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   Poster presentation in the seminar.

Some hepatoprotective ethnomedicinal plants used by Manipuri community in Barak valley, Assam, India

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Abstract
Recent survey to explore the ethnomedicinal plants used by Manipuri community of Barak valley, Assam for hepatoprotection recorded 25 species belonging to 25 genera and 22 families using structured questionnaires in consultations with the community practitioners. For curing liver ailments, the use of aboveground plant parts was higher (80%) than the underground plant parts (8%). Of the aboveground plant parts, leaf was used in the majority of cases (10 species), followed by whole plant (5 species), fruit (4 species), bark (3 species), stem (2 species) and seeds (1 species). Root of one species was also used by them to protect their livers.

Key words: Manipuri community, Barak valley, Hepatoprotective plants, Traditional Knowledge.

INTRODUCTION
Hepatoprotectivity means protection of liver - the largest gland of the body. This important organ can be caused by (a) drugs, (b) viruses, (c) bacteria, (d) mushrooms and (e) parasites. The most common disease of liver is the hepatitis.

Southern Assam is one of the remotest parts of N.E India and is also equally significant so far as the medicinal plant research is concerned. Many traditionally formulated medicines are available here for treating different types of diseases like Hepatitis, cancer, ulcer etc. from generation after generation. The state of Assam comprises two valleys namely the Brahmaputra valley and Barak valley. The Barak valley is the southernmost part of the Assam lying approximately at 24° N to 25 ° N latitude and 92 ° E to 93 ° E longitude. Three districts of Assam, Cachar, Karimganj and Hailakandi are located in Barak valley. The inhabitants of these areas are Bengali, Hmar, Manipuri, Kuki, Dimasa, and other different groups of tribal people. Manipuri is a Mongolian type of community inhabited in 18 villages of these three districts. To cure their different diseases, even today, they depend on their traditional knowledge on medicinal plants. Some of the works related to the medicinal plants of Barak valley, Assam include ethnomedicinal uses of plants by Manipuri and Barman communities of Cachar district, Assam (Das et al 2003), diversity and conservation of medicinal plants in Barak valley, Northeast India (Barbhuinya et al 2009), environment ethics in the culture of Meeties from North east India (Singha et al 2001), Traditional use of medicinal plants by the Jaintia tribes in North Cachar Hills district of Assam, N.E. India (Sajem et al 2006), some observations on the status of medicinal plants of Barak valley, economic development of Assam (Bhattacharya 1998), ethnobotany of Barak Valley (Southern Assam) with special reference to folk medicine (Nath & Maiti 2003), Flora of Assam Vol. I-IV (Kanjilal et al 1934 – 1940), ethnogynaecological records from the state of Assam (Gogoi et al 1979), etc. are important.

The medicinal importance of plants of Assam and other states of N.E. India is well known and a good number of well documented publications are available including Bor (1940), Deb (1968), Devi (1990), Kumar (2002), Caius (2003), Nath & Maiti (2003), Pandey, et al. (2006), Vardhana (2008), and Tiwari et al (2009).

The published works concerned with the ethnobotany of Manipuri community of Barak valley of Assam is comparatively very less. The present work represents particularly the hepatoprotective ethnomedicinal plants used by the Manipuri community in Barak valley of Assam.
METHODOLOGY
The field survey was carried out during 2007 to 2008 covering all seasons to collect information on the hepatoprotective plants used by the Manipuri people inhabited villages of Bibigram, Gobindonagar, Lakhipur, Jaribond, Wapokpi, Echaper and Katlicherra located in the three districts of the Barak Valley, Assam. Plants have been collected in their flowering and fruiting stages as far as possible from the natural habitat. Notes were taken regarding the location, habitat, distribution pattern, nature of roots, tubers, bulbs or rhizomes, etc. Specimens were processed into mounted herbarium sheets following Jain & Rao (1977).

Methodologies as suggested by Schultes (1960, 1962), Jain (1964, 1967, 1987, 1989) and Ford (1978) have been followed using collection of information on ethnobotanical aspects. The informations have been gathered from the elderly villagers, local medicine-men, both men and women and cultivators using semi-structural questionnaires. Queries have been made repeatedly, occasionally taking the help from interpreters. Confirmation of data on each medicinal plant has been done through cross-checking. Queries include: (a) SI no. (b) Botanical name (c) Family (d) Local name (e) Parts used (g) Process of utilization (h) Established reports of utilization.

