Global Journal of Pharmacology 9 (4): 377-384, 2015
ISSN 1992-0075

DOI: 10.5829/idosi.gjp.2015.9.4.101204

Traditional Usage of Ethno-Medicinal Plants among the Chakma Community of Tripura, India

Anupam Guha and Daina Chakma

Department of Botany, Women's College, Agartala-799001, Tripura, India

Abstract: An ethno-botanical study focused on medicinal value of plants was carried out among the Chakma community of Tripura, India with aims to document the traditional knowledge of the medicinal plants used in various ailments. The information was based on normal interview, discussion and conversation with local herbal practitioners, elderly people of Chakma community. In this study, a total of 59 plant species in 55 genera belonging to 41 families were described which have been used in the treatment of around 33 different diseases. Apocynaceae is the most frequently used family in context to the number of species used by the Chakma Community. The other important families used for medicinal plants are Caesalpiniaceae, Amaranthaceae, Rutaceae, Araceae, Zingiberaceae, Asteraceae, Liliaceae and Combretaceae respectively. Mostly leaves are used for the formulation of folk medicine. An attempted has been made to document the ethnophy to therapeutics and the folk claims of the plant parts used along with their medicinal uses. Most frequently medicated claims were Diarrhoea, Dysentery, Toothache, Jaundice, Bone fracture, Cough and cold. All these claims need to be subjected to previous established literature to validate the potentiality of these plants and plant parts as drugs.

Key words: Chakma community · Ethnomedicinal plants · Drugs · Tripura

INTRODUCTION

Ethnobotany is the study of the correlation between plants and people: from "ethno" - study of people and "botany" - study of plants. Ethnobotany is considered a branch of ethnobiology. Ethnobotanical studies are the complex interaction between (uses of) plants and cultures. The focal point of ethnobotany is on how plants have been or are used, supervised and recognized in human societies. Tribal people are the ecosystem people who live in harmony with the nature and maintain a close relationship between man and environment [1]. All cultures have traditions of folkloric medicine that include the use of plants and other ethno pharmacological products [2]. Ancient tribal people have used plants to cure a variety of ailments but they keep no records and the information is mainly passed on verbally from generation to generation [3]. Traditional healers employ methods based on the ecological, socio-cultural and religious background of their people to provide health care. Plant derived medicines are widely used because they are relatively safer than the synthetic alternatives and are easily available, cheaper also. The biological evaluation of plant products on the basis of their use in the traditional herbal system of medicine develops a basic platform for the recent and newer drug discovery methods, development of new drugs from different plant sources [4-6].

Tripura is India's third smallest hilly state in the North-eastern part of the country (Figure 1). Tripura state lies between 22°56' to 24° 32'N latitude and between 90° 09'to 92° 20'E longitudes covering an area of 10, 491 sq.km. In Tripura, 19 different tribal communities are found to dwell, viz. Tripura, Shantal, koki, Noatia, Lusai, Halam, Jamatia, Chakma Mog, Riang and others. The climate of Tripura is characterized by intermediate temperature and highly humid atmosphere. During summer (April-May), maximum temperature reaches 38°C. In summer relative humidity ranges 50-75% while during monsoon it remains over 85%. The present study was carried out in Tripura, India. Several ethno-botanical studies [7-10] in the state have documented various healing plants with folk recipes.

Corresponding Author: Anupam Guha, Department of Botany, Women's College, Agartala-799001, Tripura, India.

