade of the last century there was little work on ethnobotany for any part of the country except some causal or indirect information in account [1, 2]. During last forty years S. K. Jain and his colleagues made studies on several tribal people of the India in their natural habitat and recorded empiric knowledge about plant use through field observation. India with her many living groups of people, having diversified ethnic culture, history of rituals and performance, who are more or less isolated from modern world and are closely associated with their ambient vegetation in the emporia of ethnobotanical research [3]. India with 3029 million hectares of land mass and 17 million hectares of forest cover possesses great emporia of natural resources and diversified culture, with over 53 million tribal belonging to over 550 tribal communities that come under 227 linguistic groups [4]. They inhabit varied geographical and climatic zones of the country and are dependent on plant resources. They very often use the phytoresources of their surroundings to prevent and cure various ailments of their own and domesticated animals [3,6]. India has 45,000 plant species, of which 15,000 species are of flowering plants, having

about 7,000 species identifies as medicinal plants [5]. The information about medicinal properties of plants came down traditionally by through generation by word of mouth. About 85% of the rural population of India depends on wild plants for the treatment of various ailments [6].

Tripura is India's third smallest state located in the Bio-geographic zone of 9B-North East Hills between 22°56' and 24°32' N latitude and between 90°09' and 92°20' E longitude. The total area of the state is 10,497.69 sq.km. The forest covering area of the state is about 6292.681 sq. km. Temperature ranges from 10-36 °C and the annual rainfall about 247.9 cm. Tripura is rich in its biological resources and possesses an extremely rich plant biodiversity [7, 8]. There are 19 different tribal communities are found in Tripura viz. Tripuri, Reang, Noatia, Jamatia, Halam, Kuki, Chaimal and Uchai are known to have migrated to this state from outside in the historical period as such they are regarded as the original settlers of Tripura. The list of the immigrant tribes includes the rest i.e., Chakma, Magh, Garo, Lushai, Bhutia, Lepcha, Bhil, Munda, Oraon and Santhal. Each community has their unique socio-cultural heritage, language, food habits. Although there are different dialect forms among the different communities but Kokborok is the standard spoken form among these groups. Most of the tribal economies have been engaged in subsistence agriculture, jhum, piggery, fishery and hunting [9]. A rich diversity of both population and flora in the state has provided an

initial advantage to its inhabitants since times immemorial for observing and scrutinizing the rich flora and fauna for developing their own traditional knowledge. With the passage of time, they have developed a great deal of knowledge on the use of plants and plant products in curing various ailments. They have a deep belief in their native folklore medicine for remedies. There are very little work has been done in the field of traditional herbal medicine of Tripura. Notwithstanding, there are several efforts were given to document several medicinal plants and their utilization by the indigenous tribe of Tripura [10-15]. Although, present attempt has been made by the authors to investigate and document further less known traditional herbal practice by the tribes of Tripura.

MATERIALS AND METHODS

Ethno-botanical exploration was undertaken particularly in the isolated tribal inhabitant hilly dense forest areas where they live along with their own customs and traditions. During the ethno-botanical survey particularly in the West district; several herbalists,

medicine men and women of Tripuri and Reang community were first identified and visited several time to gathered information on medicinal usage of plants. Such study was carried out by adopting the appropriate methodology [16]. Periodical trips were undertaken to the different tribal hamlets to document the ethno-botanical information during 2011-2012. Details of information on the medicinal plants, usage, types of medication, disease treated and mode of treatment were documented. Direct observation, causal interaction and structured interviews were adapted to collected valid information from herbal practitioners. Plants were identified using standard Floras [7, 17-19]. The data collected in the field were digitized and preserved carefully. Voucher specimens were prepared and deposited in the herbarium of Botany Department, Tripura University.

Enumeration: The medicinal plant species are enumerated alphabetically with their valid botanical name, family, vernacular name(s), followed by availability status, parts used, ailments, dosage and mode of administrations (Table 1).