The plants were identified by consulting different floras especially Flora of British India (Hooker 1872 – 1897), Flora of Assam (Vols. 1 – 4 by Kanjilal et al 1934 – 1940 and Vol. 5 by Bor 1940), Flora of Tripura State (Deb 1981, 1983), and matching at Assam University herbarium. After completion of the work sets of identified herbarium sheets have been deposited at the Herbarium of the Assam University Silchar.

RESULT AND DISCUSSION
Altogether 25 species of hepatoprotective plants belonging to 24 families were recorded during the survey. Except Cucurbitaceae (2 spp.) all other families are represented by one species only. Table 1 presented these plants alphabetically along with their local and scientific names, families, parts used, and mode of use.

The use of the aerial plant parts was higher (80%) than the underground plant parts (8%). Of the aboveground plant parts, leaf was used in the majority of cases (10 species), followed by whole plant (5 species), fruit (4 species), bark (3 species), stem (2 species) and seeds (1 species). Root of one species was also used by them to protect their livers. Of these Neptunia oleracea is a rare aquatic sensitive plant, Lycopodium annotinum is a rare pteridophyte and Trichosanthes dioica is a commonly cultivated crop plant. A cross check of the literature on the medicinal uses of local plants revealed that except Cinnamomum obtusifolium remaining 24 species recorded here are otherwise also known for their medicinal uses (Bor 1940; Deb 1968; Devi 1990; Kumar 2002; Caius (2003); Pandey et al 2006 and Vardhana 2008).

The efficacy of the recorded plants is not clear. It was not possible to contact any patient during the survey but the practitioners of local folk medicines claim that all the patients gets cured if they complete the entire course of treatment.

However, proper scientific evaluation of these plants is required to understand their efficacy and/or usefulness.

Table I: Hepatoprotective ethnomedicinal plants used by the Manipuri community in Barak valley of Assam

