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Full Length Research Paper

Ethnomedicinal uses of some traditional medicinal plants found in Tripura, India

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The tribal people of Tripura are accustomed to a wide variety of medicinal plants used in their herbal medicinal practices. A field study carried out on some tribal villages of Tripura (north) reported several plants having multiple applications as herbal medicines. A total of 25 of such plants were recorded from the medicine men and aged villagers of various villages. Some important plants include *Oroxylum indicum*, *Euphorbia nerifolia*, *Scoparia dulcis*, *Jatropha curcas* and *Kaempferia rotunda*.

Key words: Tripura, herbal, medicinal plant.

INTRODUCTION

Human beings and plants share an age old relationship. Man has been depending on plants for medicinal purpose before the beginning of the written records. Fossil records suggest that even the Neanderthal people were no exception. About 250 years ago, 250,000 to 300,000 higher plants were the source of drugs for the world's population (Duke, 1990). Dependence on plants is still seen and it is estimated that 25% of prescription drugs contain active components derived from higher plants (Tiwari and Joshi, 1990).

North east India is one of the major biodiversity hotspots and the state of Tripura is no exception. Although, more than 31% of the state population consists of different ethnic communities, not much work has been done on the ethnobotany of this region. Although Shil (2007) and Singh (2007) carried out detailed work, the major segment comprising of several ethnic groups of Tripura remained unexplored till date.

The present work indicates the multiple formulations in which the ethnomedicinal plants have been used by the same and different ethnic groups in the region.

The study area included the state of Tripura (Figure 1) located in the far end of north east India. Tripura is a land of hills and dense forests located in between 22° 56$^{//}$ N and 24° 32$^{//}$ N latitude and 90° 09$^{//}$ E and 92° 20$^{//}$ E longitude. The state covers an area of 1,049,169 hectares of which 285,000 hectares is under forest cover.

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MATERIALS AND METHODS

Field surveys were undertaken at different sites, covering all seasons. The studies were undertaken during May 2008 to May 2009. The sites covered include Nabincherra, Jaithang, Boonang, Baithangbari, Kalacherra, Balidhum, Noagang, Baruakandi, Chandra Halam Para, Biragibari, Shailenbari and Gobindapur villages of Tripura. Plants were collected in their flowering and fruiting stage and from their natural habitat. Thorough observations were made on spot collection of individual plant species and field data as regards location, natural habitat, distribution pattern, nature of roots, tubers, bulbs or rhizomes, etc., were recorded. Characteristics that cannot be observed after drying, such as color and scent were recorded separately on spot. Smaller herbaceous plants were collected as whole. In the case of shrubs, under shrubs, woody herbs and climbers, respective twigs were collected.

Informations were collected mainly from the medicine men, village headmen and the aged and experienced people. Repeated queries were made for confirmation and data gathered on each plant were cross checked for further verification. Interpreters' help was taken wherever following the local language was found difficult.

The collected plant specimens were pressed and dried at room temperature. The dried material was then disinfected using $HgCl_2$ and absolute alcohol. After that, the plants were mounted on the standard size herbarium sheets. The data taken in the field was transferred to the slip pasted on the herbarium sheets. Methodologies as suggested by Schultes (1960, 1962), Jain (1964, 1967, 1991); Jain and Rao (1977); Jain and Borthakur (1980); and

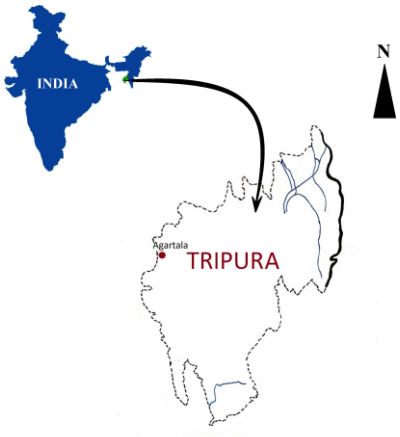

Figure 1. Map of Tripura.

