

## Some Anti-diarrhoeic and Anti-dysenteric Ethno-medicinal Plants of Mao Naga Tribe Community of Mao, Senapati District, Manipur

Sunita Gurumayum<sup>1\*</sup> and Jiten Singh Soram<sup>2</sup>

<sup>1</sup>Dept. of Botany, Asufii Christian Institute, Mao, Senapati District, Manipur-795150

<sup>2</sup>Dept. of Zoology, Asufii Christian Institute, Mao, Senapati District, Manipur-795150

\*Corresponding Author E-mail: justienaone@gmail.com

### ABSTRACT

*Diarrhoea and dysentery are the important causes of mortality in the developing countries till today. On the other hand, Manipur state as a whole lies in the Indo-Burma Biodiversity hot spot owing to which harbours diverged plants supporting about 50% of India's biodiversity. Mao Naga tribe inhabits the Mao area, located at a unique geographic, climatic and topographical area in Senapati district of Manipur. The people of Mao Naga tribe think themselves to have migrated from China through oral storytelling and have a distinct colourful culture and tradition in which traditional system of medicine forms a large part. However, this vast body of ethno-botanical knowledge has remained largely unexplored. Thus, an ethno-medicinal survey has been conducted with the help of local volunteers and accordingly this paper has a record of 45 plant species being used in traditional medicine belonging 41 genera and 28 families for treating diarrhoea and dysentery. The family Asteraceae has maximum species representation of six followed by the family Zingiberaceae with five recorded species. Leaves were the maximum parts used compared to the other parts with their 34.3% usage, followed by fruit (15%) and bark (12%). The study also showed an immense potential for ethno-botanical research in the area.*

**Key words:** Mao tribe, diarrhoea, dysentery, medicinal plant, treatment.

### INTRODUCTION

Diarrhoea comes from the Greek word *diarrhoia*. *Dia* means "flow" and *rrhoia* means "through" and the term "flowing through (diarrhoea)" was coined by Hippocrates. Thus, diarrhoea is a condition that involves the frequent passing of loose or watery stools. It usually affects the smaller bowel and the infection is confined to the upper epithelial layers of the intestinal lumen. There is no cell death in such condition and the infection is caused due to the release of toxins by the infecting pathogens. The disease is characterized by increased frequency of bowel movement, wet stool and abdominal pain. Children are more susceptible to the complications of diarrhoea because, a smaller amount of fluid loss leads to dehydration as compared to adults and is the second largest cause of death among children in developing countries. On the other hand, dysentery is bloody diarrhoea in which the loose or watery stools contain visible red blood cells and mucus. Dysentery is most often caused by *Shigella* species (bacillary dysentery) or *Entamoeba histolytica* (amoebic dysentery). When a person gets dysentery, the upper epithelial cells are attacked and destroyed leading to the ulceration of the colon. It is accompanied by fever at times and the patient usually complains of cramps and pain in the lower abdomen. Thus, either diarrhoea or bloody diarrhoea forms an important cause of mortality all over the world especially in the developing countries<sup>13</sup>. Globally, an estimated 1.8 billion diarrhoeal death among children occur every year<sup>35</sup>. According to the World Health Organization (WHO) approximately 3.5 million deaths each year are also attributable to diarrhoea and 80% of those deaths occur in children under the age of 5 years. Many public and private research institutions are trying to control this disease, but the rate of diarrhoeal death incidence is still high in developing countries<sup>21</sup>.