<table>
<thead>
<tr>
<th>Botanical name</th>
<th>Local name</th>
<th>Plant Parts Used</th>
<th>Process of utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aegle marmelos (L.) Correa [Rutaceae]</td>
<td>Heirikhagok</td>
<td>Tender leaves</td>
<td>Taken orally with milk in the morning in jaundice</td>
</tr>
<tr>
<td>Aloe barbadensis Miller [Asphodelaceae]</td>
<td>Dhriti kumar</td>
<td>Leaves</td>
<td>Juice taken orally</td>
</tr>
<tr>
<td>Argemone mexicana L. [Papaveraceae]</td>
<td>Khomthokpi</td>
<td>Leaves</td>
<td>Taken fresh orally</td>
</tr>
<tr>
<td>Botanical name (Family)</td>
<td>Local name</td>
<td>Plant Parts Used</td>
<td>Process of utilization</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------</td>
<td>------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td><em>Azadirachta indica</em> A. Jussieu (Meliaceae)</td>
<td>Neem</td>
<td>Leaves</td>
<td>Fried in oil and taken orally in jaundice</td>
</tr>
<tr>
<td><em>Benincase hispida</em> (Thunberg)</td>
<td>Torbot</td>
<td>Fruit</td>
<td>Boiled in water and taken orally in jaundice</td>
</tr>
<tr>
<td><em>Cogniaux</em> [Cucurbitaceae]</td>
<td>Ureirom</td>
<td>Leaves</td>
<td>Crushed leaves taken orally in jaundice</td>
</tr>
<tr>
<td><em>Bixa orellana</em> L. [Bixaceae]</td>
<td>AwathabFru</td>
<td>Its</td>
<td>Crushed leaves taken orally</td>
</tr>
<tr>
<td><em>Cajanus cajan</em> L. [Fabaceae]</td>
<td>Arhar haoi</td>
<td>Tender leaves</td>
<td>Crushed leaves taken orally</td>
</tr>
<tr>
<td><em>Centella asiatica</em> (L.) Urban [Apiaceae]</td>
<td>Peruk</td>
<td>Whole plant</td>
<td>Boiled in water and extract taken orally in jaundice</td>
</tr>
<tr>
<td><em>Chenopodium ambrosiodes</em> L. [Chenopodiaceae]</td>
<td>Monshaobi</td>
<td>Leaves</td>
<td>Crushed leaves taken orally</td>
</tr>
<tr>
<td><em>Cinnamomum obtusifolium</em> Nees [Lauraceae]</td>
<td>Ram tejpait</td>
<td>Bark</td>
<td>Dried, powdered and taken orally in jaundice</td>
</tr>
<tr>
<td><em>Cuscuta reflexa</em> Roxburgh [Cuscutaceae]</td>
<td>Swarnalata</td>
<td>Plant</td>
<td>Boiled in water and extract taken orally in jaundice</td>
</tr>
<tr>
<td><em>Garcinia cowa</em> Roxburgh [Clusiaceae]</td>
<td>Heibung</td>
<td>Young fruit</td>
<td>Eated fresh</td>
</tr>
<tr>
<td><em>Lycopus annotinum</em> L. [Lamiaceae]</td>
<td>Club-mosses</td>
<td>Whole plant</td>
<td>Crushed and taken orally</td>
</tr>
<tr>
<td><em>Mentha arvensis</em> L. [Lamiaceae]</td>
<td>Nungshihidak</td>
<td>Leaves</td>
<td>Extract or paste taken orally in jaundice</td>
</tr>
<tr>
<td><em>Neptunia oleracea</em> Loureiro [Mimosaceae]</td>
<td>Ekaithabi</td>
<td>Leaves</td>
<td>Fresh leaves crushed and taken orally in jaundice</td>
</tr>
<tr>
<td><em>Nyctanthes arbor-tristis</em> L. [Oleaceae]</td>
<td>Singgralei</td>
<td>Bark and roots</td>
<td>Dried, powered and taken orally in liver complaints</td>
</tr>
<tr>
<td><em>Pavetta indica</em> L. [Rubiaceae]</td>
<td>Kukurchura</td>
<td>Roots</td>
<td>Dried, powered and taken orally in jaundice</td>
</tr>
<tr>
<td><em>Phlogacanthus thyrsiflorus</em> (Roxburgh) Nees [Acanthaceae]</td>
<td>Nongmangkhamsamubi</td>
<td>Leaves</td>
<td>Fresh or fried taken orally in jaundice</td>
</tr>
<tr>
<td><em>Punica granatum</em> L. [Punicaceae]</td>
<td>Kamphoi</td>
<td>Seeds</td>
<td>Taken orally with honey in liver problems</td>
</tr>
<tr>
<td><em>Saccharum officinarum</em> L. [Poaceae]</td>
<td>Chu</td>
<td>Stem</td>
<td>Juice taken orally during day time in jaundice</td>
</tr>
<tr>
<td><em>Saraca indica</em> Roxburgh [Caesalpiniaceae]</td>
<td>Ashok</td>
<td>Stem</td>
<td>Extract taken orally in jaundice</td>
</tr>
<tr>
<td><em>Terminalia arjuna</em> (Roxburgh) Wight &amp; Amott [Combretaceae]</td>
<td>Arjun</td>
<td>Bark</td>
<td>Dried, powered and taken orally with milk in liver diseases</td>
</tr>
<tr>
<td><em>Tinospora cordifolia</em> (Wildenow) Ningthou-khongli [Menispermacae]</td>
<td>Whole plant</td>
<td>Extract taken orally against enlarged liver</td>
<td></td>
</tr>
<tr>
<td><em>Trichosanthes dioica</em> Roxburgh [Cucurbitaceae]</td>
<td>Kwakthabi</td>
<td>Fruits</td>
<td>Fresh fruits taken orally in jaundice</td>
</tr>
</tbody>
</table>

**LITERATURE CITED**


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Some Antipyretic Ethno-medicinal Plants of Manipuri community of Barak Valley, Assam, India

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Abstract

This ethnobotanical survey was carried out to collect the information on the use of some antipyretic activity plants used by Manipuri community of Barak valley, Assam. A total of 26 nos. of antipyretic plant species belonging to 20 families and 23 genera have been recorded through structured questionnaires in consultations with the community practitioners. For curing fever the use of aboveground plant parts was higher (65.38%) than the underground plant parts (15.38%). Of the aboveground plant parts, leaf was used in the majority of cases (13 species), followed by whole plant part (5 species), fruit (1 species), bark (1 species), flower (2 species), root (2 species), and rhizome (2 species), were also found to be in use by the Manipuri community of Barak valley, Assam having antipyretic activity plants. The present paper implies the potential of the traditional knowledge for the mankind. Some of the interesting plants are *Canna indica* L., and *Dactyloctenium aegyptium* (L) P. Beauv.