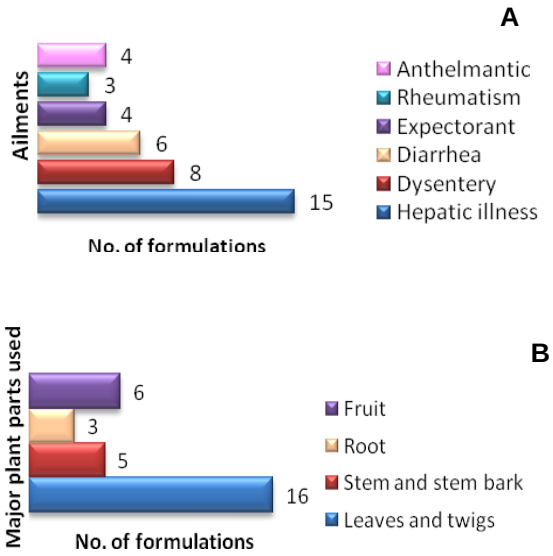

Figure 2. A: Major ailments and the number of formulations reported for them. B: Major plant parts used.

Jain and Mudgal (1999), was followed in collecting ethno-medicobotanical information. For identification purpose, several Floras and Monographs were consulted, such as Flora of British India (Hooker, 1872-1897) Flora of Assam, Vol. I-IV (Kanjilal et al., 1934, 1938, 1939, 1940) and Vol. V (Bor, 1940), Flora of Tripura (Deb, 1981, 1983).

The specimens were deposited in the Assam University Herbarium. The data regarding plants collection were recorded as (a) Sl. no. (b) scientific name (c) family (d) tribe and local name (e) parts used (f) process of utilization and (g) established report of use. The plant specimens were authenticated using the voucher specimen from the Assam University Herbarium.

RESULTS

During the study, a total of 2 plants each were reported from the families Asteraceae, Euphorbiaceae and Laminaceae. A maximum of 15 formulations were recorded for hepatic illness and jaundice followed by 8 plants for dysentery and 6 plants for diarrhea (Figure 2). The formulations reported involved a maximum use of leaves (16 formulations) (Figure 2). All other plant parts recorded two uses each. Extracts of different plant parts were used mostly to treat different ailments (17 formulations). The highest of 4 different uses was recorded for *Kalanchoe pinnata*, 3 different uses each was recorded for *Aegle marmelos*, *Aegeratum conyzoides, Azadirachta indica, Cajanus cajan* and *Euphorbia nerifolia.* All other plants recorded 2 uses each. Detailed description of the ethnomedicinal plants with multiple uses have been recorded in Table 1.

There was no standard dose for all the patients for a single herbal formulation in all the cases. However, dosage depends mostly on the intensity of the disease and the age of the person concerned.

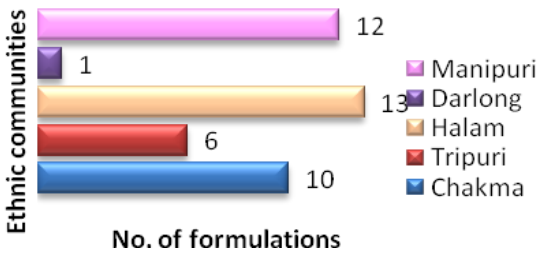

Figure 3. Number of formulations reported for different ethnic communities.

DISCUSSION

The present piece of work throws light on some of the plants used for multiple reasons by the ethnic communities of the state. A total of 24 plants were reported from the 5 different ethnic communities of Tripura state used for multiple reasons. Previously, similar study recorded 20 ethnomedicinally important plants from the Kurumba tribe of Tamil Nadu, India (Alagesaboopathi, 2011). In another case, there is a report on 63 ethnomedicinal plants used by the Chakma community residing in Arunachal Pradesh (Sarmah et al., 2008). 50 medicinal plants were reported to be used by the Tripuri medicine men (Majumdar and Dutta, 2007). However, documentations comprising only of the ethnomedicinal plants having diverse uses have not yet been found for the Manipuris Tripuris, Halams, Chakmas or Darlongs. In the present study, a total of 12 plants were recorded for Manipuris, 10 plants for Chakmas, 6 plants for Tripuris, 13 plants for the Halams and 1 plant for the Darlong community (Figure 3).