Manipur is one of the small hilly states situated at the north eastern extreme corner of India that connects the Indian sub continent to East Asia as a unique passageway<sup>7</sup>. The state lies between 23.80°N and 25.68°N latitudes and 93.03°E and 94.78°E longitudes. It is bounded on the east by the Somra tract and the upper Chindwin areas of Myanmar, on the west by the Cachar hills of Assam, on the north by the Naga Hills of Nagaland, and on the south by the Chin Hills of Myanmar. The state has a total area of 22,327 sq. km. where in around 92% of the land is hilly area which surrounds the central bowl shaped valley formed by the deposits of alluvial soil valley area of about remaining 8 percent<sup>22</sup>. The State has a vast forest cover of 17,090 square km. which is 76.54% of the State's total geographical area of 22,327 square km. In terms of forest canopy density classes, the State has 730 sq.km areas under very dense forest, 6,151sq.km area under open forests. Numerous ethnic groups inhabit both the hill and valley area, thereby forming a diverged cultural and ethnic background<sup>28</sup> and Mao Naga tribe is one among them. Besides ethnic and cultural diversity, the region also lies in the Indo-Burma biodiversity hotspot, forming a unique bio-geographic province harbouring major biomes recognized in the world. It has the richest reservoir of diverged plant and supports about 50% of India's biodiversity<sup>20</sup>.

The Mao Naga tribe inhabits in over forty villages of the northern hills of Senapati District of Manipur state which lies between latitude 23.83°N to 25.68°N and longitude 93.03°E and 94.78°E. Modern Naga historians brought out the migration theory of the tribe through story telling that one of the Naga groups moved out during the reign of emperor of China, Qin Chin Haungchi, who built the Great Walls of China about 215 B.C. to keep out Mongols. There was mass exodus during this period as the emperor demanded forced labour, heavy taxation from his subjects and this led to discontentment among the population starvation, exhaustion and the political unrest. The oral tradition also says, Ikhro river is one of the tributaries feeding Barak river on which the forefathers en-route to Makhel Village and settled down there. Many of the Naga tribes trace their place of origin or point of their migration to this Makhel of Mao and its surrounding area<sup>4</sup>. They belong to the Mongolian stock and speak Tibeto-Burmese language, and have socio-cultural affinities with the Southeast Asia<sup>3</sup>. They have a very rich culture and traditional practices which is unique of its own. They are settled as agricultural community. In general the agricultural practices of the Mao tribe are considered to be the most advance form amongst the various Naga tribes in North-east India<sup>19</sup>. They are closely associated in various ways with their surrounding, landscape and resources mainly plants and animals for their day today requirements. They still follow their traditional beliefs including botanical folklore and adhere to the traditional ways. Thus, these ethnic people living in the remote areas used a variety of indigenous traditional medicinal plants as their folk medicine since time immemorial and various traditional indigenous medicinal plants play a vital role in making of traditional remedies of various diseases in the absence of medical facilities. It has also been reported of a long history of use of the ripen fruits of *Rhus javanica* (a small tree abundant grown in the hilly areas of Manipur, north-east India) as traditional medicine used among the traditional healers of Naga tribal community in Manipur, used to treat diarrhoea and dysentery as well as the other gastrointestinal disorders<sup>33</sup>.

There has been a massive technological advancement in the field of modern medicine, but many people in the developing countries still depend on medicinal plants for their daily health care requirements<sup>13</sup>. Even the world health organization (WHO) has started a diarrhoea disease control program to study traditional medicine practices and other related aspects, together with the evaluation of health education and prevention approaches<sup>34, 1</sup> and as such there are several works done on ethno-botany, medicinal plants and traditional techniques from the northeast region by various workers on different ethnic tribal communities. There are some worth mentioning reports of works done on ethno medicinal plants used by the different tribal communities from Northeast India viz. the north Cachar hills<sup>29</sup>; Tai-Khamyangs of Assam<sup>30</sup>; Sikkim<sup>31</sup>; Tinsukia, Assam<sup>5</sup>; Apatani, Arunachal Pradesh<sup>16</sup>; Angami-a, Nagaland<sup>23</sup> etc. There has also been several works done from the state of Manipur in the subject such as the report on the plants used by meitei community of Manipur for the treatment of diabetes by A. Premila Devi<sup>2</sup>; documentation of medicinal plant from among Zou tribes for the treatment of diarrhoea and dysentery by H. Esther