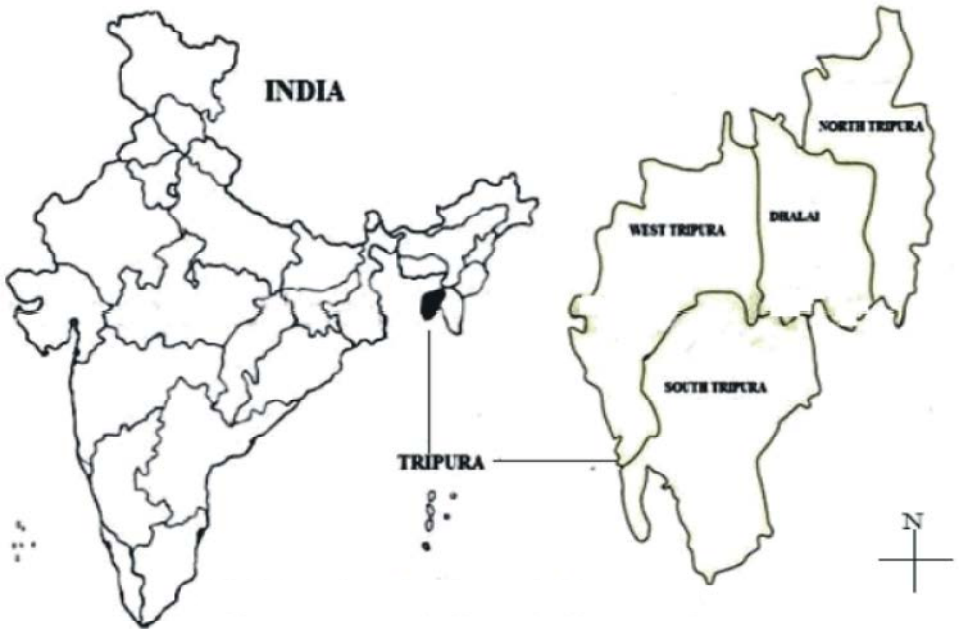

Fig. 1: Location of study area (Tripura state)

However, an extensive attempt is made to report on ethnomedicinal plants used by Chakma community people of Tripura, India.

MATERIALS AND METHODS

Exhaustive field survey has been undertaken covering all the seasons for gathering information on each and every species useful in herbal medicine among the Chakma. Survey conducted in different villages of Tripura state. The present research study was undertaken to document the plants solely used by the Chakma tribe of Tripura state for the treatment of various diseases. The information's on medico-botanical aspects was collected by questionnaires to the traditional practioners. This being a descriptive research, survey method involving collection of data through questionnaire was adopted. The plants were collected from the study area, dried, preserved and identified with the help of available literature [11-13]. Voucher specimens were deposited in the Herbarium of Department of Botany, Women's College, Agartala.

RESULTS AND DISCUSSION

About the Community Chakma: The Chakma population is estimated to be around 64, 293 (Population census of Tripura, 2001). Chakma is one of the prominent Tripura tribes. The people belonging to Chakma tribe believe in the sermons of Lord Buddha. Kailsahahar , Kanchanpur, Udaipur, Amarpur, Belonia and Sabroom sub-divisions of Tripura are the prime locations where *Chakma* tribe live. Their language is grouped under Tibeto-Chainese family. Chakma are dependent on Jhum cultivation [14-15]. By nature they are not so much active for advancement of life and entirely depend on surrounding environment for livelihood. They also rely on forest products and medicinal plants for sustaining their life.

Taxonomic Enumeration: The reported plants were arranged according to their scientific name, family, vernacular names (as recorded during the field work), parts used and therapeutic uses. Plant species belonging to 55 genera and 59 species in 41 families are being used by the Chakma people for the treatment of common diseases [16]. The dose is prepared by using juice, leaf, bark extracts and other parts of the plant. Scientific names arranged alphabetically, followed by family, local names/ habit, Chakma names, plant part and medicinal uses are listed in Table 1 & Fig. 2.