In spite of all positive initiatives by the villagers for conservation of the traditional knowledge and the ethnomedicinal plants, introduction of *ex situ* techniques

Table 1. Plants with multiple uses in tribal ethnomedicine of Tripura.

Sl. No.	Scientific name	Family	Tribe and local name	Part used	Process of utilization	Established report	Plants reported for the first time for their specific utilities during this study
1.	*Aegle marmelos* Correa	Rutaceae	Chakma, Manipuri and Tripuri - Bael	Leaves, gum from fruit, ripe fruit	1. Chakma- Leaves pounded to paste with equal quantities of leaves of *Cajanus cajan* and a little water and 1 cupful extract taken in the morning in empty stomach in combination with molasses in jaundice. 2. Manipuri- One teaspoonful gum is taken once daily for 2 days in jaundice. Pulp of ripe fruit in dysentery. 3. Tripuri- Fruit pulp as medicine and for prevention of dysentery.	Pulp of unripe fruit is aromatic, cooling, laxative. Unripe or half ripe fruit is astringent, stomachic, digestive and used in diarrhea. Root bark is used in intermittent fevers and as fish poison (Chopra, et al., 1956). Useful in indigestion and constipation, unripe fruit is used in dysentery and diarrhea (Patiri and Borah, 2007).	Hepatoprotective property of the leaves and gum of the fruit in a new report.
2.	*Aegeratum conyzoides* Linn.	Asteraceae	Chakma- Gundhuabon Halam and Tripuri- Shyamtulsi	Leaves and twigs	1. Chakma- Fresh leaf extract used as anti hemorrhagic. 2. Halam- Paste of leaves and twigs used as antihaemorrhagic. 3. Tripuri- Juice used as an expectorant.	Root juice is antilithic; leaf juice is stypic, applied to cuts and sores, externally in ague (Chopra et al., 1956).	Expectorant property of the leaves is a new report.
3.	*Ananas comosus* (L.) Merrill.	Bromeliaceae	Manipuri- Gihom	Leaves	1. Leaf extract with milk and sugar candy in rheumatic swellings. 2. Extract of leaf base is taken 1 teaspoon thrice daily in diarrhea.	Used for the treatment of dysuria. Cortex is used as alexipharmic, antitussive, and anti diarrheal and leaves is used against dyspepsia or anti diarrheal agent (Song, 1999; Sripanidkulchai et al., 2000, 2001).	Use as anti- rheumatic is a new report.
4.	*Azadirachta indica* A. Juss.	Meliaceae	Halam and Manipuri- Neem	Leaves and stem bark	1. Halam- Leaves boiled in water to bathe patient with malaria and chicken pox. 2. Smoke produced by burning leaves is used as mosquito repellent. 3. Manipuri- Bark paste made to tablets and administered in severe jaundice.	Young fruits, bark and root bark is used as astringent, antiperspirant; leaves as poultice in boils, antiseptic in ulcers and eczema; gum demulcent tonic in cataract; dry flowers tonic, stomachic; oil stimulant, antiseptic in rheumatism and skin diseases; bark, gum, leaf and seeds in scorpion stings and snake bites; berries purgative, emolument and anthelmintic (Chopra et al., 1956).	Hepatoprotective property is a new report.
5.	*Cajanus cajan* (L.) Millsp.	Fabaceae	Halam- Khokhlaing Manipuri- Arail	Leaves and twigs	1. Halam- Mature seeds are cooked as a pulse and given in weakness. 2. Leaf and twig paste is applied throughout the body during jaundice. 3. Manipuri- Soup of fresh leaves and twigs is administered in jaundice.	Seeds are used in snake-bite; paste of seeds and leaves are used to control milk flow (Chopra et al., 1956).	Use in physical weakness is a new report.

