



Ethno-toxic Plants of Cachar District in Southern Assam with Special Reference to Their Medicinal Properties

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Abstract

In the present study, the medicinal plants having poisonous property found by the local people of Cachar district have been recorded as traditional knowledge on the basis of words of mouth and also on personal interview. A total twenty four ethnotoxic plants belonging to thirteen families have been recorded which are found to be useful in curing various diseases. Here maximum of six plants belongs to the family Solanaceae, three plants belongs to both the Fabaceae & Euphorbiaceae, two plants belongs to both Asteraceae & Apocynaceae and other family contains one plant each.

Keywords: traditional knowledge, ethnotoxic, poisonous, interview.

Introduction

As north-eastern region of India is one of the biodiversity hotspot so it contains so many flora which show different chemical properties which are directly or indirectly beneficial or harmful for society. This region is inhabited by a number of tribes of various ethnic groups, each with unique cultural heritage. It is now believed that these ethnic groups are also rich with plant lore. Their habitat in remote forest areas without modern facilities has compelled them to depend upon plants for their primary health care and by doing so generation after generation they preserve this rich lore of plants. In Assam some works are available on the medicinal plants used by Mikir people (Barthakur, 1981), postnatal care of women in traditional system in Assam (Barthakur, 1996), ethnomedicinal surveys of the Miris (Hajra & Baishya, 1980), medicinal plants of Tejpur (Puri, 1987), the plants used to cure jaundice in Golaghat district (Pandey et al., 1996) etc.

In Southern Assam some works are available on the Ex situ conservation and multiplication of rare, threatened and endangered medicinal plants of

Assam (Chowdhury, et al., 2002), Status of plant biodiversity of Cachar district and its conservation (Sharma et al., 2002) ethno-medico-botanical aspect of Riang tribe of Assam (Dutta Choudhury, et al., 2002), Ethnomedicinal plants used by Barman and Manipuri community, Cachar district (Das & Sharma, 2003), study of plant biodiversity & its conservation in Hailakandi district, Assam (Das, et al., 2004), ethno-medico-botanical study of cachar district, Assam (Das, 2000) etc.

Although ethnic people reported the medicinal plants, they had also identified some poisonous property of few plants which also contain medicinal value. That is why ethno-toxicity become a sub-field of ethno-botany that deals with the study of traditional knowledge of plant toxicity, not only those that have relevant written sources (e.g. Traditional Chinese Medicine, Ayurveda), but especially those, whose knowledge and practices have been orally transmitted over the centuries. People use not only the medicinal plants but also the toxic plants having some other value in different purpose knowingly or unknowingly. Because a

single plant contains lots of compounds which do not show uniformity in function. From the time immemorial human beings have used the plant species for repelling the unwanted fauna. Using plant product in demand of pleasure is also a traditional practice which is harmful to body. Medicine man also prescribes some plant for treatment of disease which is toxic actually. In toxic plant some works are available on the evaluation of some indigenous plant extracts for adult mortality of CTC12-a strain of *T. castaneum* (Parveen et al., 1997), effects of aqueous extracts of the seeds of *Datura stramonium* on some indices of liver & kidney function in rats (Gidado et al., 2001), toxicity of *Annona aquamosa* Linn. Extracts against *Callosobruchus maculatus* (Mollah et al., 2003b), toxicity studies of ethanol extract of the leaves of *Datura stramonium* in rats (Gidado et al., 2006), toxicity of *Thevetia peruviana* (Pers) Schum. Extract to adults of *Callosobruchus maculatus* F. (Mollah et al., 2007), characterization of the neurotoxicity induced by the extract of *Magnistipula butayei* in rat (Charles et al., 2007) etc.

Some of the animals and plants contain toxic compound. Animals like Snakes and some Insects use this for capturing their prey. The primary consumer i.e. herbivores are more vulnerable to plant toxin. In view of this fact it is essential to prepare toxicity database for as many animal species as possible. Besides human being also exposed to many toxic plant. But it is important to mention here that this traditional knowledge is preserved only by words of mouth and passes from one generation to next generation. On the other hand now a day's these traditional knowledge are facing two problem ie. Urbanization and insurgency activity. So here we find the scope of research to preserve this traditional knowledge with necessary modification. It is important to know whether the plant has any clinical utility or not. Because in many cases it seems that it is just difference of dose to act as toxin or medicine. In the backdrop of the above facts the present study aims to assess the diversity of ethno-toxic plant in Cachar district & investigate their impact on medicinal purpose.

