

# A Study on Ethnobotanically Important Plant Species Used against Various Gastro-Intestinal (GI) Disorders by the Indigenous People of Barpeta District of Assam, North-East India

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**Abstract** Plants and plant products have been used in traditional medication system to treat several human diseases since long back. The North-eastern region of India is a part of foot hills of Himalayas and Indo-Burma biodiversity hot spot and it was proved to be a home for a large number of ethnobotanically important plant species by several researchers. The present study was carried out during July, 2018 to June, 2019 for a period of one year at Barpeta district of Assam, North-East India to prepare a database on traditional knowledge of indigenous people regarding the uses of different plants to cure various Gastro-Intestinal (GI) disorders. The district is situated at a global position between 26°45'-26°50' N' latitude and 90°30'-91°51'0"E longitude. Extensive field studies were conducted in the study area to obtain firsthand information on uses of ethnobotanically important plants. Sample specimens were collected and preserved during the study period. This report has documented 55 number of plant species belonging to 38 families used by the local people and especially by the traditional drug practitioners of the study area against various GI anomalies. In spite of the availability and accessibility of the modern system of medication, most of the people of the study area still depend on herbal medication system provided by

traditional drug practitioners to treat a range of GI anomalies. This documentation will help to harness this traditional knowledge and to preserve this knowledge for the betterment of future mankind.

**Keywords** Ethnobotany, Gastro-Intestinal (GI) Disorders, Traditional Medication

## 1. Introduction

Plants and plant products have been used as medicine to treat several human diseases since long ago. In a country like India, the traditionally used medication system plays an important role in health care of rural people. About 45000 number of plant species were recorded and identified in India and out of which more than 35000 plant species have been claimed to possess medicinal properties [1]. According to World Health Organization, about 80% of the World's population especially the tribal and rural dwelling population depends on herbal medications for their primary health care needs [2].

The North-eastern region of India is a part of foot hills

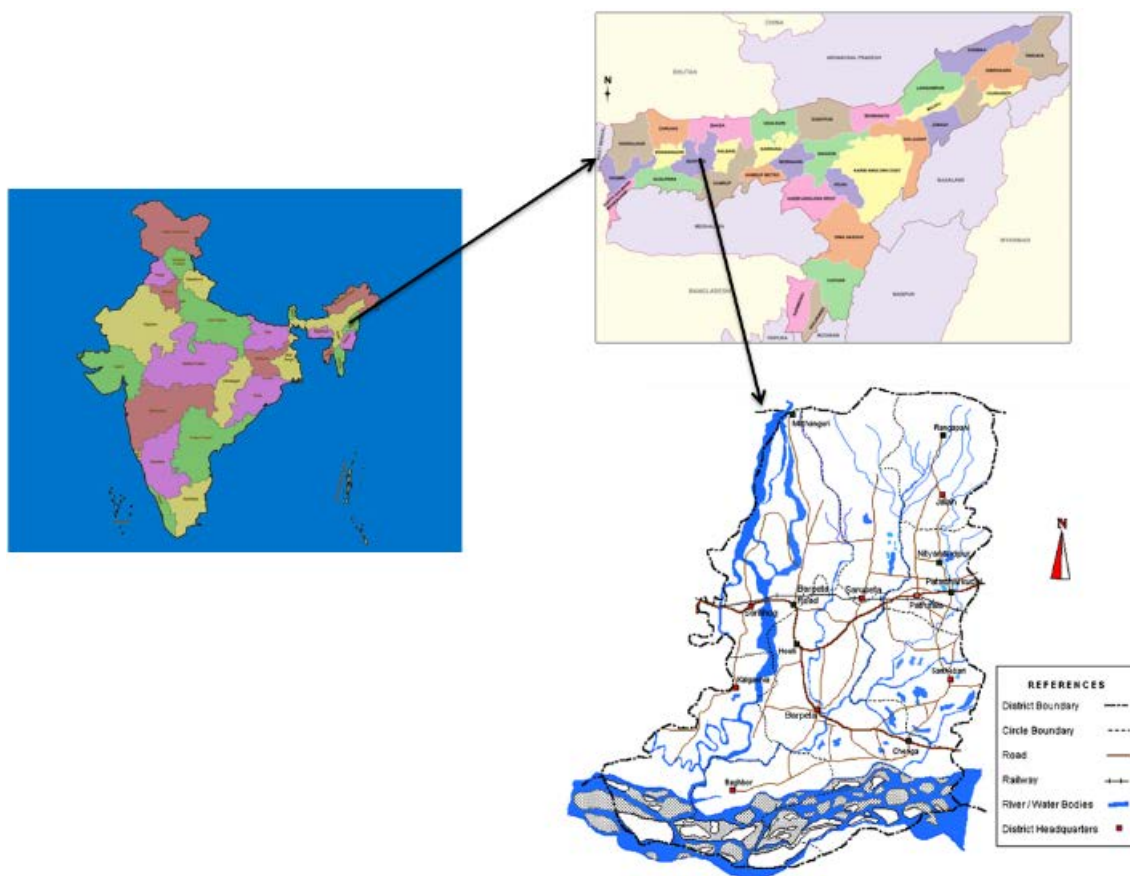
of Himalayas and Indo-Burma biodiversity hot spot and it comprises about 50% of India's total biodiversity [3]. Several researchers have studied about the ethnobotanically important plant species of this region at different times [4-7]. Assam is one of the evergreen states of North-East India and more than 200 medicinally important plant species were reported from this state [8].