Gangte et al<sup>12</sup>; traditional knowledge of kidney stones treatment by muslim maiba (herbalists) of Manipur, India by M. M. Ahmed and P. K. Singh<sup>24</sup>; herbal folk medicines used for urinary and calculi/stone cases complaints in Manipur reported by Lokendrajit N. et al<sup>18</sup>; a report on ethno-botany of Chothe tribe of Bishnupur District(Manipur) by S. Purbashree et al<sup>25</sup>etc. Prof. R.K. Mutatkar, President, IASTAM and Chairman, Dept. of Health Sciences, University of Pune also has pointed out that, people need to rediscover kinship with plants that give their food and medicine, re-establish Man-Nature relationship in curative medicine as plant medicine cure methods in the treatment of diseases have been claimed to have no side effects and they are cheaper than modern medicine. However, there are no reports on the detailed practice on the usage of folk medicinal plants by Mao Naga for a particular disease. Besides this, the medicinal plants and the practice of their usage is facing a serious threat owing to modernization, deforestation and lack of proper written records passed down from generation to generation. Thus, in the backdrop of above facts, the present work is an attempt to assess, study and document the folk medicinal plants and their usage by the Mao Naga of Mao for curing of diarrhoea and dysentery which is one of the most common diseases in the region. It is also wished that, the extrapolation of this data might be of help to the future researchers in their pursuit of further in-depth study in the area.

### MATERIALS AND METHODS

Survey of anti-diarrhoeal and anti-dysenteric plants were done for a period of one year (January to December, 2009) with the help of local volunteers. Detail information regarding the medicinal plants, part of the plants used, how they are used etc. were extracted consulting local practitioners, elders and knowledgeable villagers. The data were collected in a comprehensive questionnaire format. As far as possible the validity of the information collected were again counter checked and confirmed by direct interaction with the patients who use these medicinal plants. Small herbs were collected as a whole whereas twigs were collected in case of climbers, shrubs and trees. The collected plant specimens were identified based on published literatures of Hooker<sup>11</sup>, Kanjilal et al<sup>15</sup>, Deb<sup>9</sup><sup>10</sup>, Bor<sup>6</sup>, Sinha<sup>32</sup> and Joshi<sup>36</sup> and correct nomenclature were given to the specimens.

### RESULT AND DISCUSSION

In the present ethno-medicinal study on the use of traditional herbal medicine among the Mao tribe of Mao with special reference to the treatment of diarrhoea and dysentery, a total of 45 different medicinal plant species belonging to 41 genera and 28 different families have been recorded. The people of Mao tribe community of Manipur have been using these plants as an alternative to modern medicines for the treatment of diarrhoea and dysentery. Local elders and practitioners possess rich traditional knowledge based on locally available resources of plants for the management of many diseases or disorders including diarrhoea and dysentery. Through them it has also been learned that some of the plants viz. *Ageratum conyzoides*, are exotic and have reached the area along with the fodder of Horse brought by the Indian Army in 1960s. Table-1 shows the scientific name, family, vernacular name, common English name of the plants, parts used and method of their preparation. The family Asteraceae has been found to have maximum species representation numbering six followed by the family Zingiberaceae with five recorded species. The Fabaceae family has been found to be represented by four species and five families viz. Acantheaceae, Anarcadiaceae, Lamiaceae, Euphorbiaceae and Rubiaceae were recorded to be represented by two/two species each. The remaining 20 families viz. Polygonaceae, Saurauraceae, Apiaceae, Rutaceae, Araliaceae, Ranunculaceae, Bengoniaceae, Solanaceae, Meliaceae, Delleniaceae, Xanthorrhoeaceae, Vervanaceae, Passifloraceae, Mussaceae, Myrtaceae, Malvaceae, Cyperaceae, Rosaceae, lythraceae and Poaceae have been recorded with only one/ one species representation. As far as the plant parts used for the treatment is concerned, leaves were the maximum parts used comparing to the other parts with their 34.3% usage followed by fruit (15%) and bark (12%). The details are given in the table-2 and graph-1. Similar studies have also been taken up by many authors in different fields and areas. Such studies also validate the present work. Das et al<sup>8</sup> has documented a total of 8 species of medicinal

