



AN ETHNOBOTANICAL SURVEY OF SOME USEFUL PLANTS OF MANIPUR, INDIA WITH
REFERENCE TO THEIR TOXICITY

¹Maibam Rasila, ^{*}¹Meenakshi Bawari and ²Satya Bushan Paul

¹Department of Life Sciences and Bioinformatics, Assam University, Silchar-788011,

²Department of Chemistry, Assam University, Silchar-788011,

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ABSTRACT

Manipur, a North-eastern state of India has got a wide range of natural resources pertaining to its flora which are being used for ethnomedicinal purposes. A survey was carried out in Manipur and indigenous knowledge of local traditional uses was collected through questionnaire and personal interviews during field trips. The information was obtained from the traditional medicine practitioners and other experienced persons having knowledge on many useful plants. A data comprising of 24 plant species having medicinal and toxic properties and other uses representing 16 families was reported.

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INTRODUCTION

Biodiversity is the very basis of human survival and constitutes the resources upon which families, communities and future generations depend. The Indian subcontinent is endowed with most varied and diverse soil and climate conditions suitable for the growth of various plant species. The indigenous people are well acquainted with the properties and uses of plants of their surroundings and they depend on the forest resources for various purposes like for wood, timber, non-timber forest products, medicines, food etc (Pushpangadan, 1995). Manipur, one of the easternmost border states (22,327 km² geographical area) of India is a part of Indo-Myanmar Hot spots of bio-diversity (Myers *et al*, 2000) and possess rich floral diversity. It lies between 94°31' to 94°78' E and 23°83' to 25°68' N and situated between 550 to 3600 m above sea levels. It comprises of 92% hilly terrains surrounding a saucer shaped valley of 1856 km² called the Imphal valley.

The ethnobotanical uses of plants comprises many interesting and useful aspects of plant science. Since time immemorial, man has used various parts of plants for preventing and curing diseases and to maintain good health (Chah *et al*, 2006). The importance of gathering information on useful plants is to initiate their proper scientific management and economic development of the confined area. Today a substantial number of drugs are developed from plants (Fabricant and Farnsworth, 2001) which are active against a number of diseases. The use of these medicinal plants is well known among the indigenous people in rural areas of many developing countries. Despite the wide range of the medicinal properties, some plants are also found to possess poisonous properties. This is because of the fact that a plant contains certain phytochemical compounds which may have different actions on living system. The information from

published literatures also reveals many medicinal plants which causes toxicity. *Datura stramonium* L. is voluntarily used for its hallucinogenic properties. Its anticholinergic compounds are likely to produce delirium and stupor but rarely cause deep coma (Oberndorfer, 2002). Aqueous extract of the seeds are reported to be used in the treatment of gastric pains and indigestion (Bhattarai, 1993). The alcoholic extract of *Coscinium fenestratum*, medicinal plants reputed for health promoting and various therapeutics effects in the Indochina region, induced neurotoxicity in cerebral cortex, striatum and hippocampus and also increased stereotype behaviors in rats (Wanchai, 2006). *Semecarpus anacardium* pericarp oil extract had adverse effects on physiology as well as histology of kidney. Oral administration of *Semecarpus anacardium* extract led to inflammation of renal tissue and cells at initial stage, further resulting in severe damage of renal tissue and tubules (Choudhari and Deshmukh, 2007). The fruits of this plant is having very good anti tumor activity along with antiseptic, anti-inflammatory and cardiotoxic effect (Nadakarni *et al*, 1999). *Polygonum hydropiper* is the most popular plant used as fish poison. It is used as fish toxin for catching the fishes from aquatic resources as well as for removal of uneconomical fishes from the aquaculture pond (Bhapaban *et al*, 2007). The whole plant, either on its own or mixed with other herbs, is decocted and used in the treatment of a wide range of ailments including diarrhoea, dyspepsia, itching skin, excessive menstrual bleeding and haemorrhoids (Chevallier, 1996). The plant also possesses bitter, stimulant, tonic, diuretic, carminative, anthelmintic, emmeragogue, haemostatic properties (Sharma, 2003). The present paper deals with the ethnobotanical exploration in different areas of Manipur. A data on the utility and toxicity of these documented plants were recorded.