From ancient period people made use of plants for their livelihood and medicare. Some plants they used are cultivated while others grow in wild conditions. The Chakma people depend predominantly on plants for food, medicine, agricultural implements, art and crafts and for other requirements [17-21]. Plant species were also used

Table 1: List of plants used in folk medicine by Chakma communities

Scientific name	Family	Local name/Habit	Chakma name	Parts used	Ethno-medicinal use
		A. Dicotyledons			
Acmella paniculata (Wall. Ex DC.) R.K. Jansen	Asteraceae	Marhatitiga/Herb	Osonshak	Flower	Crushed flower is applied to treat Toothache
Achyranthes aspera L	Amaranthaceae	Apang / Herb	Uvalayara	Leaf	Leaf extract is taken for treat Cough, fever
Adhatoda vasica Roxb.	Acanthaceae	Basak/ Shrub	Basak pada	Leaf	Leaf extract use to treat Cough
A*egle marmelos* (L.) Corr.	Rutaceae	Bel/ Tree	Belgulu	Fruit	Fruits are directly taken to treat Diarrhoea, dysentery
Alstonia scholaris (L.) R.Br.	Apocynaceae	Chatim/Tree	Jarbo sesna	Leaf	Mother sits on the leaf of Jarbo sesna to romote milk production.
Amaranthus spinosus L.	Amaranthaceae	Katanotey/ Herb	Hadamarej	Root	Juice prepared from root is taken to treat Pregnancy problem
Artocarpus heterophyllus Lam.	Moraceae	Kathal/ Tree	Hattol	Latex	Latex is used to treat Skin disease
Azadiracta indica A. Juss.	Meliaceae	Neem/ Tree	Neem gach	Leaf	Leaf used to treat Skin disease and stem used for Toothache
Boerhavia diffusa L.	*Nyctaginaceae*	Punarnava/Herb	Purnadalak	Leaf	Leaf used to treat anemia and edema
Cardiospermum halicacabum L.	Sapindaceae	Lataphatkari/ Climber	Hedaboksa shak	Whole Plant	Hot water extract of the plant is taken to treat Chiken-fox. Leaf is taken for fever and root is used to treat mumps
Cajanus cajan (L.)	Fabaceae	Arhar/ Shrub	Dumursumi	Leaf	Paste prepared from leaf is taken in Jaundice, Cough and gastritis. Seeds are used to treat Snake bite
Carica papaya L.	Caricaceae	Pepe/ Tree	Hogoya	Latex	Latex of green fruit is used to induce abortion
Cassia alata L.	Caesalpiniaceae	Dadmardan/ Shrub	Dattalong pada	Leaf	Leaf Paste of leaf is applied in eczema and ringworm
Cassia sophera L.	Caesalpiniaceae	Kalkasunde/ Shrub	Ijji gach	Seed	Paste of seed is applied in eczema and ringworm
Cassia tora L	Caesalpinaceae	Chakunda	Latha	Seed	Seeds are useful in obdurate skin diseases, ring worm, itching
Catharanthus roseus L. G. Don	Apocynaceae	Nayantara/ Herb	Chokful	Leaf	Leaf juice is taken to treat Gastritis, Abdominal pain
Centella asiatica (L.) Urban	Apiaceae	Thankuni/ Herb	Menmini	Leaf	Leaf juice is taken in Digestive, Dysentery, Gastritis
Cissus quadrangularis L.	Vitaceae	Harjora/ Climber	Harvangadaru	Leaf	Paste of leaf is used to plaster the fractured area. Stem is used to treat Cancer
Citrus lemon (Christ.) SW.	Rutaceae	Kagogi lebu/Tree	Hagugi	Fruit	Juice from fruit is taken to treat Jaundice
Dillenia indica L.	Dilleniaceae	Chalta/ Tree	Ulugach	Flower	Flower prepared pills and taken in Weakness, Low pressure after delivery
Eupatorium odoratum L.	Asteraceae	Assam lata/ Shrub	Mugujuher	Leaf	Crushed leafs are applied in Cuts and wounds
Ficus hispida L.f.	Moraceae	Dumur/ Tree	Dumur gulu	Fruit	Fruits are directly taken in Dysentery and Diarrhoea
Gmelina arborea L.	Verbenaceae	Gamari/Tree	Gamari gach	Seed	Paste of seeds are spread affected area to treat Itching
Grewia microcosm L.	Tiliaceae	Patka/ Tree	Assarbiji gach	Leaf	Juice from leaf is taken to treat Jaundice
Hibiscus macrophyllus Roxb.	Malvaceae	Udal/Tree	Lambak	Bark	Fresh juice of bark is used in blood dysentery, painfill micturation
Holarrhena pubescence (Buch. Ham.) Wall.	Apocynaceae	Kurchi/ Tree	Huruk gach	Bark	Juice from bark is taken with sugar for Jaundice
Hyptis suaveolens (L.) Poit	Lamiaceae	Tokma/ Shrub	Chongadana gach	Root	Paste of root is taken with sugar for the treatment of High blood pressure
Jatropha curcas L	Euphorbiaceae	Keron	Keran	Stem	Fresh juice of the stem used in blood dysentery, tender stem in pyorrhoea as tooth bruah
Lawsonia inermis L.	Lythraceae	Mehedi/ Shrub	Minti pada	Leaf	Paste from leafs is used for Hair Falling and to remove dandraft
Mangifera indica L.	Anacardiaceae	Am/ Tree	Amm gach	Bark	Juice prepared from bark is taken with sugar to treat bleeding piles