Table 1: Showing the ethno-medicinal plants of Tripura

Sl. No.	Botanical Name and Family	Vernacular Name (Bengali- B Kokborak-K Reang-R)	Availability Status	Part(s) Used	Ailments	Dosage and Mode of Administration
1.	<i>Actinodaphne obovata</i> Bl. Lauraceae	Talukung (K)	Wild, occasional	Tender Leaves	Irregular menstruation	Equal amount of young leaves of this plant are mixed with the leaves of <i>Cardiospermum helicacabum</i> L., <i>Clerodendrum viscosum</i> L., <i>Eclipta alba</i> (L.) Hassk., <i>Gomphrena globosa</i> L. are boiled in 1-2 cups of water. 1 cup of the extract is taken 3 times for 3-4 days for irregular menstruation.
2.	<i>Amomum linguiforme</i> (Roxb.) Benth. Zingiberaceae	Bon Alach (B)	Wild, rare	Rhizome	Muscular rheumatism	Dried rhizome is powdered and half teaspoonful powder is mixed with equal amount of honey and taken once a day for about one month in case of muscular rheumatism.
3.	<i>Aquilaria malaccensis</i> Lamk. Thymeleaceae	Agar (B)	Planted, rare	Bark	Leucoderma and rheumatism	Poultice of bark are given to cure rheumatic pain, decoction of bark are rubbed on the spotted areas before bath till cure.
4.	<i>Asparagus racemosus</i> Willd. Liliaceae	Satamuli (B)	Wild, rare	Tuberous roots.	Epilepsy	Half cup tuberous root's decoction dilute with equal amount of milk and taken ones a day for three month as a remedy against in epilepsy.
5.	<i>Atylosia scarabaeoides</i> (L.) Benth. Papilionaceae	Ban kalai (B)	Wild, common	Leaves and Seed.	Skin disease	Crushed leaves and seed are applied externally on body in any kind of skin disease of children.
6.	<i>Barleria prionitis</i> L. Acanthaceae	Ziodi (R)	Wild, common	Leaves	Pruritis, Rubefacient and blotch.	Equal amount of leaves of this mix with the ashes of <i>Terminalia chebula</i> fruit and sulphur-di-oxide (Gandhak) are crushed and made into pills (500 mg) and then dried. About 1-2 pills are mixed with 100 ml of coconut oil and massaged everyday all over the body.
7.	<i>Barringtonia acutangula</i> (L.) Gaertn. Lecythidaceae	Hijol (B)	Wild, occasional	Bark and tender leaves	Worm infection, boils	Decoction of bark about 5ml, is used twice a day for 2-3 days in worm infection, juice of tender leaves is applied in boils to promote suppuration.
8.	<i>Brassaiopsis glomerulata</i> (Bl.) Regel. Araliaceae	Chapok (K)	Wild, common	Flower bud	Gastritis, ulcer, Jaundice	Immature flower is cooked with common vegetable and taken with rice during sever gastritis and ulcer, juice extract from both mature and immature flower and prescribe 2 cup in a day during jaundice.
9.	<i>Brassaiopsis griffithii</i> C.B. Clarke. Araliaceae	Chapok (K)	Wild, common	Flower and fruit	Gastritis, ulcer, Jaundice	Immature flower is cooked with common vegetable and taken with rice during sever gastritis and ulcer, juice extract from both mature and immature flower and prescribe 2 cup in a day during jaundice.
10.	<i>Canavalia gladiata</i> (Jacq.) DC. Papilionaceae	Makhan sim (K)	Wild, occasional	Pod	Jaundice	Soup of the tender pod is given to the patients suffering from jaundice.