MATERIALS AND METHODS

Extensive field survey has been carried out during all the seasons by collecting information through interviews with traditional herbalists

*Corresponding author: meenakshibawari@yahoo.co.in

or maibas, elderly people and several other experienced men and women who have good knowledge about the identification of plants, their ethnobotanical uses, toxicity, modes of preparation, route of administration or application. Routine methods of botanical collection and herbarium techniques have been followed in this study (Jain and Rao, 1977). The collected plant specimen were then identified based on published literatures.

RESULTS

During the field survey, ethnobotanical information of 24 species of plants belonging to 16 families have been collected from various habitats of the study area. For each plant species listed, scientific name, local (vernacular) name in Manipuri, family, applications, parts used and their utility & toxicity are given (Table 1 and 2).

Table 1. List of the reported plants with their uses

Scientific name	Local name	Family	Parts used	Application and uses
<i>Abrus precatorius</i> L.	Chaning	Fabaceae	Seed	Seed powder is used as an abortifacient.
<i>Aeglemarmelos</i> Correae. Roxb	Heirikhagok	Rutaceae	Root bark, fruit, leaf	Leaf and aqueous decoction of root bark showed hypoglycemic effect, ripe fruit pulp extract in water is taken in stomach ulcer.
<i>Albizia myriophylla</i> Benth.	Yangli	Fabaceae	Bark	Bark powder used in the preparation of fermented beverage "Atingba".
<i>Arisaema tortuosum</i> (Wall) Schott.	Lincheisu	Araceae	Tuber	Decoction is applied in snake bite.
<i>Blumea balsamifera</i> L.	Langthrei	Asteraceae	Leaf	Used in traditional rituals. Crushed with water and taken in stomach ulcer.
<i>Caesalpinea anneophylla</i> Roxb.	Kanggon	Caesalpinaceae	Leaf	Fried leaf is consumed to get relief from uneasiness.
<i>Datura stramonium</i> L.	Sagolhidak amuba	Solanaceae	Leaf	Burnt dried leaf smoke is inhaled for treating asthma.
<i>Eclipta prostrata</i> L.	Oochisumbal	Asteraceae	Leaf	Leaf extract with little honey is given in cough, fever and leaf paste is used in toothache.
<i>Entada phaseoloides</i> Merrill.	Kangkhill	Mimosaceae	Bark & seed	Bark powder is effective in stomach ulcer, seed powder is applied in headache and fever, seed is used for preparing traditional rosaries.
<i>Eupatorium odoratum</i> L.	Kambilei	Asteraceae	Leaf	The ash of the leaf mixed with honey and water is taken in asthma.
<i>Euphorbia antiquorum</i> L.	Tengnou	Euphorbiaceae	Stem	Used in painful inflammation.
<i>Melia azaderach</i> L.	Seijrak	Meliaceae	Leaf	Leaf decoction is taken bath in skin diseases and to remove head lice, also used as insect repellent.
<i>Nerium indicum</i> Mill.	Kabirei	Apocynaceae	Root & leaf	Root paste is applied in boils, leaf decoction paste is used in poisonous bites.
<i>Nicotiana tobacum</i> L.	Hidakmana	Solanaceae	Leaf	Used in smoking for relaxation and recreation purposes and also taken together with betel leaf and areca nut. It is applied in boils.
<i>Opuntia dillenii</i> Haw.	Meipokpi	Cactaceae	Phylloclade	Decoction along with common salt is applied in bone fracture
<i>Phyllanthus urinaria</i> L.	Chakpaheigru	Euphorbiaceae	Whole plant	Boiled soup is taken in urinary disorder, crushed plant is applied in skin problems
<i>Polygonum minus</i> Huds.	Chakhong macha	Polygonaceae	Whole plant	Water decoction is taken for better urination.
<i>Ranunculus scleratus</i> L.	Kakyelkhujil	Ranunculaceae	Whole plant	Boiled soup is taken in urinary disorder, boiled paste is applied in skin diseases
<i>Rhododendron arborum</i> Sm.	Kharamlaishok angangba	Ericaceae	Flower & leaf	Dried flowers is highly effective in checking dysentery and diarrhoea, leaf tincture is used in gout and rheumatism
<i>Ricinus communis</i> L.	Kege	Euphorbiaceae	Seed	Seed oil is applied in cracking of limbs.
<i>Sapindus trifoliatus</i> L.	Kekru	Sapindaceae	Seed	Seed is used for cleaning golden jewelleryes.
<i>Scirpus lacustris</i> L.	Kouna	Cyperaceae	Leaf	Used for making mat, baskets, bags and other items.
<i>Solanum torvum</i> Swartz.	Shingkhangga	Solanaceae	Mature fruit	Cough and tonsil problems.
<i>Thevetia peruviana</i>	Utonglei	Apocynaceae	Bark & fruit	The ash of the bark mixed with water is used in diabetes treatment, fruit latex is used against skin diseases.