plants used by the *Zeme (Naga)* tribes of North Cachar Hills which were found to be distributed across 8 families. Different parts of the plants were used by the *Zemes* as medicine. *Tamarindus indicus* has been reported for the treatment of snakebite by the Hmar tribe of Cachar district whereas the *Zeme (Naga)* tribe of the area uses the same in the treatment of diarrhoea. The use of *Psidium guyava* by the *Hmars* and *Reangs*<sup>8</sup> also validates the reported use of the same species by the people of Mao in the present study for the same diseases. Besides these, there are also the reports of some of the plants recorded in the present study being used in the treatment of the diseases viz. *Adhatoda vesica*, *Alstonia scholaris*, *Punica granatum*, *Solanum nigrum*<sup>27</sup>; *Adhatoda vesica* and *Punica grantum* in Dir Kohistan valley<sup>14</sup>; *Musa paradisiacal*, *Punica grantum*, by the people of Gond tribe<sup>26</sup>; *Oroxylum indicum* by Chothe tribe of Manipur<sup>25</sup>; *Callicarpa arborea* and *Mikania micrantha* in western Mizoram<sup>17</sup> etc. Thus, the present study has revealed that the Mao Naga tribes' knowledge about the medicinal use of plants is vast and genuine.

**Table-1. Ethnomedicinal plants used by Mao Naga tribe of Mao, Senapati district, Manipurs**

S.No.	Scientific name	Vernacular name	English name	Family	Parts used	Usage pattern
1.	<i>Polygonum orientale</i> Linn.	Obuvii	Smartweeds.	Polygonaceae	Leaves	Fresh leaves are boiled with or without rice and serve the patient suffering from serious diarrhoea and dysentery for quick relief.
2.	<i>Paederia foetida</i> Linn.	Oboripro	Chinese Fever Vine	Rubiaceae	Leaves	Fresh leaf juice is mixed with water and given to relief gastritis/acidity.
3.	<i>Elsholtzia ciliata</i> Thunb.	Nopiu	Late-summer mint	Lamiaceae	Leaves	Fresh leaves extract is given to treat gas formation and quick relief from stomach upset.
4.	<i>Rhus semialata</i> Linn. or <i>Rhus chinensis</i>	Omoshii	Chinese galls or nutgall tree	Anacardiaceae	Fruits	Fresh leaf or dried ripen fruit decoction is used for treating dysentery and diarrhoea.
5.	<i>Gynura bicolor</i> DC.	Tabovii	Okinawan spinach	Asteraceae	Leaves and young stems	Leaves along with the young stems is boiled with or without rice and is taken for treating gastritis/ chronic acidity
6.	<i>Zanthoxylum armatum</i> DC	Momo mochu	Prickly-ash or Hercules' Club.	Rutaceae	Fruits	The whole fruit is crushed and applied on the abdomen or three to five seed's fleshy covers are chewed and taken for stomach, stomach disorder and expulsion of gas from the stomach.
7.	<i>Eleutherococcus cissifolius</i> Griff.	Kosa Motsii	Eleuthero or Siberian ginseng.	Araliaceae Juss	Leaves	Leaf decoction is used to treat stomach disorder.
8.	<i>Thalictrum foliosum</i> D.C.	Okhruvii	Naga guining	Ranunculaceae	Whole plant	The whole plant is boiled or eaten raw for chronic acidity, diarrhoea and dysentery,
9.	<i>Oroxylum indicum</i> Linn.	Kakidzihe	Indian trumpet flower	Bignoniaceae	Bark and Root	Decoction of the freshly peelings of the bark and outer covering of the root is taken for Diarrhoea
10.	<i>Justicia adhatoda</i> Linn.	Kojii kakra	Malabar Nut.	Acanthaceae	Leaves and Roots	Decoction of fresh leaves, seeds and fruits is taken for acidity, abdominal pain, indigestion, appetizers
11.	<i>Physalis peruviana</i> Linn.	Tsiibobopro	Cape gooseberry or ground cherry	Solanaceae	Leaves and Fruit	The leaves are taken raw or boiled and the decoction is taken for diarrhoea and dysentery.