Table 1: Continued

Sl. No.	Botanical Name and Family	Vernacular Name (Bengali- B Kokborak-K Reang-R)	Availability Status	Part(s) Used	Ailments	Dosage and Mode of Administration
11.	<i>Careya arborea</i> Roxb. Lecythidaceae	Kumbhira (B), Kumbhi(K)	Wild, common	Flower and bark	Cough, mouth and throat infection	Equal amount of crushed fresh flower and bark are soaked overnight in one glass of water, patients are prescribe to gargling with the filtrate solution thrice daily.
12.	<i>Ceiba pentandra</i> (L.) Gaertn. Bombacaceae	Sweta Shimul (B)	Planted, occasional	Root and bark	Fever and Diabetes	Decoction of root is prescribed as a tonic during fever, bark decoction sometimes taken in empty stomach to cure diabetes.
13.	<i>Chenopodium album</i> L. Chenopodiaceae	Bathu shag (B)	Cultivated, common	Whole plant	Stomach disorder	Whole plants cooked as vegetable or sometimes boiled for any stomach disorder.
14.	<i>Chenopodium ambrosioides</i> L. Chenopodiaceae	Bara Bathu sag (B), Bara Bathua (K), Batto (R)	Wild, common	Leaves and stem	Scabies	Leaves and stems are boiled in water, strained, cooled and then sponged all over the body.
15.	<i>Cissus adnata</i> Roxb. Vitaceae	Shiltedoi (K)	Wild, common	Tender leaves	Jaundice	Boiled leaves are prescribed to take one glass in a day in empty stomach to cure jaundice.
16.	<i>Croton oblongifolius</i> Roxb. Euphorbiaceae	Chucka (B)	Wild, common	Fruit	Fever	Dry fruits are powdered and mixed with little honey are given during fever.
17.	<i>Debregeasia longifolia</i> (Burm. f.) Weed. Urticaceae	Thepan (K), Nicchia (B)	Wild, common	Tender Leaves	Dysentery, arthritis	Tender leaves are taken as vegetable during dysentery, crushed leaves paste is applied as poultice in case of arthritis.
18.	<i>Eriocaulon cinereum</i> R. Br. Eriocaulaceae	Acchoni (K)	Wild, frequent	Whole plant	Hair tonic and ringworms	Paste is applied externally on hair before bath. Small pills prepare from paste are also taken in empty stomach to check ringworms.
19.	<i>Erioglossum rubiginosum</i> (Roxb.) Bl. Sapindaceae	Muli (K), Aboian (B).	Wild, occasional	Bark	Blood dysentery, malarial fever	Dry bark powder is taken with milk during malarial fever, raw bark are given to chew in case of blood dysentery.
20.	<i>Euphorbia hirta</i> L. Euphorbiaceae	Dudhi (B)	Wild, frequent	Whole plant	Gonorrhoea and to increase lactation	About 4-5 teaspoonful of plant juice and one teaspoonful sugar dilute in one cup of warm milk and taken once daily for 7-8 weeks as a remedy for gonorrhoea and lactation.
21.	<i>Ficus hirta</i> Vahl. Moraceae	Damur (B), Denga (K)	Wild, common	Leaves	Bone fracture, rheumatic pain	Paste of leaves are applied on the fractured area, poultice of leaves are given during serious rheumatic pain.