Table 2. List of the above plants with their toxic properties

Scientific name	Toxic parts	Toxicity
<i>Abrus precatorius</i> L.	Seed, root	Fatal to human and livestock, gastrointestinal problems
<i>Aegle marmelos</i> Correa & Roxb.	Root, bark	Use as fish poison
<i>Albizia myriophylla</i> Benth.	Bark	Hallucinogenic, high dose consumption of juice prepared from the bark cause dizziness
<i>Arisaema tortuosum</i> (Wall) Schott.	Leaf	Ingestion may cause vomiting in animals
<i>Blumea balsamifera</i> L.	Leaf	Use as fish poison
<i>Caesalpinea anneophylla</i> Roxb.	Root bark	Used for catching fishes after poisoning
<i>Datura stramonium</i> L.	Leaf, seed	Hallucinogenic, even small amount is fatal
<i>Eclipta prostrata</i> L.	Root	Emetic
<i>Entada phaseoloides</i> (Linn.) Merr.	Seed, bark, fruit	Used as fish poison
<i>Eupatorium odoratum</i> L.	Leaf	Leaves juice with salt is treated as poison
<i>Euphorbia antiquorum</i> .	Whole plant	Plant is poisonous
<i>Nerium indicum</i> Mill.	Whole plant	Ingestion may cause vomiting, bloody diarrhoea, unconsciousness, death
<i>Nicotiana tobacum</i> L.	Leaf	Used as fish poison, hallucinogenic properties
<i>Opuntia dillenii</i> Haw.	Whole plant	Plant is toxic
<i>Phyllanthus urinaria</i> L.	Whole plant	Used as fish poison
<i>Melia azaderach</i> L.	Fruit	Cause dizziness and vomiting when taken in excess
<i>Polygonum minus</i> Huds.	Seed	Seeds are used as fish poison
<i>Ranunculus scleratus</i> L.	Whole plant	Poisonous and toxic to animals
<i>Rhododendron arboreum</i> Sm.	Leaf	Young leaf causes intoxication in large quantities
<i>Ricinus communis</i> L.	Fruit	Cause burning in mouth, convulsion, vomiting and is often fatal
<i>Sapindus trifoliatus</i> L.	Root bark	Used for poisoning fish
<i>Scirpus lacustris</i> L.	Rhizome	Suspected of poisoning cattle
<i>Solanum torvum</i> Swartz.	Fruit	Poisonous to livestock
<i>Thevetia peruviana</i>	Fruit	Consumption can be fatal

Table 3. Some reported medicinal and toxic properties of the above mentioned plants