Key words: Manipuri community, Barak valley, traditional knowledge

Introduction

Fever is associated with liver cell damage, viral infection, cold, cough etc. in our body. In nature there is so many types of plants which has some antipyretic activity are available. It is believed that the herbal medicine is the best one because it has no side effect in our body. Southern Assam is one of the remotest parts of N.E India & is also equally
significant so far as the medicinal plant research is concerned. Many traditional formulating medicines are available here for treating different types of diseases like Hepatitis, cancer, ulcer etc. from generation after generation.

The Barak valley is the southernmost part of the Assam and comprises three districts namely Cachar, Karimganj and Hailakandi. The inhabitants of these areas are Bengali, Hmar, Manipuri, Kuki, Dimasa, and other different types of tribal people. Manipuri is a Mongolian type of community inhabited in 18 villages of these three districts. Many of them still depend on medicinal plants for the treatment of different ailments. But with the modern civilization, their traditional knowledge on medicinal plants are going to be extinct. Some of the works related to the medicinal plants of Barak valley, Assam are Ethno medicinal uses of plants by Manipuri and Barman communities of Cachar district, Assam (Das et al., 2003), Diversity and conservation of medicinal plants in Barak valley, Northeast India (Barbhuiya et al., 2009), Environment ethics in the culture of Meeties from North east India (Singha et al., 2001), Traditional use of medicinal plants by the Jaintia tribes in North Cachar Hills district of Assam, northeast India (Sajem et al., 2006), Some observations on the status of medicinal plants of Barak valley(Saha et al., 2003), Economic development of Assam (Bhattacarya 1998) Ethnobotany of Barak Valley (Southern Assam) with special reference to folk medicine (Nath and Maiti, 2003), Flora of Assam Vol. I-IV (Kanjilal, et al., 1934-40) published by the Govt. of Assam, A few Ethnogynaecological Records from the state of Assam’ (Gogoi et al., 1979) etc.

Comparatively very less attention has been given by the ethno botanists for exploring the ethnomedicinal resources of the Barak valley, Assam. This survey was done to explore more about the diversity of valuable ethnomedicinal plants of this valley.

Materials and Methods

The field survey was carried out during 2007 to 2008 covering all seasons to collect information on the plants having antipyretic activity used by the Manipuri people inhabited villages of Bibigram, Lakhipur, Jaribond, Moagalpur, Echaper, Katlicherra, Dulabcherra respectively located in the three districts of the Barak valley, Assam.

Plants have been collected in their flowering and fruiting stage as far as possible from the natural habitat. While collecting the individual plant species a thorough observation have been made regarding the location, natural habitat, distribution pattern, nature of roots, tubers, bulbs or rhizomes, etc. Methodologies as suggested by Schultes
(1960 and 1962), Jain (1964, 1967, 1987, 1989) and Ford (1978) have been followed using collection of information on ethnomedicobotanical aspects. The information about the antipyretic plants, have been gathered from the village old men, medicine man, even local men, women and cultivators using semi-structured questionnaires. Data on each plant have been recorded on their family, vernacular name, occurrence and process of utilization by the Manipuri for antipyretic effect.

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. The collected plants were identified by consulting a no. of Floras 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 2 (Deb, 1981,1982), Assam University herbarium sheets collection etc. One each set of identified herbarium sheets have been deposited in the Herbarium of Department of Life Science, Assam University, Silchar.

Results

(1) Name of the plant: *Andrographis paniculata* Nees.
Family: Acanthaceae
Vernacular name: Vabuti.
Occurrence: It is commonly cultivated in home garden.
Process Of Utilization: The fresh juice of the leaves along with honey is prescribed in fever.

(2) Name of the plant: *Azadirachta indica* A.Juss
Family: Meliaceae.
Vernacular name: Neem
Occurrence: Commonly cultivated in home gardens.
Process Of Utilization: The fresh leaves are useful household remedy in fever.

(3) Name of the plant: *Bixa orellana* Linn.
**Family:** Bixaceae.
**Vernacular name:** Ureirom.
**Occurrence:** It is found in home garden.
**Process Of Utilization:** The bark decoction has antipyretic effect.