Table 1. Contd.

6.	*Carica papaya* L.	Caricaceae	Manipuri and Chakma- Paypay	Root and fruit	1. Manipuri- Extract of raw roots is administered 2 - 3 teaspoon thrice daily in jaundice. 2. Chakma- Unripe fruits is cooked as a vegetable, ripe fruit, eaten raw. Fruits are considered to be stomachic.	Latex of unripe fruits is used to remove freckles and blemishes from skin, anthelmintic; ripe fruits stomachic, carminative, diuretic; seeds vermifuge, emmenagogue, used to quench thirst (Chopra et al., 1956).	Hepatoprotective property is a new report.
7.	*Centella asiatica* (Linn.) Urban	Apiaceae	Halam- Perup Manipuri- Thunmankuni	Leaves and entire shoot	1. Halam- Eaten either as paste or cooked as a vegetable for dysentery and diarrhea. 2. Manipuri- Decoction of the shoot part along with four other ingredients is used as a combination medicine for jaundice.	Plant is useful as alternative and tonic in diseases of skin, leprosy, nerves and blood; leaves are used for improving memory and in syphilitic skin diseases (Chopra et al., 1956).	Hepatoprotective property is a new report.
8.	*Clerodendrum viscosum* Vent.	Verbenaceae	Chakma-Killiashak Tripuri- Bhati pataa	Leaves and root	1. Chakma- Extract is used as expectorant. Decoction of the leaves is used to check high blood pressure. 2. Tripuri- Root extract is administered 1 teaspoon thrice daily as febrifuge.	Root paste is used applied locally in dental caries. Root extract in abdominal pain (Rahman et al., 2007).	Use against high blood pressure is a new report.
9.	*Cynodon dactylon* (L.) Persoon	Poaceae	Chakma- Doob pataa	Shoot and roots	1. Chakma- Shoot extract is anti-haemorrhagic. 2. Manipuri- ½ cup of extract of roots is consumed thrice daily for 2 days to get rid of rheumatic swellings.	Decoction of roots diuretic in dropsy, secondary syphilis; root infusion in piles, crushed roots in chronic gleets; plant juice is astringent, useful in cuts and wounds, diuretic, used in dropsy and anasarca, useful in diarrhea, dysentery, nervous diseases and eye troubles (Chopra et al., 1956).	Use as anti-rheumatic is a new report.
10.	*Euphorbia nerifolia* Linn.	Euphorbiaceae	Manipuri- Kupoit pataa Halam- Sairapal	Leaves	1. Manipuri- Leaves are heated on any fire source and the juice is applied to the ear in any sort of ear infection. 2. Vapor is inhaled as medicine during fever. 3. Halam- Oven heated leaves are placed on the chest to control cough.	Milky juice is used as purgative, for skin diseases; roots in scorpion sting, snake bite, as antiseptic and fish poison (Chopra et al., 1956).	Use in ear infection and fever are new reports.
11.	*Jatropha curcas* Linn.	Euphorbiaceae	Chakma-Girogaachh	Branches	1. The sap is applied locally in gum infections. 2. Raw leaves are used in high blood pressure.	Seeds and roasted nuts are purgative; latex is useful in scabies, eczema and ringworm; leaves are lactagogue, rubefacient (Chopra et al., 1956).	Use against high blood pressure is a new report.

Table 1. Contd.