Table 1: Continued

Melastoma melabatricum L.	Melasomaceae	Datranga/Shrub	Maga pittungulu	Leaf	Paste prepared from leafs are useful to treat toothache
Mimosa pudica L.	Mimosaceae	Lajjaboti/ Herb	Lajuriher	Fruit	Fruits are used for Dysentery, Diarrhoea, emetic. Stem extract are Used to treat Bone fracture
Moringa oleifera Lamk	Moringaceae	Sajina/ Tree	Sesna shak	Bark	Juice prepared from bark is taken with sugar for Jaundice
Ocimum sanctum L.	Lamiaceae	Tulsi/ Herb	Tulusi pada	Leaf	Extract of leaf is used to treat Cough
Oroxylum indicum (L.) Kurz	Bignoniaceae	Khona/ Tree	Honagulu	Bark	Juice prepared from bark is mixed with sugar and taken to treat Jaundice
Peaderia foetida L	Rubiaceae	Gandha bhadali/ Climber	Dukhupui	Leaf	Extract of leaves are used in Diarrhoea, indigestion
Phyllanthus emblica L.	Euphorbiaceae	Amloki / Tree	Hadamala	Fruit	Fruits are used for Dysentery and Diarrhoea
Physalis micrantha Link.	Solanaceae	Phutka/ Herb	Pittungulu	Root	Root extract mixed with sugar taken to treat Dysentery
Piper betel L.	Piperaceae	Pan / Climber	Pan	Leaf	Crushed leafs are applied in wounded area and toothache
Psidium guajava (L.)	Myrtaceae	Piyara/Tree	Guyam	Leaf	Young leaf is taken directly in Diarrhoea
Sesamum inducum L	Pedaliaceae	Til/ Herb	Shiping	Leaf	Juice of leaves are used externally as hair shampoo for dandruff
Tabernaemontana divaricata (L.) R. Br.	Apocynaceae	Tagar/ Shrub	Hastadangar	Root	Extract prepared from root is taken with sugar to treat the Children in fever
Tamarindus indica L.	Caesalpiniaceae	Tetul/ Tree	Tedoy	Fruit	Ripe fruit are directly taken for Headache, High pressure
Terminalia chebula Retz	Combretaceae	Haritaki/ Tree	Oithal	Fruit	Ripen/ green fruits are taken directly to treat Gastritis and Abdominal pain
Terminalia belerica (Gaert) Roxb	Combretaceae	Bahera/Tree	Boragulu	Fruit	Fruit is taken directly to treat cough and Diarrhoea
Thevetia peruviana (Pres.) Merr.	Apocynaceae	Kolkiphul/ Shrub	Goiphul	Seed	Latex of seeds are used to treat Boils
Tinospora cordifolia (wild) Hook. F. & Th.	Menispermiaceae	Gulanch/ Climber	Duksa sungsari	Whole plant	Watery extract of stem is used in loose motion, Diabetes
Vitex negundo L.	Verbenaceae	Nishinda/ Shrub	Nishinda	Leaf	Juice of the leaves are used in arthritis
			B. Monocotyledons		
Acorus calamus L	Araceae	Bardai/Herb	Lang Hing	Rhizome	Sundried rhizomes along with mustard oil are applied locally for curing arthritis
Allium cepa L.	Liliaceae	Piaj/ Herb	Peaj	Bulb	Juice prepared from bulb is taken to Cough, asthma
Allium sativum L.	Liliaceae	Rasun/Herb	Ron	Bulb	Bulb is directly taken to treat Boils, gastritis
Ananas sativus Schult. F.	Bromeliaceae	Anaras/ Shrub	Anas	Fruit	Fruit Unripe fruit is directly taken to treat Abortifacient
Areca catechu L.	Arecaceae	Supari/ Tree	Subari	Fruit	Fruit is directly taken to treat Cough
Colocasia esculenta (L.) Schott	Araceae	Kachu/ Herb	Araceae	Latex	Latex of Stem is used to treat Bee or ant bite
Costus specious (Koen ex Retz.) Sm.	Zingiberaceae	Keo/Herb	Mailuma kathama	Rhizome	Juice of rhizome used in cold and cough, asthma, dyspepsia
Crinum asiaticum (L.)	Amaryllidaceae	Sukdarshan/ Herb	Koba ron	Root	Paste prepared from root is applied in Boils
Curcuma longa L.	Zingiberaceae	Halud/Herb	Olod	Rhizome	Paste prepared is taken in Cough and treated on head of frightened child
Musa sapientum L.	Musaceae	Bangla kala/ Herb	Hattuli hala	Fruit	Fruits boiled in hot water is taken to treat Diarrhoea
Zingiber officinale Roxc.	Zingiberaceae	Ada/ Herb	Ada	Rhizome	Juice prepared from Zinger is taken to treat Diarrhoea and Cough