22.	<i>Glycosmis arborea</i> (Roxb.) DC. Rutaceae	Phatikhira (B); Blang jambura (K)	Wild, common	Whole plant	Jaundice, anaemia, worms and vomiting	Fresh barks are pounded with half cup of bark decoction and given to take orally in every morning and evening for about three weeks in case jaundice and anaemia. About 15-20 g of fresh leaf and 10 g of root pounded and half cup of juice administered twice a day in case of vomiting or intestinal worms.
23.	<i>Gmelina arborea</i> Roxb. Verbenaceae	Gamair (B)	Planted, common	Fruit	Wounds	Decoction of fruits is applied in case of serious wounds.
24.	<i>Grewia sapida</i> Roxb. Tiliaceae	Amang (B)	Wild, common	Young Leaves	Bone fracture	Paste of young leaves is applied on bone fracture.
25.	<i>Hoya globulosa</i> Hook.f. Asclepiadaceae	Khufree (K)	Wild, common	Latex	Poisonous bite	Latex is applied in case of any insect or poisonous bite.
26.	<i>Hymenodictyon excelsum</i> (Roxb.) Wall. Rubiaceae	Chepkowa (K)	Wild, occasional	Flower bud	Jaundice, fever	Spatial type of vegetable is cooked by flower bud and prescribes to the patients suffering from jaundice and fever.
27.	<i>Kaempferia galanga</i> L. Zingiberaceae	Homola (K)	Wild, rare	Rhizome	Asthma	Decoction of rhizome prescribes in asthma.
28.	<i>Leucas lanata</i> Benth. Lamiaceae	Dron (B)	Wild, occasional	Leaves	Cough and cold	Decoction of leaves is prescribed with honey in case of dry cough.
29.	<i>Laportea interrupta</i> (L.) Chew. Urticaceae	Phereijang (K)	Wild, frequent	Roots and leaves	Paralysis	Fresh roots of this plant are crushed with leaves of <i>Eriocaulon cinereum</i> R. Br. and <i>Holarrhena antidysenterica</i> Flem. in a 2:1:1 ratio. The extract is massage on the affected area and sometimes poultice also prescribe.
30.	<i>Ludwigia adscendens</i> (L.) Hara. Onagraceae	Lhum phool (K)	Wild, frequent	Root	Dental pain	Fresh root are prescribe to crushed with salt to cure sever dental pain.
31.	<i>Meyna spinosa</i> Roxb. Rubiaceae	Monkata (B)	Wild common	Tender Leaves	Skin irritation	About 40-50 g of leaves crushed with little amount of zinger, the paste is rubbed on the infected areas.
32.	<i>Mussaenda roxburghii</i> Hook. f. Rubiaceae	Mussaenda (B); Kuthoikhum (K)	Wild, common	Leaves	Bone fracture	Approx. 100 g matured fresh leaves are crushed and one egg (Hen's) mixed with it and made into paste, warmed up then applied on the fractured area of the body and covered with a young banana leaf and bandaged with some hard materials (bamboo stick). After seven days bandaged should be open and repeat the treatment with the above formulation at least three times or more.
33.	<i>Nigella sativa</i> L. Ranunculaceae	Reonky (K)	Wild, common	Whole plant	Bronchial disorder	Decoction of plant mix with the decoction of leaves of <i>Olea europea</i> L. in 2:1 ration and given to patients suffering from respiratory disorder.