Botanical name	Medicinal properties	Toxic properties
<i>Abrus precatorius</i>	It has been used in the treatment of coughs and vomiting in different animal species (Gunsolus, 1995).	The black and red seeds of the plant contain the very poisonous phytotoxin, abrin (Clarke and Clarke, 1975).
<i>Aegle marmelos</i>	Leaf extract has been reported to regenerate damaged pancreatic beta cells in diabetic rats (Das <i>et al.</i> , 1996)	Leaves cause abortion and sterility in women. The bark is used as fish poison (Desai <i>et al.</i> , 2012)
<i>Albiziamyriophylla</i> Benth.	Thai people use this plant as an anti diabetic agent (Pannangpatch <i>et al.</i> , 2006)	
<i>Arisaema tortuosum</i>	Tubers are externally applied in snake bite (Bhatt and Negi, 2006)	Roots are used to kill worms in cattle (Deepa and Diwakar, 2004)
<i>Blumea balsamifera</i>	Decoction of leaves used for the treatment of gas distention and abdominal colic. Roots have appetite stimulating properties (Nadkarni and Nadkarni, 1976)	
<i>Datura stramonium</i> L.	Mixture of the leaves and seeds taken orally as a decoction and smoke is used for the asthma (Hirschman <i>et al.</i> , 1990)	Tropane alkaloids results in widespread paralysis of parasympathetic innervated organs (Friedman and Levin, 1989)
<i>Eclipta prostrata</i>	The plant is used in the traditional medical practices of India to treat hepatic diseases and hyperlipidemia (Kumari <i>et al.</i> , 2006)	
<i>Entada phaseoloides</i> Merill.	Paste of the seed pulp is used as an herbal medicine to reduce inflammation and pain of joints and lymph nodes (Kirtikar, 1935)	
<i>Eupatorium odoratum</i>	Anti-inflammatory activity and wound healing activity (Owoyele <i>et al.</i> , 2005)	Incidence of renal and hepatic toxicity has been recorded with the ingestion of the plant at high doses (Pieme, 2006)
<i>Euphorbia antiquorum</i>	Acrid, anodyne, digestive, emetic, purgative, stomachic (Loro <i>et al.</i> , 1999)	
<i>Melia azederach</i>	Fruit and bark have been reported for hypoglycemic property (Chaturvedi <i>et al.</i> , 2005)	Flowers and berries are toxic to rats and mice (Zakir <i>et al.</i> , 1991)
<i>Nerium indicum</i>	Hepatoprotective against carbon tetrachloride induced hepatotoxicity in rats (Govind, 2010)	The bark extract may be used as a potent molluscicide (Singh and Singh, 1998)
<i>Nicotiana tabacum</i>	Anti-helminthic (Iqbal <i>et al.</i> , 2006)	Possess stomach and respiratory poisoning properties which is attributed to the active constituent nicotine (Lale, 2002)
<i>Opuntia dillenii</i>	Analgescic and anti-inflammatory activity (Loro <i>et al.</i> , 1999)	
<i>Phyllanthus urinaria</i>	This plant may serve as an alternative source of antioxidants for prevention of doxorubicin cardiotoxicity, (Chularojmontri <i>et al.</i> , 2005)	
<i>Polygonum minus</i>	The phenolic compounds from this plant can be potentially used as a natural drug to protect human mucosa from necrotizing agents (Suhailoh <i>et al.</i> , 2012)	
<i>Ricinus communis</i>	Anti-inflammatory and the free radical scavenging activity (Illavarasan <i>et al.</i> , 2006)	
<i>Sapindus trifoliatus</i>	A thick aqueous solution of the pericarp is used for the treatment of hemicranias, hysteria or epilepsy (Kirtikar and Basu, 1999)	It causes vomiting and nausea and is known to cause irritation of gastric mucosa when administrated orally (Sharma and Vigyan, 1986)
<i>Solanum torvum</i>	Used as a tonic and haematopoetic agent and for treatment of pain (Ambasta, 1992)	
<i>Thevetia peruviana</i>	The plant or its parts can be used for the treatment of diabetes, liver toxicity, microbial infection and to relieve pain (Singh <i>et al.</i> , 2012)	Plants are toxic to most vertebrates as they contain cardiacglycosides (Shannon <i>et al.</i> , 1996)

The plants listed belong to Solanaceae, Asteraceae, Euphorbiaceae (3 species each) followed by Fabaceae, Apocynaceae (2 species each) and Ranunculaceae, Ericaceae, Rutaceae, Cactaceae, Polygonaceae, Cyperaceae, Araceae, Sapindaceae, Caesalpinaceae, Mimosaceae, and Meliaceae (1 species each).

DISCUSSION

The traditional knowledge available with the ethnic people plays an important role in quick and proper identification of natural resources having potential for commercialization. It also provides useful informations for scientific research, being the key to identifying those elements in a plant with a pharmacological value. Most people especially in the rural areas use traditional medicines for their common day ailments. A vast knowledge of how to use the plants against different illnesses may be expected to have accumulated in areas where the use of plants is still of great importance (Diallo *et al.*, 1999). Besides the medicinal value, many plants play an important role in the socio-economic development as they can be used for timber, rosaries, firewood, catching fishes, poisoning the pest in field etc. They also produce toxic effects on the animal system, if they are not processed properly or if given in improper doses. Considering the importance of the above reported plants in local substenance, it is suggested to protect them and their habitat. The wealth of this knowledge needs to be preserved for sustainable development. This can be exploited to enhance the potential of valuable drug yielding plant species. As these plants are used for medicinal purposes, a

detail phytochemical screening and identification of the components present should be known. This will allow wider acceptance of the medicinal plants by the people.

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