Fig. 2: Photographs of some recorded ethnomedicinal plants: A. *Boerhavia diffusa* L. *B. Cissus quadrangularis* L. C. *Tinospora cordifolia* (wild) Hook. F. & Th. D. *Holarrhena pubescence* (Buck. Ham.) Wall E. *Alstonia scholaris* (L.) R.Br. F. *Moringa oleifera* Lamk

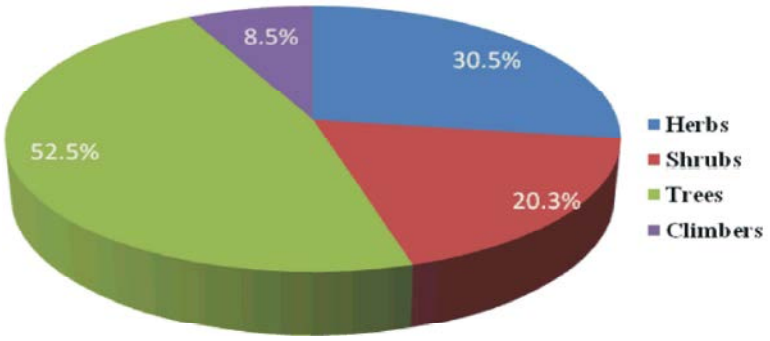

Fig. 3: Perecentage of life Plant habit used by the Chakma community of Tripura

to prevent abortion, achieve easy delivery, gastric and respiratory problems, fever, antidote for snake and scorpion bites, arthritis, toothache, cough, dysentery, Jaundice and sexual power [22-28]. The Majority of plant species belong to families Apocynaceae, Caesalpiniaceae, Amaranthaceae, Rutaceae, Araceae, Zingiberaceae, Asteraceae, Liliaceae and Combretaceae. Among these 59 plant species belong to 34 dicots and 7 to monocots.