Table 1: Continued

Sl. No.	Botanical Name and Family	Vernacular Name (Bengali- B Kokborak-K Reang-R)	Availability Status	Part(s) Used	Ailments	Dosage and Mode of Administration
34.	<i>Pancreatium verecundum</i> Ait. Amaryllidaceae	Hodorothang (K)	Wild, common	Leavess and roots	Chicken pox	Paste prepared from crushed leaves and root of this plant are applied on the body in a thin layer to cure.
35.	<i>Parkia javanica</i> (Lamk.) Merr. Mimosaceae	Yaikhrai (K), kukiteto (B)	Planted, occasional	Tender fruit	Gastritis, ulcer	Tender fruits are cocked to make a special dish called 'Ironba' to cure stomach ulcer and gastric disorders.
36.	<i>Passiflora foetida</i> L. Passifloraceae	Ban kamala (B), Fok Fok gula (R)	Wild, common	Leaves and Fruit	Blood purifier, burns and scabies.	Ash of the leaves mixed with ghee and applied in burns and scabies, to heal the wounds and immediate relief from pain. Ripe fruits are prescribed to take raw as a blood purifier.
37.	<i>Pentapetes phoenicea</i> L. Sterculiaceae	Dibbucchi (K)	Wild, common	Tender Shoot	Nephritic disorder	Tender shoots are cooked specially for the patients suffering from nephritic disease.
38.	<i>Phajus flavus</i> (Bl.) Lindl. Orchidaceae	Maittehandori (K)	Wild, rare	Capsule	Earache	Fresh fruit of this plant are mixed with the leaves of <i>Vernonia cinerea</i> 2:1 ration. Decoction of this mixture is applied as ear drop.
39.	<i>Pothos catharthii</i> Schott. Arecaceae	Thinara (K)	Wild, common	Leaves and stem	Asthma and snake bite.	Decoction of Leaves is given to cure asthma; dried pieces of stem are prescribed to tie up on arms to prevent snakebite.
40.	<i>Pouzolzia zeylanica</i> (L.) Benn. Urticaceae		Wild, common	Leaves	Eczema	Crushed Leaves are with little common salt are applied on skin to cure eczema.
41.	<i>Psidium guineense</i> Swartz. Myrtaceae	Bangayam (B), Jarbogoyam (R)	Wild, rare	Leaves and twigs	Scurvy and dentrites	About 100-200 g of fresh Leaves and twigs are boil with two glasses of water and reduced to one glass, given as mouth wash to the patient suffering from scurvy. Young Leaves chewed and teeth are brushed with twig or young stem to make the gum strong and prevent untimely falling of teeth.
42.	<i>Psophocarpus tetragonolobus</i> (L.) DC. Papilionaceae	Khedarong (K)	Wild, occasional	Pods and seeds	Tonic and diarrhoea	Pods are cooked as a tonic especially for women who suffered from after delivery ailments. Dry seed powder is also prescribed to take with worm water for diarrhea.
43.	<i>Rorippa indica</i> (L.) Brassicaceae	Ban sarisha (B)	Wild, common	Leaves	Urinary and nephritic disease	Decoction of Leaves is given in empty stomach during suffering from urinary and nephritic disease.
44.	<i>Semecarpus anacardium</i> L. f. Anacardiaceae	Vela (B), (K)	Wild, common	Fruits, Seeds	Hair tonic	Decoction of seed is applied externally on the scalp before one hour of bath to prevent hair baldness or excessive falling of hair.
45.	<i>Solanum stramonifolium</i> Jacq. Solanaceae	Ram begun (K), Tide Begal (R)	Wild, occasional	Whole plant	Chest pain and asthma	About 250 g of whole plant are boiled in one liter of water till it reduces into paste. About 1-2 teaspoonful of this paste taken with little honey twice a day for one week.
46.	<i>Solanum xanthocarpum</i> Schr. Solanaceae	Kantikari (B)	Wild, common	Whole plant	Asthma	About 250 g stem juice is boiled in 2 liters of water, reduced to half liter, which is further evaporated into a thick viscous liquid. Equal amount of honey is added for preserved it. About 1-2 spoonfuls are taken 4-5 times a day as a remedy against asthma.
47.	<i>Sphenoclea zeylanica</i> Gaertn. Sphenocleaceae	Jhil marich (B), Hhekhrok (K)	Wild, frequent	Whole plant	Blood dysentery	About 5-10 gm of fresh plant are boiled in 2 cup of water until it reduce in 1 cup, about 2-3 spoonful of extract is prescribe during blood dysentery.
48.	<i>Typhonium trilobatum</i> (L.) Schott. Araceae	Kharkan (K), (B)	Wild, occasional	Leaves, tubers	Bleeding piles, rheumatism.	Leaves and tubers are cooked as vegetable and prescribe to the patient suffering from piles and rheumatism.
49.	<i>Zanthoxylum limonella</i> (Dennst.) Alston. Rutaceae	Bajna (B); Bajrong (K)	Wild, occasional	Bark, Fruits	Constipation, dysuria.	About half cup root decoction is mixed with 4-5 drops of honey and given twice a day for about one week to relieve lower abdominal pain and dysuria. Fruits are also prescribed for sexual stimulant.
50.	<i>Xanthium strumarium</i> L. Asteraceae	Banokhra (B)	Wild, frequent	Leaves	Earache	2-3 drops of leaves juice is applied in case of earache