Gastro-intestinal (GI) disorders are those which are associated with the gastro-intestinal tract and its associated glands viz., liver, pancreas etc. Diseases like dysentery, diarrhea, constipation, indigestion, stomach ache, stomach ulcer, worm infestation in children, piles, acidity or gastric trouble, Jaundice etc. are considered as GI disorders. The primary objective of the present study was to prepare a database on indigenous knowledge on medicinal plants used for curing various Gastro-Intestinal ailments of human beings among local people of Barpeta district of Assam, North-East India.

## 2. Materials and Methods

### 2.1. Study Area

The present study was carried out at Barpeta district of Assam, North-East India (Fig.1). The district is situated at a global position between 26°45'-26°50' N' latitude and 90°30'-91°51'0"E longitude. Barpeta district of Assam is bounded by Nalbari district to the East, Bongaigaon & Chirang district to the West, Baska district to the North and Goalpara & Kamrup district to the South. The district headquarter, Barpeta town is located at a distance of about 105km from the state capital, Guwahati city. The district covers an area of 2645 sq. km with a total population of 1693622 (2011 census) and is having a total of 850 revenue villages [9]. The climatic condition of the area is subtropical with an annual average rainfall of 200-300 cm. This area is very rich in floral bio resources [10].



**Figure 1.** Map of the Study Area

## 2.2. Conduction of Survey, Sample Collection and Identification

An extensive field study was carried out among the local people of the study area for a period of one year from July, 2018 to June, 2019. Simple random sampling method was adopted to conduct the survey. Basically, local traditional drug practitioners (locally known as Kabiraj or Bez) along with elderly people of age ranges between 40-90 years were interviewed for first-hand information regarding the use of different plants, mode of drug preparation and dosage composition which they use to cure Gastro-Intestinal anomalies. A total of 45 numbers of traditional drug practitioners (Kabiraj or Bez) were interviewed during the survey period.

The sample collection was done at the study sites by following standard protocol for plant collection. For collection of plant samples, study area was visited along with the respective Kabiraj or Bez from whom the information was recorded. Plant samples were collected in the flowering state and were kept in care. Collected plant samples were further processed and preserved following

the routine protocol of standard herbarium preparation. Identification of the collected specimens were done with the help of pertinent floras [11-13] as well as with the help of taxonomic expert and confirmed with the authentic specimens present at the Botany Department, Gauhati University and Botanical Survey of India, Eastern Circle, Shillong, Meghalaya, India.

## 3. Result

A total 55 number of plants belonging to 38 families which are used to cure GI disorders were recorded and identified during the study. The descriptions of the plants have been depicted in table 1. Mode of preparation of drugs and their application against different GI disorders have been described in table 2. Figure 2 has depicted the distribution of the plants recorded during the study according to their habit. Different parts of the plants are used against different GI disorders as depicted in figure 3. Numbers of different plants used against different GI disorders has been depicted in figure 4.

**Table 1.** Descriptions of the plants identified during the study

Sl. No.	Scientific name	Vernacular name	Family	Type	Parts used
1	<i>Aegle marmelos</i> (L.) Corr.	Bel	Rutaceae	Tree	Fruit
2	<i>Alocasia indica</i> (Roxb.) Schott	Man-kochu	Araceae	Herb	Corm
3	<i>Allium sativum</i> L.	Naharu	Liliaceae	Herb	Bulb
4	<i>Aloe vera</i> (L.) Burm. f	Salkonwari	Liliaceae	Herb	Leaf
5	<i>Amaranthus spinosus</i> L.	Kata-Khutura	Amaranthaceae	Herb	Whole plant
6	<i>Averrhoa carambola</i> L.	Kardoitenga	Oxalidaceae	Tree	Fruit
7	<i>Azadirachta indica</i> A. Juss.	Mahanim	Meliaceae	Tree	Leaf
8	<i>Boerhavia diffusa</i> L.	Purnounouwa	Nyctaginaceae	Herb	Leaf and stem
9	<i>Calotropis gigantea</i> (L.) R. Br	Aakan	Asclepiadaceae	Tree	Leaf
10	<i>Camellia sinensis</i> L. kuntze	Chapat	Theaceae	Tree	Leaf
11	<i>Centella asiatica</i> L.	Manimuni	Apiaceae	Herb	Whole plant
12	<i>Coriandrum sativum</i> L.	Dhaniya	Apiaceae	Herb	Whole plant
13	<i>Costus speciosus</i> (Koen. ex Retz.) Smith	Jamlakhuti	Costaceae	Herb	Rhizome
14	<i>Curcuma longa</i> L.	Haladhi	Zingiberaceae	Herb	Rhizome
15	<i>Carica papaya</i> L.	Amita	Caricaceae	Tree	Fruit
16	<i>Citrus limon</i> (L.) Osbeck	Nemutenga	Rutaceae	Tree	Fruit
17	<i>Dillenia indica</i> L.	Outenga	Dillaniaceae	Tree	Fruit
18	<i>Eclipta prostrate</i> L.	Kehraj-bon	Asteraceae	Herb	Leaf
19	<i>Garcinia cowa</i> Roxb. ex DC.	Kuji-thekera	Clusiaceae	Tree	Fruit
20	<i>Garcinia pedunculata</i> Roxb.	Bor-thekera	Clusiaceae	Tree	Fruit
21	<i>Houttuynia cordata</i> Thunb.	Machenderi	Saururaceae	Herb	Leaf
22	<i>Hydrocotyle sibthorpioides</i> L.	Saru-manimuni	Apiaceae	Herb	Whole plant
23	<i>Hyptis suaveolens</i> (L.) Poit.	Tokmah	Lamiaceae	Shrub	Seeds
24	<i>Ipomea mauritiana</i> Jacq.	Bhui-komora	Convolvulaceae	Climber	Rhizome
25	<i>Justicia adhatoda</i> L.	Bahakatita	Acanthaceae	Shrub	Leaf