According to plant habit the numbers of plant species (Life forms) have been used by the Chakma community are 30.5% herbs, 20.3% shrubs, 52.5% trees and 8.5% climbers respectively (Figure 3).

The majority utilized plant parts for the preparation of folk medicine is leaf which is 33.8%, then fruit 18.6%, root 8.5%, stem 1.7%, seed 6.8%, bark 8.5%, rhizome 6.8%, bulb 3.4%, latex 5.08% and whole plant 3.4% respectively (Figure 4). The study showed that bulb, rhizome, root and the whole plant have been used in formulation of folk medicine is 22.12% for the cure of diseases. These are the unfriendly way of using plants because it needs to eradicate or abolish the whole plant. Moreover the aerial parts of the plant (leaf, flower, fruit and seed) can be used without eradicating the plant. For this, it is an outstanding way to conserve them. The studied ethno-medicinal plant species have been used to treat various diseases which are illustrated in Figure 5. The various diseases such as Diarrhoea, Dysentery, Diabetes, Cough, Jaundice, Skin diseases, Boils, Gastritis, Toothache, Abortion, Fever, Bone fracture, High blood pressure, Asthma, Itching, Abdominal pain and Ring warm were found to be 16.9%, 15.3%, 3.4% 16.9%, 8.5%, 5.08%, 8.5%, 8.5%, 10.2%, 5.08%, 5.08%, 3.4%, 3.4%, 3.4%, 3.4%, 3.4%, 5.08% plant species used respectively whereas Anaemia, Antiseptic, Edema, Bee and ant bite, Bleeding, Cancer, Chicken fox, Dandruff, Hair falling, Headache, Low pressure, Mumps, Snake bite, Pregnancy problem, Arthritis and Weakness each one was found to be 1.70% plant used. The most commonly used methods of folk-medicine are juice, extract, paste, pills etc. Both external and internal methods of practice of folk-medicine have been recommended.

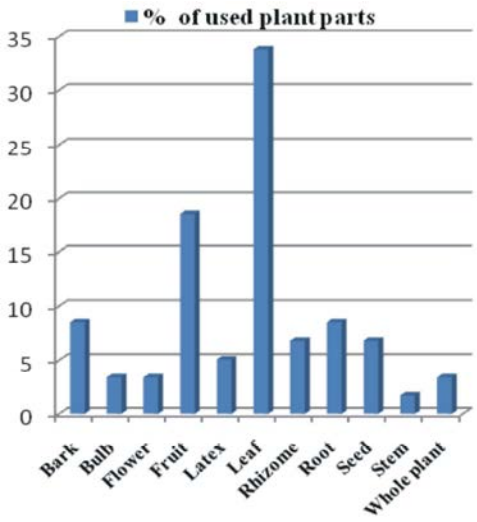

Fig. 4: Percent of used plant parts as folk medicinein in the chakma C community of Tripura

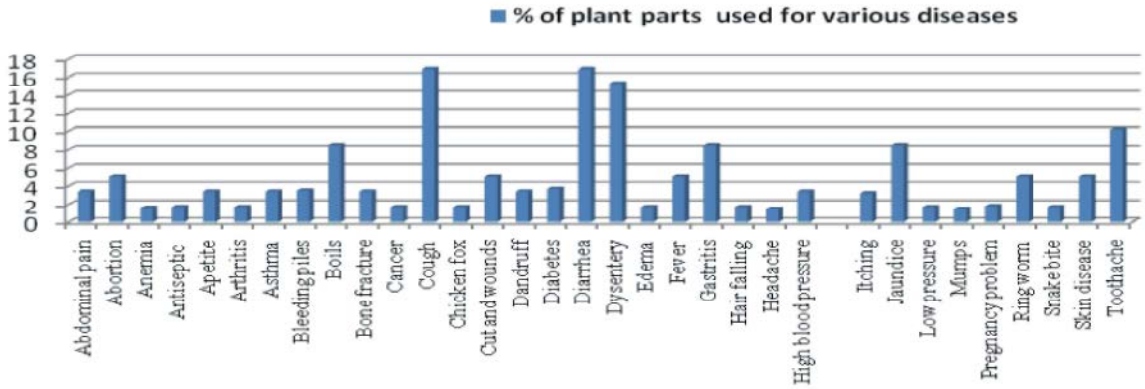

Fig. 5: Percentage of plant species used for various diseases in the Chakma community of Tripura