RESULTS AND DISCUSSION

Present ethnomedicinal survey was identified 50 plant species belonging to 46 genera and 36 families, used for the preparation of 67 remedial formulations. Out of 36 families Papilionaceae and Urticaceae holds 3 genera each, Araceae, Lechthyidaceae, Euphorbiaceae, Rubiaceae, Rutaceae, Zingiberaceae each contains 2 genera and the rest contains 1 genus each. Many of the medicinal plants were collected from the nearest forest from their natural

habitat, only 5 plants were found to planted or cultivated form. Although, out of 50 medicinal plants 6 species were observed with rare populations and 12 species were with occasional distribution in their wild habitats. The plant parts used for medical preparations include leaves, bark, flower, fruits, tender shoots, seeds, root and rhizome etc. Among the plants parts, leaves from 20 species are used; whole plant and fruits are used from 9 species; bark from 6 species; flower, root and seeds from 4 species; stem and rhizome from 3 species. Among the ailments skin disease,

jaundice, rheumatic pain, gastrointestinal problems, cough and respiratory problems were most frequent diseases among the inhabitants. Most of the plant species were having more than a single therapeutic use. Maximum number of formulations were recorded 12, which was used for gastrointestinal ailments (dysentery, diarrhoea, gastritis, stomachache, ulcer etc.) followed by skin related disease (8), 7 formulation were used for bronchial ailments (cough, respiratory disease), 5 formulation for jaundice, 5 for rheumatic and arthritis, 4 species used in fever and urinary or nephritic disorder, 3 species used for sexual disease and bone fracture and the rest were used to treat epilepsy, diabetes, hair tonic, anemia, paralysis, poisonous bite, dental pain and earache etc. It is quite possible to found similarities in the use of medicinal plants and their formulations to treat same disease by different tribal community due to intermixing of tradition and culture. For instance, leaf of *Euphorbia hirta* is used by Hooralis tribes of Tamil Nadu to treat leucorrhoea [20]; but this is used by the tribes of Tripura to cure gonorrhoea and to increase lactation. Malayali tribes in Pachamalai Hills of Tamil Nadu used *Gymnema sylvestre*, *Phyllanthus amarus*, *Tinospora cordifolia* and *Trainthema portulacastrum* etc. plants through different formulations to cure jaundice[21]. Although, *Brassaiopsis glomerulata*, *Brassaiopsis griffithii*, *Canavalia gladiata*, *Cissus adnata*, *Glycosmis arborea* and *Hymenodictyon excelsum* etc. plants are used by the tribes of Tripura to the same disease. However, majority of plants were recorded with greater differences in terms of composition, dosages and their applications.

These plant species and their formulations were extensively used by the tribal communities of Tripura, but their efficiency has not yet been proven scientifically. Most of the recorded plants has multipurpose usage and may be promote for their commercial cultivation. Species priority should need to set for clinical trials and pharmacological studies based on their potentiality for curing simple to chronic diseases. There should be a regional community organization who promotes those traditional healers and their herbal formulations through proper documentation, collaboration among the stakeholders, evaluation of their therapeutic use, clinical trials and examination, development of propagation technique, promotion and marketing of traditional medicine etc. However, appropriate policy making and incorporation of IPR issues are required for R and D programme to lead the development of new drugs from those formulations.

CONCLUSION

Modern healthcare system in the tribal and rural area of Tripura lack sufficient infrastructure. Being a hilly and forest areas this traditional health care system are very vital in Tripura not only for curing disease but also for their livelihood. Majority of tribal population lives in remote areas or proximity to the forests, which bound them to rely solely on this system of traditional herbal practice. Folklore healers of Tripura are having commendable knowledge of the medicinal virtues of the surrounding plants. The plant parts such as root, leaf, flower, fruit and seeds are used by tribal as a medicine and their knowledge of practice has come down through generations. But now days this flow of indigenous knowledge from elder to younger generation is interrupted as the young generation is reluctant to learn about traditional medicinal practices. The younger generations often depart their villages because of the profound economic changes. Indigenous practices and knowledge regarding the sustainable harvest and utilization of plant resources as medicine should need to documented and preserved before they disappear. These herbal formulations and lesser known medicinal plants will receive greater significance in upcoming days.

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