Physiography & climate of the study area

In any type of taxonomical survey physiography and climate of the specific study area is considered as a very important tool because the diversity and characteristics of the flora and fauna of a particular site are directly related to environmental factors. Here in this survey the study area that has been taken is Cachar district in southern Assam of north-east India. The state Assam contains 2 valley naming Barak Valley & Brahmaputra Valley. Geographically Barak valley is older than Brahmaputra Valley. Cachar district is situated in the southern part of the state Assam. Its northern part is surrounded by North Cachar Hills and Meghalaya, south by Mizoram, east by Manipur and west by Bangladesh. The geographical area of Cachar district is 3,786 sq. km which constitute 4.83% of the total area of Assam. The altitude of the Cachar district is 36.5 meters (m.s.l.) and it lies between latitude 90°44' E and longitude 20°04' N latitude. Physiographically, the district consists of small hillocks, plains, beels and extreme low-lying flood prone areas. The mean maximum temperature of the district was 37°C in summer and mean minimum temperature was 10°C during winter months. The district receives mean annual rainfall of 2800 mm and has mean annual relative humidity about 85%. The rainy season starts from April to September, while the months of December and January exhibit very dry period in Cachar district. Soil of Cachar district is slightly acidic, pH ranges from 4.5 to 5.5. The valley and low hilly sides have clay loam to sandy loam type of soils.

Materials & Methodology

Exhaustive field surveys have been undertaken covering all seasons for gathering information on each and every species found in the knowledge of the local people. Surveys were conducted in Dargakona, Duwarbond, Fakirtila, Dudhpatil, Sonai, Bihara, Lakhipur, Captanpur, Jirighat area of Cachar district inhabited mainly by Bengali, Deshwali and Manipuri communities. Plants have been collected in their flowering and fruiting stage as far as possible from the natural habitat and serially tagged with collection numbers. The data

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on indigenous toxicity were collected through interviewing the local people of Cachar district using open-ended interviews. As many as 37 respondents were interviewed independently in their villages to document the toxicity of the medicinal plants. Smaller herbaceous plants have been collected as whole and in case of shrubs, under shrubs, woody herbs and climbers, respective twigs have been collected.

Methodologies as suggested by Schultes (1960 and 1962), Jain (1964, 1967, 1987, 1989) have been followed during collection of information on ethnotoxicobotanical aspects. Information on poisonous as well as medicinal plants have been collected mainly from the medicine- men, village headmen and aged and experienced people. Queries have been made repeatedly, occasionally taking help from interpreters for confirmation of data on each plant. Data on each plant have been recorded as follows: (a) Sl. No. (b)Scientific name (c) Family (d) Vernacular Name (e) toxicity and (a) medicinal property (b) part used.

Instant pressing of specimens, as far as possible was done Rainy seasons' specimens were pressed by spraying 10% formaldehyde. Succulent, bulbous and rhizomatous plants were boiled till the plant turned yellow and pressed properly. Dried

specimens were poisoned properly with a saturated solution of HgCl₂ dissolved in absolute alcohol and mounted with fish glue on standard (42 X 28 cm). Field data with collection number, locality, short description, vernacular name, collector's name were transferred from the field notebook to printed level on the right hand corner of the herbarium sheet for ready identification. A number of Floras Monographs were consulted, especially flora of British India (Hooker, 1872-1897), Flora of Assam, Vol. 1-7 (Kangilal, et al., 1930- '40) and vol. 5 (Bor, 1940), Flora of Tripura state vol. 1 and II (Deb, 1981, 1982) for future studies. Arrangement of plants have been made with the correct nomenclature followed by the names of families of Angiosperms based on Bentham and Hookers (1862- 1883) system of classification. Data recorded in case of each plant includes scientific name, family, vernacular name, toxicity, medicinal uses and part used have been provided. One each set of identified herbarium sheets have been deposited at the Assam University, herbarium collection.

Result & Observation

Table: 1- List of the reported plants in the survey & their toxicity found from mouth of ethnic people