The internal use of folk-medicine is 68.79% whereas the external use is 31.21%.The time of taking, dose and duration of practice of these folk-medicines are varied from traditional healers to healers and on the basis of disease. The establishment of community.

Clinic is in many rural areas and that may change gradually the existing pattern of indigenous knowledge based system of healthcare. Recently, they are losing their precious heritage of plant use indigenous knowledge because of, industrialization and urbanization. At present younger generation lost the interest to continue their parental tradition because it does not provide them proper financial support for their livelihood [29-31]. If these conditions continue; their traditional plant use knowledge will be loose rapidly. Now, it is a burning necessity to document their ethno-medicinal use information to protect them from disappearing. This information can be the source and help the modern researchers in the discovery of new drugs.

CONCLUSION

The present study adds to the earlier knowledge regarding the use of plants in the treatment of common diseases. The increasing demand of medicinal flora has resulted in the rapid dwindling of these natural resources. There is an urgent need of systematic conservation and sustainable production of medicinal plants involving local communities, researchers and departmental field group with stronger linkage for collaborative work to meet future demand on a sustained manner.

ACKNOWLEDGEMENTS

Authors are greatly thankful to Professor B. K. Datta, Dept. of Botany, Tripura University for identification and authentication of the plant materials and valuable suggestions during the preparation of the manuscripts. Special thanks are also extended to all the traditional

informants of Chakma community peoples for their active participation and knowledge sharing during the field investigation.