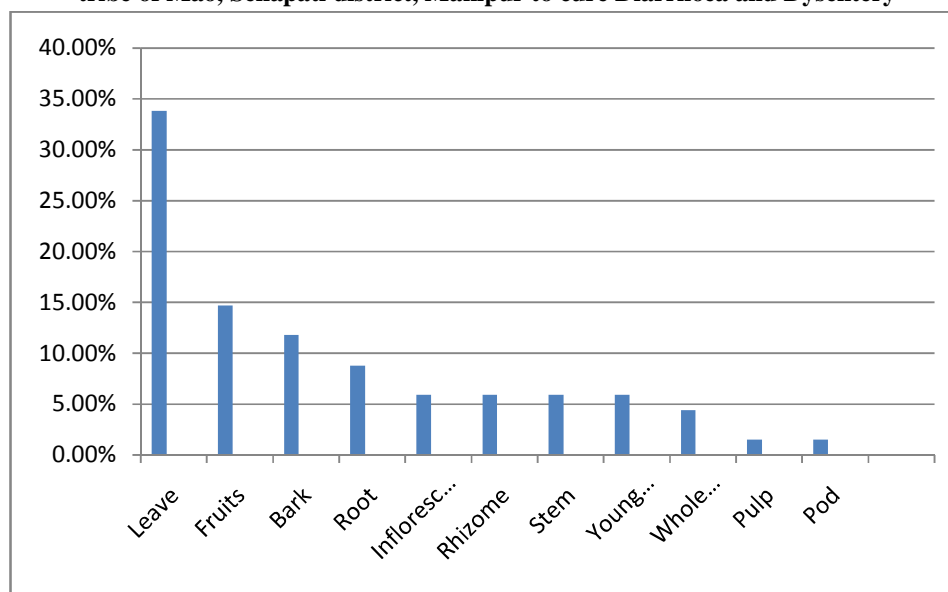
12.	<i>Passiflora edulis</i> Lindl.	Kheboshii	Passion fruit	Passifloraceae	Fruit and leaves	Fresh leaves decoction as well as the leaves is taken raw for treating dysentery, diarrhoea and stomach upset.
13.	<i>Musa paradisiaca</i> Linn.	Ovii	Bananas	Musaceae	Fruit	One to three ripe bananas is taken at a time to subdue or stop loose motion/ diarrhoea. Roasted unripe banana is also taken in serious condition of the same ailment.
14.	<i>Psidium guajava</i> Linn.	Pondoshi	Common guava	Myrtaceae	Fruit and young tender Leaves	Leaf decoction is given for treating diarrhoea and serious dysentery. The young leaves or fruits are also taken raw for the same treatment.
15.	<i>Glochidion oblatum</i> J. D. Hooker	Lokhro todru	Twining shrub	Euphorbiaceae	Stem and Root	Fresh stem and roots extracts are taken for dysentery.
16.	<i>Mentha arvensis</i> Linn.	Opfokosopro	Mint	Lamiaceae	Young shoot and Leaves	Fresh shoot juice with a pinch of common salt or a spoon of honey is given to diarrhoea patient.
17.	<i>Chrysanthemum morifolium</i> Desmond	Shiipriipa	Florist's Daisy	Asteraceae	Leaves	Young leaves are chewed raw to treat diarrhoea and dysentery.
18.	<i>Amomum dealbatum</i>		Java cardamom	Zingiberaceae	Soft stem, buds and rhizome	Fresh soft stems are eaten raw and can treat both diarrhoea and dysentery.
19.	<i>Meyna laxiflora</i>	Heibi(M)	MAY-nuh	Rubiaceae	Dried fruits	Dry fruits are eaten to treat dysentery.
20.	<i>Hibiscus sabdariffa</i>	Okhriewo	Red sorrel	Malvaceae	Fresh leaves, Dried fruits	The juice extract of leaf with a pinch of common salt is used for the treatment of gastric problem
21.	<i>Cyperus rotundus</i>	Sembang kaathoom(M)	Nut Grass	Cyperaceae	Fresh rhizomes	Crushed rhizomes are given once in the early morning.
22.	<i>Phlogacanthus thyriflorus</i>	Kojii kohho	Chuwa ful	Acantheaceae	Leaf and inflorescence	Juice extract is used in dysentery.
23.	<i>Rubus ellipticus</i>	Berry	Yellow Himalayan raspberry	Rosaceae	Root bark	The root bark is used to treat diarrhoea and dysentery.
24.	<i>Ageratum conyzoides</i>	Orepro	Goat weed	Asteraceae	Stem, Flower & Leaf	Leafy shoot decoction is used in diarrhoea, dysentery & other related ailments.
25.	<i>Houttuynia cordata</i>	Tonggo	Lizard tail	Saururaceae	Leaf and root	Used in folk medicine is widely used to expel harmful bacteria.
26.	<i>Tamarindus indica</i> Linn.	Mange or Tamarind	Indian date	Fabaceae	Pulp of unripe fruit	Unripe pulp decoction given to dysentery patient.
27.	<i>Aloe barbadensis</i> Mill.	Ghritakumar	Indian aloe	Xanthorrhoeaceae	Leaf	Leaf extract is mixed with sugar and given in dysentery.
28.	<i>Curcuma longa</i> Roxb.	Yai-ngang	Turmeric	Zingiberaceae	Rhizomes	Pulp with banana and milk given to treat dysentery.
29.	<i>Mikania micrantha</i> Kunth.	Umang-uri(M)	Bitter Vine or Climbing Hemp Vine	Asteraceae	Leaf	Juice extract of leaf given to diarrhoea and dysentery.
30.	<i>Punica granatum</i>	Kaphoi	Pomegranate	Lythraceae	Leaf, peel	Either the extract or the fresh leaf and young fruit or peel is used to treat both diarrhoea and dysentery.
31.	<i>Cucurma angustifolia</i>	Kochapa	East Indian arrow root.	Zingiberaceae	Inflorescence	The inflorescence is made into many ways to treat dysentery.
32.	<i>Emblica officinalis</i>	Choroshi	Indian gooseberry.	Euphorbiaceae	Bark	The pounded bark decoction or fresh fruits crushed with <i>Adhatoda vasica</i> leaf are eaten to treat both diarrhoea and dysentery.