(4) **Name of the plant:** *Canna indica* L.
**Family:** Cannaceae.
**Vernacular name:** Laphurei.
**Occurrence:** It is cultivated in the flower garden.
**Process Of Utilization:** The crushed fresh root is given in fever.

(5) **Name of the plant:** *Cassia fistula* L.
**Family:** Caesalpinaceae.
**Vernacular name:** Chahui.
**Occurrence:** It is cultivated in home garden for its beautiful flowers.
**Process Of Utilization:** The decoction of the flower is given in chronic fever.

(6) **Name of the plant:** *Coptis teeta* Wall.
**Family:** Ranunculaceae.
**Vernacular name:** Urihangampal.
**Occurrence:** It grows wild.
**Process Of Utilization:** The decoction of leaves is prescribed in fever.

(7) **Name of the plant:** *Curcuma longa* L.
**Family:** Zingiberaceae.
**Vernacular name:** Yaingang.
**Occurrence:** It is cultivated in vegetable garden.
**Process Of Utilization:** The juice of the rhizome is useful in fever.

(8) **Name of the plant:** *Cuscuta reflexa* Roxb.
**Family:** Cuscutaceae.
**Vernacular name:** Swarnalata.
**Occurrence:** It is a total parasite grows in the tree found along the road sides.
Process Of Utilization: The boiled plant is considered in chronic fever.

(9) Name of the plant: *Cyperus rotundus* L  
Family: Cyperaceae.  
Vernacular name: Shembangkaothum.  
Occurrence: it is a herb that grows wild in nature.  
Process Of Utilization: The crushed extract of the roots is prescribed in fever.

(10) Name of the plant: *Dactyloctenium aegyptium* (L) P.Beauv.  
Family: Gramineae.  
Vernacular name: Pungphai.  
Occurrence: It is found along the road side, with vegetable garden etc.  
Process Of Utilization: The juice of the fresh plant is used in fever.

(11) Name of the plant: *Eclipta prostrate* Roxb  
Family: Asteraceae.  
Vernacular name: Uchishumbal.  
Occurrence: it is found in wild nature along with the vegetable garden, road side , bank of a water pool etc.  
Process Of Utilization: The juice of the leaves along with the honey is recommended in fever.

(12) ) Name of the plant: *Hedyotis diffusa* Wild.  
Family: Rubiaceae  
Vernacular name: Limorui.  
Occurrence: it is found in wild nature.  
Process Of Utilization: The decoction of the plant is recommended in intermittent fever.

(13) Name of the plant: *Helianthus annus* L.  
Family: Asteraceae.  
Vernacular name: Numitlei.  
Occurrence: It is cultivated in the flower garden.  
Process Of Utilization: The decoction of the leaves and flowers along with honey is
prescribed in malarial fever.

(14) **Name of the plant:** *Hibiscus abelmoschus* L.  
**Family:** Malvaceae.  
**Vernacular name:** Shamal moturi.  
**Occurrence:** It is cultivated in vegetable garden.  
**Process Of Utilization:** The decoction of the leaves is given in typhoid fever.

(15) **Name of the plant:** *Hydrocotyle sibthorpioides* Lam.  
**Family:** Umbelliferae  
**Vernacular name:** Paruklei  
**Occurrence:** It grows wild and also cultivated.  
**Process Of Utilization:** The juice of the plant along with honey is prescribed in typhoid fever.

(16) **Name of the plant:** *Kyllinga triceps* Rotlb.  
**Family:** Cyperaceae.  
**Vernacular name:** Chumthang achouba.  
**Occurrence:** It grows wild.  
**Process Of Utilization:** The decoction of the plant is given in fever.

(17) **Name of the plant:** *Momordica charantia* L.  
**Family:** Cucurbitaceae.  
**Vernacular name:** karanaakhabi.  
**Occurrence:** It is cultivated in vegetable garden.  
**Process Of Utilization:** The fresh juice of the leaves is given in fever.

(18) **Name of the plant:** *Nyctanthes arbor-tristis* Linn.  
**Family:** Oleaceae.  
**Vernacular name:** Singgralei.  
**Occurrence:** It is cultivated in the flower garden.  
**Process Of Utilization:** The juice of the fresh leaves is prescribed in chronic fever.
(19) **Name of the plant:** *Ocimum americanum* L.  
**Family:** Labiatae.  
**Vernacular name:** Tulsiamuba.  
**Occurrence:** Commonly cultivated in home garden.  
**Process Of Utilization:** The juice of the leaves along with the honey is given in fever.