REFERENCES

1. Shah, N.C. and M.C. Joshi, 1971. An ethnobotanical study of Kumaon region of India. Economic Botany, 35: 414-422.
2. Schultes, R.E., 1941. Lethobotanica on alcancoy Sus objects, Caldesia, 3: 7-12.
3. Bodding, P.O., 1927. Studies in Santal Medicine and Enacted Folklore. Part I and II. Memoirs of the Asiatic dosages and their applications. Society of Bengal, 10: 1-427.
4. Anonymous, 1994. Ethnobiology in India-A Status Report, (Ministry of Environment and Forest, a Govt. of India).
5. Pal, D.C. and S.K. Jain, 1998. Tribal Medicine, Nayaprakash Publisher, Kolkata.
6. Jain, S.K., 1994. Ethnopharmacology and drug development, in Ethnobotany and search for New drugs, by D.J. Chadwick and U. March, (Ciba Foundation Symposium 183, Willey, pp: 153.
7. Deb, D.B., 1981 and 1983. The Flora of Tripura State, Vols. 1 and 2, Today and Tomorrows' Printers and Publishers, New Delhi.
8. Deb, D.B., 1968. Medicinal Plants of Tripura State, Indian Forester, 94(10): 753-765.
9. Barman, D.D.P., 1983. Treatise Traditional Social Institutions of the Tripuri Community, Directorate of Tribal Research, Government of Tripura.
10. Majumdar, K., B.K. Datta and Uma Shanka, 2012..Ten new additions of tree species to the Tripura, state, North East India: Distribution of extension and geographic map. Nebio, 3(1): 17-24.
11. Singh, H.B., T.M. Hynniewta and P.J. Bora, 1997. Ethno-Medico-Botanical Studies in Tripura, India, Ethnobotany, 9: 56-58.
12. Jain, S.K. and R.R. Rao, 1977. A handbook of field and herbarium methods. Today and Tomorrow printers and publishers, New Delhi.
13. Majumdar, K. and B.K. Datta, 2007. Ethno-botanical Observation on the Traditional Usage of Medicinal Plants among the Tribes of Tripura, (P C Trivedi ed.), "Ethno medicinal Plants of India". Aavishkar Publishers, Distributors, Jaipur, pp: 136-161.
14. Majumdar, K., B.K. Datta and D. Roy, 2009 Inventory and Status of Medicinal Trees of Tripura (P C Trivedi ed.), "Indian Medicinal Plants". Aaviskar Publishers and Distributors, Jaipur, pp: 93-123.
15. Jain, S.K., 1989. Methods and Approaches in Ethnobotany, National Botanical Research Institute, Lucknow.
16. Kanjilal, U.N., P.C. Kanjilal, A. Das, R.N. De and N.L. Bor, 1934-1940. Flora of Assam, Vols. I-IV, Government Press, Shillong.
17. Prain, D., 1903. Bengal Plants. Vols-I and II, Repd. ed. (1963), BSI., Calcutta.
18. Hooker, J.D., 1872-1897. The Flora of British India, Vols. I-VII, -VIII., L. Reeve and Co., London
19. Arunachalam, K. and T. Parimelazhagan, 2011. Ethnomedicinal observation among Hooralis Tribes in Kadambur Hills, (Kalkadambur) Erode District, Tamil Nadu. Global Journal of Pharmacology, 5(3): 117-121.
20. Bhaskar, A. and L.R. Samant, 2012. Traditional Medication of Pachamalai Hills, Tamilnadu, India. Global Journal of Pharmacology, 6(1): 47-51.
21. Sebastian, M.K. and M.M. Bhandari, 1990. Edible wild plants of the forest areas of Rajasthan. J. Econ Tax. Bot., 14(3): 689-694.
22. Majumdar, K., R. Saha, B.K. Datta and T. Bhakta, 2006. Medicinal plants prescribe by different tribal and non-tribal medicine men of Tripura state, Indian J. Traditional Knowledge, 5(4): 559-562
23. Das, S. and M. Dutta Choudhury, 2010. Plants used against gastro-intestinal disorders and as anti hemorrhagic by three tribes of North Tripura District, Tripura, India. Ethnobot. Leaflets, 14: 467-478.
24. Majumder, K. and B.K. Datta, 2009. Traditional Wild Edible Fruits for Forest Dwellers of Tripura, India, Pleione, 3(2): 167-178.
25. Deb, D., L. Darlong, A. Sarkar, M. Roy and B.K. Datta, 2012. Traditional ethno-medicinal plants use by the Darlong tribes in Tripura, Northeast India. Int. J. Ayurved. Herb. Med., 2(6): 954-966.
26. Kremen, C., I. Raymond and K. Lance, 1998. An interdisciplinary tool for conservation impacts in Madagascar. Conserv. Biol., 12: 549-563.
27. Kshirsagar, R. and S. Upadhyay, 2009. Free radical scavenging activity screening of medicinal plants from Tripura. Nat. Prod. Radiance, 8(2): 117-122.
28. Kshisha, T., K. Reatul, R.S. Chowdhury and R. Banoo, 2012. Ethnomedicinal studies of chakma communities of Chitagong hill tracts, Bangladesh. Bangladesh Pharm. J., 15(1): 59-69.
29. Sen, S., R. Chakraborty, B. De and N. Devanna, 2011. An ethnobotanical survey of medicinal plants used by ethnic people in West and South district of Tripura. J. Forestry Res., 22(3): 417-426.

30. Faruque, O. and S. Bokhtear Uddin, 2011. Ethnodiversity of medicinal plants used by Tripura community of hazarikhil in Chitagong district of Bangladesh. J. Taxon. Biodiv. Res, 5: 27-32.

31. Chakraborty, R., B. De, N. Devanna and S. Sen, 2012. North east India an ethnic storehouse of medicinal plants. J. Nat. Prod. Plant Resour., 2(1): 143-152.