33.	<i>Cynodon dactylon</i>	Fiiprii	Devil's grass	Poaceae	Whole plant	In traditional medicine the whole plant is crushed and the juice extract is used to treat indigestion.
34.	<i>Dolichos lablab</i> Linn.	Litotopa	Hyacinth bean or Indian bean	Fabaceae	Leaf and pod	The juice extract with a pinch of salt given to treat both the ailments.
35.	<i>Dillenia pentagyna</i>		Nepalese Elephant Apple.	Dilleniaceae	Bark	Pounded bark decoction is regularly given to treat both diarrhoea and dysentery.
36.	<i>Cucurma caesia</i> Roxb.	Yai-mu	Black zedoary.	Zingiberaceae	Rhizome	Juice extract of the rhizome is used for the treatment of dysentery.
37.	<i>Costus speciosus</i> Smith.		Keukand	Zingiberaceae	Rhizome, leaf and soft stem	Juice extract from Rhizome, leaf and soft stem is used for treating both diarrhoea and dysentery.
38.	<i>Centella asiatica</i> Linn.	Koraio	Asiatic pennywort or Indian pennywort	Apiaceae	Whole plant	The decoction of the plant with a pinch of salt is used for treating diarrhoea, dysentery and constipation.
39.	<i>Callicarpa arborea</i> Roxb.		Masgede (Nep)	Vervanaceae	Tender shoot and bark	Tender shoots are eaten raw and the decoction of the bark is used in diarrhoea.
40.	<i>Gynura angulosa</i>	Kolatobo	Lanceleaf Blumea	Asteraceae	Leaf	Fresh or the decoction of the leaf can relief diarrhoea and dysentery.
41.	<i>Begonia roxburghii</i> A.Dc.	Joukibarut (Rongmei)	East Himalayan Begonia	Bengoniaceae	Tuberous root stocks	Mixed with barks of <i>Parkia javanica</i> and <i>Spondias pinnata</i> decoction is used in chronic dysentery.
42.	<i>Bauhinia variegata</i> Linn.	Levoh	Orchid tree/ Mountain-ebony	Fabaceae	Bark	Decoction of the bark is given till the recovery of the diarrhoea.
43.	<i>Artemisia vulgaris</i> Linn.	Shiiprei	Common Wormwood	Aseraceae	Soft stem and leaf	Decoction of stem and leaf about ½ cup is given 2-3 times.
44.	<i>Parkia javanica</i>	Yongcha	Tree bean	Fabiaceae	Pods and bark	The pod cover peel or the bark decoction is to treat both diarrhoea and dysentery.
45.	<i>Spondias pinnata</i> Linn.	Heining(M)	Wild mango	Anacardiaceae	Tender shoot	Juice extract from the tender shoot is given for the treatment of Diarrhoea and dysentery ill recovery.