(20) **Name of the plant:** *Ocimum gratissimum* L.  
**Family:** Labiatae.  
**Vernacular name:** Ramtulsi.  
**Occurrence:** It is also cultivated in home garden.  
**Process Of Utilization:** The juice of the leaves along with the honey is prescribed in fever.

(21) **Name of the plant:** *Ocimum sanctum* L.  
**Family:** Labiatae.  
**Vernacular name:** Tulsi  
**Occurrence:** It is a holy plant that cultivated in every home garden.  
**Process Of Utilization:** The juice of the leaves along with the honey is recommended in fever.

(22) **Name of the plant:** *Phlogacanthus thyrsiflorus* (Roxb) Nees.  
**Family:** Acanthaceae.  
**Vernacular name:** Nongmangkha amubi.  
**Occurrence:** commonly cultivated in home garden.  
**Process Of Utilization:** The decoction of the leaves is prescribed in fever.

(23) **Name of the plant:** *Piper betle* L.  
**Family:** Piperaceae.  
**Vernacular name:** Panamana.  
**Occurrence:** It is widely found in forest area.  
**Process Of Utilization:** The juice of the leaves along with the honey is useful in fever.

(24) **Name of the plant:** *Thevetia nerifolia* Juss.  
**Family:** Apocynaceae.
Vernacular name: Utonglei.
Occurrence: It is commonly cultivated in flower garden.
Process Of Utilization: The outer cover of the fruits are prescribed in chronic fever.

(25) Name of the plant: Tinospora cordifolia (Wild) Miers.
Family: Menispermaceae.
Vernacular name: Ningthou-khongli
Occurrence: It is found in forest area.
Process Of Utilization: The extract of the whole plant antipyretic.

(26) Name of the plant: Zingiber officinale Rosc.
Family: Zingiberaceae.
Vernacular name: Shing.
Occurrence: It is commonly cultivated in vegetable garden.
Process Of Utilization: The rhizome juice is mixed with honey is prescribed for cold fever.

Discussion
The present study revels the great diversity of antipyretic plants in this southern part of Assam and their uses for human kind. It has been found that the use of aboveground plant parts was higher (65.38%) than the underground plant parts (15.38%). In present investigation out of 26 antipyretic plants that are collected from different areas of Barak valley, Assam, the highest number of plants are used from the family Labiatae (3 species). Two species each from the families Acanthaceae, Cyperaceae. Rest of the families contributed either 1 or single species.

Acknowledgement
Authors are thankful to the Manipuri peoples for their valuable information and Experts from the dept. of Life science, Assam University, Silchar, Assam, India for their valuable comments while doing this survey in the Barak valley of Assam.

References


An Overview on Neptunia oleracea Lour.

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Abstract

An attempt was made to explore the ethnomedicinal, economical and biological importance of Neptunia oleracea Lour. The plant is used as 19 types of remedies like anticancer, antioxidant, dysentery etc. and as a food in the form of raw or stir-fry, biofertilizer like in the field of rice field environmental ornamental like sweet refrigerator etc. In India it is found in 25 states including Assam, Manipur, Mizoram etc. and in 3 union territories. The paper reviews the data related to scientific works carried out with the plant and listed the bioactive compounds isolated from the plant till date. Based on the review made present paper highlights the need of future research with Neptunia oleracea Lour. So that more active principles for treating new ailments can be isolated and made available from the plant.

Keywords: Neptunia oleracea Lour., Antioxidant, biofertilizer, Assam, union territories.

Introduction

Medicinal plants are practiced by many tribes, communities and people from generation after generation in different parts of world. Medicinal plants may be xerophytes, aquatic, epiphytic, etc. There are some aquatic plant which can be considered as a weed but if we search its ethnic value it is found as a multipurpose flora.e.g-Azolla which can be used as a good source of biofertilizer. This study highlights the use of an aquatic medicinal plant in the traditional medical practices of the people especially those used in treatment of chronic pain in abdomen and in joint inflammation, Anticancer, Antioxidant, and Dysentery etc. Neptunia oleracea Lour. is commonly known as water sensitive plant or water mimosa. Morphologically they look like Mimosa pudica except the presence of white spongy air filled tissues that covered the stem and absence of thorns. The white spongy tissue helps the plant in floating in the water. Their leaves close when they are touched and are found abundantly during the rainy season.