12.	*Kaempferia rotunda* Linn.	Zingiberaceae	Chakma- Bhojoraphul	Flower and rhizome	1. Flower decoction is used to bathe patient with skin infections. 2. Aqueous decoction of rhizome is taken ½ cup a day for1 week in jaundice.	Applied in Indonesia as the traditional insect repellant (Chan et al., 2009).	Use as a hepatoprotective agent is a new report.
13.	*Kalanchoe pinnata* Pers.	Crassulaceae	Chakma- Khurajot Manipuri- Patharkuchi	Leaves	1. Chakma- Chewed raw with sugar to control dysentery and diarrhea. 2. Juice is administered in jaundice. 3. Leaf paste is applied on skin infections and pimples. 4. Manipuri- Juice of raw leaves is administered in dysentery and diarrhea.	Juice of leaves is styptic; seed on fresh cuts and abrasions, bruises, burns and superficial ulcers, given in bilious diarrhea, lithiasis (Chopra et al., 1956). Applied in Indonesia as the traditional insect repellant (Chan et al., 1992).	Hepatoprotective and antiseptic property of the plant are new reports.
14.	*Leucas aspera* Spreng.	Laminaceae	Manipuri- Doron pushpa	Leaves and twigs	1. 2 tablespoons of extract is taken thrice daily for 3 - 4 days in jaundice. 2. One teaspoon is taken twice daily in cough.	Plant is antipyretic and insecticide. Flowers is used in cold, juice of leaves in psoriasis, scabies and chronic skin eruptions. Leaves useful in chronic rheumatism (Chopra et al., 1956). Leaves in skin diseases and painful swellings (Singh and Pandey, 1998).	Hepatoprotective property is a new report.
15.	*Marsilea quadrifolia* Linn.	Marsileaceae	Manipuri- Lamzenchin Halam- Susni	Leaves	1. Manipuri- Soup is administered daily to children as a brain tonic. 2. Halam- Soup with fingerlings of *Channa punctatus* is administered with rice for 15 days in jaundice.		Uses as brain tonic and as a hepatoprotective agent are new reports.
16.	*Mimosa pudica* Linn.	Mimosaceae	Halam- Cheaken lai Chakma- Dugjat lajari	Entire plant	1. Halam- Leaf paste is applied on the acne and pimples. 2. Chakma- Extract is used in equal proportion by weight along with bark extract of *Urena lobata* as a combination medicine against jaundice.	Leaves and roots are used in piles and fistula; leaf paste is applied to hydrocele; leaf and stem used in scorpion sting (Chopra et al., 1956).	Uses as antiseptic and as a hepatoprotective agent are new reports.
17.	*Momordica charantia* Linn.	Cucurbitaceae	Tripuri-Gangrauk	Fruits and twigs	1. Fruits is cooked as a vegetable and considered to be anthelmintic. 2. Extract of twigs is used against dyspepsia.	Leaf juice is emetic, purgative, used in biliousness, burning of soles of feet; fruits and leaves purgative, emetic, used in piles, jaundice, leprosy and as vermifuge (Chopra et al., 1956).	Used against dyspepsia is a new report.
18.	*Musa paradisiaca* Roxb.	Musaceae	Halam- Mot	Flower and stolon	1. Juice of flowers is used in dysmenorrhoea and menorrhagia. 2. Extract of the stolon is administered in dysentery and diarrhea.	Fresh dried rhizomes are used in jaundice. Immature fruits are anthelmintic (Basualdo et al., 1991; Singh and Pandey, 1998).	Uses of flowers in dysmenorrhoea and menorrhagia and stolon in dysentery and diarrhea are new reports.

Table 1. Contd.