**Table-2. Percent distribution of ethno-medicinal plant parts used by Mao Naga tribe of Mao, Senapati district, Manipur to cure Diarrhoea and Dysentery**

S. No.	Plant part	Used
1.	Leave	33.8%
2.	Fruits	14.7%
3.	Bark	11.8%
4.	Root	8.8%
5.	Inflorescence	5.9%
6.	Rhizome	5.9%
7.	Stem	5.9%
8.	Young shoot	5.9%
9.	Whole plant	4.4%
10.	Pulp	1.5%
11.	Pod	1.5%

**Graph-1.: Percent distribution of ethno-medicinal plant parts used by Mao Naga tribe of Mao, Senapati district, Manipur to cure Diarrhoea and Dysentery**



### CONCLUSION

The people of Mao Naga are settled as agricultural community and they heavily depend upon the cultivated and wild plants recourses for their survival since time immemorial. In spite of the influx of modern civilization and advancement in the field of medical science, the Mao Naga people are still holding on their traditional practices and the plant medicine cure methods in the treatment of diseases. Such traditional practices have been claimed to have no side effects and they are cheaper than modern medicine. Thus, it is felt that the use of these plants to treat various illnesses is still needed by the community, owing to their poor socio-economic conditions, high cost and difficulty to access the allopathic medicines. However, on the other hand, the medicinal plants and the practice of their usage is facing a serious threat owing to modernization, deforestation and lack of proper written records passed down from generation to generation. Thus, it is felt that, there is an urgent need and attention required to document and conserve such vital resources so as to optimize their use in the primary health care system so that a long term plan on the use of herbal drugs may be arrived at. Thorough scientific study is also required to tap and harvest the medicinal constituents of the rich medicinal plant recourses of the Mao area so as to enable catering the needs of vibrant healthcare products in future. It is therefore wished that a little effort and initiative taken up by the authors might encourage our belief in traditional practices to cure diseases.

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