Sl.No.	Scientific name	Family	Local name	Toxicity (Traditional knowledge)
1	Elythrastricta	Elaeaceae	Madar (B)	Latex is poisonous to man & animal skin, leaf consumed may create problem to the animal including depression & uneasiness.
2	Elyllathusniri	Euphorbiaceae	Bhuminamla (B)	Leaf juice is commonly used for poisoning of fishes in water.
3	Datura stramonium	Solanaceae	Dhatura (B)	Fruit is used in little quantity to prepare some local wine. In higher concentration it may be fatal.
4	Calotropis gigantea	Asclepiadaceae	Akanda (B)	Latex secreted by leaf is poisonous to skin & eye of animal & man.
5	Polygonum hydropiper	Polygonaceae	Kukurapatta (D)	Leaf is reported to be poisonous to animal and fish when consumed.
6	Sarcopus anacardium	Anacardiaceae	Vella (B)	Leaf and fruit secrete lot of latex. Latex is poisonous and may produce burning sensation in the skin of man exposed to it.
7	Eupatorium odoratum	Asteraceae	Kabilai (M)	Leaf is harmful & poisonous for grazing animals; leaf juice is used for repelling insects.
8	Iponoea hispida	Convolvulaceae	Kalmu (D)	Latex poisonous for livestock and may be fatal when consumed.
9	Crotalaria pallida	Elaeaceae	Ghartakara (D)	Leaf if consumed is harmful to animal, seeds eaten are toxic to the birds.
10	Casia alata	Elaeaceae	Kharpat (D)	Root may be poisonous if eaten.

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Sl. No.	Scientific name	Family	Local name	Toxicity (Traditional knowledge)
11	<i>Solanum xanthocarpum</i>	Solanaceae	Ketli bengan (D)	Fruits are highly toxic to the aquatic organisms. So it is used as fish poison.
12	<i>Lantana camara</i>	Verbenaceae	Goghool (D)	Flower is poisonous for animals, causes allergy to man if eaten.
13	<i>Ricinus communis</i>	Euphorbiaceae	Barella (B)	Fruit ingestion causes vomiting & uneasiness in animal.
14	<i>Thevetia peruviana</i>	Apocynaceae	Utonglei (M)	Leaf, fruit, seed latex is poisonous, fatal for animal when consumed.
15	<i>Eidhonia crassipes</i>	Portulacaceae	Metecca (D)	Flower is poisonous and is fatal for animal when eaten.
16	<i>Alstonia scholaris</i>	Apocynaceae	Chatim (B)	Root is highly poisonous for snail and insects, leaf are used as pest repellent.
17	<i>Arisaema tortuosum</i>	Araceae	Lindheishu (M)	Leaf is reported to be moderately poisonous. Its ingestion may cause vomiting in animal.
18	<i>Cymbopogon nardus</i>	Poaceae	Karakher (B)	Tuber is moderately poisonous, its ingestion may cause uneasiness.
19	<i>Datura innoxia</i>	Solanaceae	Datura (B)	Fruit is used in little quantity to prepare some local wine. In higher concentration it may be fatal.
20	<i>Cestrum nocturnum</i>	Solanaceae	Nagcharpa (D)	Leaf and flower are moderately poisonous, Its ingestion may cause uneasiness in animals.
21	<i>Ageratum conyzoides</i>	Asteraceae	Uhuri (B)	Leaf is poisonous. It is used as insect repellent.
22	<i>Solanum torvum</i>	Solanaceae	Shingkhanga (M)	Fruit is highly poisonous. Its ingestion may be fatal for the animal.
23	<i>Nicotiana glauca</i>	Solanaceae	Hickhrana (M)	Leaf is poisonous. It is harmful for animal if eaten. Its consumption in small quantity causes headache.
24	<i>Crotalaria pallida</i>	Euphorbiaceae	Jaipal (B)	Its leaf is reported to be moderately poisonous for aquatic organisms when eaten.

B- Bengali, D- Deshwali, M- Manipuri

Table: 2- List of established medicinal property of the above mentioned plants which are reported to be toxic in traditional knowledge.

S. No	Scientific name	Medicinal property	Part used	Reference
1	<i>Elythria stricta</i>	To cure leucorrhoea & excessive thirst	Bark	Ujjan et al., 2007
2	<i>Phyllanthus niruri</i>	Hepatoprotective	Leaf & fruit	Harish, 2005
3	<i>Datura stramonium</i>	To cure encephalitis	Leaf, fruit	Burns, 2005
4	<i>Calotropis gigantea</i>	Hepatoprotective	Stem	Lochi et al., 2009
5	<i>Polygonum hydrocotyle</i>	Anti-inflammatory	Root	Furta
6	<i>Sarcopus anacardium</i>	Antimicrobial	Nut & leaf	Mishra et al., 2007
7	<i>Eupatorium odoratum</i>	Useful in fever, skin disease, prevent abortion	Root	Aranil et al., 2000
8	<i>Ipomea hirsuta</i>	Useful in headache, rheumatism, epilepsy, leprosy & ulcer etc.	Leaf	Edison
9	<i>Crotalaria pallida</i>	Anti-inflammatory	Bark	Wang et al., 2003