19.	*Phlogacanthus thyrsiflorus* (Hardwicke) Mabberley	Acanthaceae	Manipuri- Nunbangha Chakma- Basokpata	Leaves	1. Manipuri- Vapour in hot water with *Nyctanthes abor tristis* and *Clerodendron viscosum* is inhaled in rheumatism. 2. Chakma- Leaf juice is used as an expectorant.	Leaf extract is administered orally in gout and rheumatism (Roy et al., 2008).	
20.	*Psidium guajava* L.	Myrtaceae	Halam- Sapri	Fruits and twigs	1. Young twigs is chewed in empty stomach every morning for 1 week in dysentery and diarrhea. 2. Fruit is used in anaemia.	Root bark is reported to be astringent, used in diarrhea; fruits laxative; leaves astringent, used against diarrhea, cholera, vomiting, wounds and ulcers (Chopra et al., 1956).	Use against anaemia is a new report.
21.	*Scoparia dulcis* L.	Scrophulariaceae	Darlong- Boltekanza Halam- Naipungchewk	Leaves and twigs	1. Darlong- Decoction of the plant is used as anthelmintic for infants of age 6 months to 1 year. 2. Halam- ½ glass of extract is taken once daily for 3 - 4 days in empty stomach in jaundice.	Plant infusion is used as ague and as an emetic (Chopra et al., 1956).	Use as anthelmintic and hepatoprotective are new reports.
22.	*Spilanthes paniculata* Wallich ex. DC.	Asteraceae	Halam- Ansha	Leaves	1. Halam- Boiled leaves is used with rice in stomach troubles and liver problems. 2. Darlong- 1 teaspoon of juice is administered thrice daily for 3 - 4 days in dyspepsia.	Inflorescence is used to brush teeth in toothache (Hynniewta and Kumar, 2008).	Use as hepatoprotective and against dyspepsia are new reports.
23.	*Terminalia chebula* Retzius	Combretaceae	Tripuri- Bukhala buthai Manipuri-Manahi	Dried fruit	1. Tripuri- 1 teaspoon extract is administered thrice daily as stomachic. 2. Manipuri- Is a component of a multiple ingredient remedy for jaundice.	Laxative, ulcers, used in carious teeth and piles (Chopra et al., 1992). Dried mature fruits astringent, stomachic, purgative, laxative (Farooq, 2005).	Hepatoprotective property is a new report.
24.	*Oroxylum indicum* (L.) Vent.	Bignoniaceae	Halam-Kaak-rakung Tripuri- Taukharun	Stem bark and immature fruits	1. Halam- The cooled aqueous extract is taken with 2 tablespoons of sugar in 300 ml water as many times a day as possible in jaundice. 2. Tripuri- Soup is used as stomachic and anthelmintic.	Root bark is used in fever, bronchitis, intestinal worms, leucoderma, asthma, inflammation, anal troubles, etc. Fruits and seeds as expectorant, purgative and bitter tonic (Kirtikar and Basu, 1996). Stem bark is used in jaundice (Mokat and Deokule, 2006). Root bark as tonic and astringent, in diarrhea, dysentery and rheumatism. Tender fruits is refreshing and stomachic. Seeds are purgative (Tiwari et al., 2007).	
25.	*Ocimum sanctum* L.	Laminaceae	Tripuri- Tulsi	Leaf	1. 1 teaspoon of extract is administered twice daily for 1 week as an expectorant. 2. Extract is administered in 1:1 ratio with rhizome extract of *Zingiber officinale* at a dose of 1 teaspoon twice daily for 1 week in jaundice.	Used against cough, fever, dysentery, stomach diseases and as mosquito repellant (Khan and Rashid, 2006).	Hepatoprotective property is a new report.

for the commercially viable species is necessary. This would be a step ahead in conservation of the herbal knowledge and at the same time generate income opportunities for the communities. Establishment of the Tripura Medicinal Plants Board (MPBT) on 12th September 2001 was a step forward in this regard. However, further steps are in this regard.

Conclusion

The study shows the dependence of the ethnic people on the herbal remedies in their day to day life. The people in general were found to be having strong faith in traditional medicine. Most of them were found to thrive only on herbal medicine throughout their life. Traditional knowledge of such kind demands serious conservation measures. The current study may thus prove to be of great use to the researchers, conservationists, foresters and people interested in herbal medicine. The documentation may further help to conserve the traditional knowledge and aid in the improvement of the local people of these areas.

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