The stems of the plant is creeping, floating and rooting at the nodes. The roots are in cluster and brown in colour. The leaves are bipinnate with 2-4 pairs small in size, leaflets are found in 7-22 pairs and mostly hairless. Flowers are bright yellow in colour and have very long peduncles in sub-spherical axillary heads. The pods are shorty oblong in umbrella-like cluster, green in colour. It has an unusual smell that can be used in the identification of the plant.

Classification of the plant is as follows:-

Kingdom - Plantae.
Division — Magnoliophyta.
Class —— Magnoliopsida.
Order —— Fabales.
Family —— Fabaceae.
Tribe —— Mimosaceae.
Genus —— Neptunia
Species —— Neptunia oleracea Lour.

The plant is distributed from Africa, Asia tropical, Northern America to Southern America. In India it is found in Andhra Pradesh, Andaman and Nicobar, Arunachal Pradesh, Assam, Bihar, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Pondicherry, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal (GRIN 2006). The plant is grown in and around the ponds, lakes and swamps etc. (Hyde et al., 2009). The plant is sold as rooted or unrooted cuttings in the market.
Ethnomedicinal utility of *Neptunia Oleracea* Lour.

Exhaustive literature search showed that the plant is a good remedy for different types of ailments like, Astringent (Warrier et al., 1995), Antidiarrhoeal (Warrier et al., 1995), Anthelmintic (Warrier et al., 1995), Diuretic (Warrier et al., 1995), Anodyne (Warrier et al., 1995), In burning sensation (Warrier et al., 1995), Cardiotoxic (Pullaiah 2006), Antidote (Pullaiah 2006), Antibacterial (Pullaiah 2006), Antileptic (Pullaiah 2006), Anticancer (Pullaiah 2006), CNS depressant (Pullaiah 2006), Ophthalmia (Pullaiah 2006), Aphrodisiac (Pullaiah 2006), Pain killer and anti-inflammatory (Pullaiah 2006), Lumbago (T. 2006), Scabies (Pullaiah 2006), skin disorder (Pullaiah 2006), Hepatoprotective (Biochemistry 2020 competition, 1995), Dysentery (Jadhav, 2006), Antioxidant (Thalang et al., 2001), Stimulant (Igoli et al., 2005).

**Biological activity of Neptunia oleracea Lour.**

The plant is considered as an ornamental plant (GRIN 2006), sweet refrigerant (Warrier et al., 1995). Workers from the IBSD, Imphal 2003 reported that sixty five (65) non-symbiotic and symbiotic nitrogen fixing bacterial were isolated from this plant and are confirmed as nitrogen fixing bacteria and a good source of biofertilizer in the wet land rice field. The leaves, stems, shoot tips, young pods are taken as raw or store in different parts of world. A report has been made from Cochin China that the spongy tissue crisped and juice is taken as food but it is not an easily digestible food item (Sturtevant 1919). *Neptunia oleracea* Lour. may increase water loss from dams through increased evaporation via water transpiration through its leaves and as well as offering quality grazing to livestock (Hannan et al., 2008). This plant has a great potential as aquatic vegetables and weed. The energy value of the edible portion of shoots (per 100 g) is shown in the table below (Table-1) (Hannan et al., 2008).

<table>
<thead>
<tr>
<th>Compound</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture</td>
<td>89.4 g</td>
</tr>
<tr>
<td>Protein</td>
<td>6.4 g</td>
</tr>
<tr>
<td>Fat</td>
<td>0.4 g</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>0.8 g</td>
</tr>
<tr>
<td>Fibre</td>
<td>1.8 g</td>
</tr>
<tr>
<td>Ash</td>
<td>1.2 g</td>
</tr>
<tr>
<td>Ca</td>
<td>887 mg</td>
</tr>
<tr>
<td>P</td>
<td>7 mg</td>
</tr>
<tr>
<td>Fe</td>
<td>5.3 mg</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>5155 IU</td>
</tr>
<tr>
<td>Vitamin B1</td>
<td>0.12 mg</td>
</tr>
<tr>
<td>Vitamin B2</td>
<td>0.14 mg</td>
</tr>
<tr>
<td>Niacin</td>
<td>8.2 mg</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>1.8 mg</td>
</tr>
</tbody>
</table>

Table-1: The table shows the energy value of *Neptunia oleracea* Lour. per 100 g of shoots.