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S. No	Scientific name	Medicinal property	Part used	Reference
10	<i>Casia alata</i>	Useful in skin disease, constipation, intestinal parasitosis, diabetes etc.	leaf	Makinde et al., 2007
11	<i>Solanum xanthocarpum</i>	Antibacterial & antifungal	Root, stem, leaf, fruit	Salar & suchitra, 2009
12	<i>Lantana camara</i>	Antibacterial agent	Leaf & fruit	Pattraik & Pattraik, 2010
13	<i>Ricinus communis</i>	Antibacterial	Seed	Jonho & Enebeaku, 2008
14	<i>Thevetia peruviana</i>	Anti-fertility	Seed	Mitra & Mikharjee, 2009
15	<i>Eichornia crassipes</i>	Antibacterial	leaf	Fareed et al., 2008
16	<i>Alstonia scholaris</i>	Anti-diarhoeal activity	leaf	Sah et al., 2009
17	<i>Arisaema tortuosum</i>	Useful in stress	leaf	Choudhary et al., 2008
18	<i>Cymbopogon nardus</i>	Antimicrobial & insecticide	leaf	Basilio et al., 2006
19	<i>Datura innoxia</i>	Antimicrobial	leaf	Eftekhari et al., 2005
20	<i>Cestrum nocturnum</i>	Larvicidal	leaf	Jawalet et al., 2010
21	<i>Ageratum conyzoides</i>	Blood glucose level lowering	leaf	Nyari et al., 2006
22	<i>Solanum torvum</i>	Antimicrobial	leaf	Lalitha et al., 2010
23	<i>Nicotiana glauca</i>	Useful in headache, anti-diarhoeal, relief pain etc.	leaf	Charlton, 2004
24	<i>Crototiglium</i>	Useful in Gastrointestinal disturbance	leaf	Wang et al., 2008

Discussion

A total no of 24 species has reported which are known as plants having poisonous property in indigenous knowledge and also useful in medicinal purpose. Most of the plants that showing toxicity are latex secreting plants. Evolving over a long period of time based on necessities and experiences, indigenous medicinal system is an important component of indigenous knowledge of the local people of Cachar district which is an important natural resource that facilitates the development process in cost effective, precipatory and sustainable ways and plays an important role in resource conservation. Along with the medicinal plant they have also reported some poisonous property of the plant. In case of poisonous property they found two types of mode of action ie. directly and indirectly. Directly use of toxic plant like to capture the fish, poisoning the insects pest etc. On the other hand indirectly is that founding toxicity while using for medicinal or any other beneficial purpose. In the studied villages more

than 20 indigenous toxic reports are being found in 24 plant species of medicinal value.

While gathering the medicinal plants from their habitat peoples avoid collecting plants those are infected by insects, pests and any other disease. Plants affected by sunstroke, hailstorms, high velocity winds, fire & floods are also not collected to be used for preparation of indigenous medicine. But they cannot avoid the principle ingredients of photochemical. If there is some harmful compound in the leaf than they have only two option ie. not to use the plant or tolerate the miseries of using the plant. Here some plants are reported which are used in medicinal purpose but they also have toxicity. If somehow it is possible to keep apart the toxic ingredients from the plants they are tremendously useful for therapeutic uses. Here we found the necessity of pharmacological industries. With the help of detail phytochemical investigation and biological screening above mentioned can be done. But when the matter of pharmacological industries comes another problem arises.

The traditional medicine and health care practices are threatened as the bioresources on which they are dependent are depleting with weakening and even disappearing of institutions and practices of safe guards those have evolved from culture counters of local people to ensure regulated use of bioresources. Further the ruthless exploitation through unscientific and non regulated collection of medicinal plants in the recent times by pharmaceutical industries also disturbed the regulatory practices, thereby threatening and endangering plants of medicinal value. In order to conserve biodiversity the local people follow a number of other regulations such as maturity of the plants, height of the plants, patterns of branching, color and other morphological characters' while collecting the medicinal plants so as to ensure that medicinal plants do not die out or disappear from the natural habitat. These regulations are getting diluted under

commercialization. Commercial collection of medicinal plants also ignores other regulatory guidelines relating collection of parts of medicinal plants. For example the branches are collected when they are fully grown during springs & rains & young leaves are collected during flowering & ripening of fruits by Bengali & Manipuri people of Cachar district. An authenticated documentation of indigenous knowledge system and possible value addition with sustainable pharmacological works will help to the confidence building of the practitioners promote their economy and help to process of biodiversity conservation

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