**Compound isolated from Neptunia oleracea Lour.**

A chlorophyll related compound, Pheophorbide a, has been isolated from the leaves of *N. oleracea* Lour that inhibites the action of tumour promoter, induced Epstein-Barr virus in ICR mouse skin (Nakamura et al., 1996). A flavonol glycoside has been isolated from *Neptunia oleracea* Lour by Yadava and Tiwari in the year 2003. Ri = R1 = CH3, R2 = CH3COOH, R3 = COOH, X1 = O and X2 = OH, these pheophorbide derivative compounds have a great potential as...
An overview on Neptunia

Antineoplastic agents that will be inexpensive and which can be taken orally to large amount as a potential therapy for cancer, or possibly as a dietary supplement to prevent chemotherapy that has been isolated from *Neptunia oleracea* Lour. (Brooks et al., 2007).

**Conservation status of Neptunia oleracea Lour.**

According to the report given by S. Sahoo (2001) three species of aquatic plants like *Neptunia oleracea* Lour. *Trapa natans* and *Scirpus grossus* will vanish or become rare all over Jaipur, India.

In Nigeria the management of water resources are undertaken by Research Institute of Oceanography & Marine Research. The National Institute for Freshwater Fisheries Research is responsible for various research programmes on fisheries and other aquatic resources, Federal Environmental Protection Agency (FEEPA) is responsible for monitoring pollution and safety aquatic resources and National Resources Conservation Council is responsible for monitoring and conservation of natural resources including water and aquatic resources.

In India current researches are going on assessments of contribution of *Neptunia oleracea* Lour. nodule bacteria on rice and creation of gene pool efficient *Azospirillum* strains for utilization in legume crops by Current Institution Research and Development activities. The dept. of Biotechnology, Ministry of Science and Technology, Govt. of India establishes the IBSD, Imphal during the year 2001 to realize the importance of rich biodiversity and unique bioresources of N.E. Regions of India which falls within the Indo-Burma biodiversity hotspot through biotechnological interventions for socio-economic growth.

**Future research needs with Neptunia oleracea Lour.**

Some research work like antibacterial, characterization of different strains of nodule bacterium, antitumor promoter activities, antioxidant activities have been carried out with *Neptunia oleracea* Lour. A chlorophyll related compound, Phosphorbid e a and A flavonoid glycoside compounds are isolated from this plant. It has been observed that most of the research work was carried out in the characterization of the nodule bacterium of this leguminosae flora. In traditional medicine it is used in the treatment of different types of diseases (19) but very few biological activities have been undertaken to prove the traditional claims. So far as isolation of bioactive principles is concerned, only three compounds have so far been isolated from the plant except the traditional potentials of the plant in which following researches may be undertaken with *Neptunia oleracea* Lour.

1. Hepatoprotective activity of leaves of the plant and isolation of hepatoprotective active principles of the plant.
2. Astringent, Antidiarrhoeal, Aphrodisiac and Anthelminthic activities of the plant by phytochemical and biological screening methods.
3. Diuretic and Analgesic effects of the plant and its related compounds on the animals.
4. The plant may be evaluated for its use in burning sensation, Lumbago, Scabies and skin disorders.
5. The cardiotonic, Antidote and Antileptic mechanism of the compounds present in the plant may be studied by biological screening process.
6. CHS depressant, Ophthalmic and anti-inflammatory activities of the plant and its related compounds may be studied.
7. Dysentery and Stimulant properties of the plant by observing chemical and biological entities of the plant.

**Conclusion**

This aquatic weed has the capability to cure 19 types of human ailments like cancer, jaundice, skin disoder etc. In some part of the World *Neptunia oleracea* Lour. is used as a biofertilizer, vegetable, ornamental & in the treatment of contaminated water etc. In the Barak valley, Assam, India this plant is sold as rooted and unrooted stem with white spongy tissues. A report has been found
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that *Neptunia oleracea* Lour. is mostly preferred as a hepatoprotective and vegetable aquatic plant by the Manipuri community of this valley. In Barali valley, Assam, India *Neptunia oleracea* Lour. is found only in the rainy season.

*Neptunia oleracea* Lour. has a great potential as a vegetable, biofertilizer and medicinal plant. So, more phytochemical, biological studies are required to be done, so that structural, functional and economic status of the plant can be known in detail.

References