Table 1 Continuous

26	<i>Leea asiatica</i> (L.) Rid.	Aiha bon	Liaceae	Herb	Root
27	<i>Leucas aspera</i> (Willd.) Link	Doron-bon	Lamiaceae	Herb	Stem and leaf
28	<i>Mentha spicata</i> L.	Pudinah	Lamiaceae	Herb	Whole plant
29	<i>Machilus bombycina</i> King ex Hook. F.	Chom	Lauraceae	Tree	Leaf
30	<i>Marsilea minuta</i> L.	Pani-tengechi	Marsileaceae	Herb	Whole plant
31	<i>Meyna spinosa</i> Roxb. ex Link.	Moin	Rubiaceae	Tree	Leaf
32	<i>Momordica charantia</i> L.	Titakerela	Cucurbitaceae	Climber	Fruit
33	<i>Moringa oleifera</i> Lam.	Sajina	Moringaceae	Tree	Leaf, flower and fruit
34	<i>Murraya koenigii</i> L. Sprengel	Narasingha	Rutaceae	Shrub	Leaf
35	<i>Musa paradisiaca</i> L.	Bhimkol	Musaceae	Shrub	Body, Fruit
36	<i>Musa sapientum</i> L.	Kachkol/Pura kol	Musaceae	Shrub	Fruit
37	<i>Oxalis corniculata</i> L.	Tengesitenga	Oxalidaceae	Herb	Whole plant
38	<i>Ocimum sanctum</i> L.	Tulsi	Lamiaceae	Shrub	Leaf
39	<i>Paderia scandens</i> (Lour.) Merr.	Bhedailota	Rubiaceae	Climber	Leaf and stem
40	<i>Piper nigrum</i> L.	Jaluk	Piperaceae	Climber	Fruit
41	<i>Psidium guajava</i> L.	Madhuriaam	Myrtaceae	Tree	Fruit
42	<i>Phyllanthus emblica</i> L.	Amlokhi	Phyllanthaceae	Tree	Fruit
43	<i>Punica granatum</i> L.	Dalim	Lythraceae	Shrub	Fruit and leaf
44	<i>Solanum torvum</i> Sw.	Tita-bhekuri,	Solanaceae	Shrub	Fruit
45	<i>Solanum ferox</i> L.	Saru-titabhekuri	Solanaceae	Shrub	Fruit
46	<i>Solanum lycopersicum</i> L.	Bilahi	Solanaceae	Shrub	Fruit
47	<i>Spondias pinnata</i> (L. f.) Kurz	Amora	Anacardiaceae	Tree	Fruit
48	<i>Swertia chirayita</i> (Roxb. Ex Fleming)	Chirata	Gentianaceae	Tree	Leaf and stem
49	<i>Syzygium cumini</i> (L.) Skeels	Kala-jamu	Myrtaceae	Tree	Fruit and bark
50	<i>Terminalia bellerica</i> (Gaertn.) Roxb	Bhomora	Combretaceae	Tree	Fruit
51	<i>Terminalia chebula</i> Retz.	Hilikha	Combretaceae	Tree	Fruit
52	<i>Vitex negundo</i> L.	Posotiya	Verbenaceae	Shrub	Leaf
53	<i>Vigna mungo</i> (L.) Hepper	Matimah	Fabaceae	Herb	Seed
54	<i>Vitex peduncularis</i> Wall.	Ahoi	Verbenaceae	Herb	Root
55	<i>Zinziber officinale</i> Roscoe	Ada	Zingiberaceae	Herb	Rhizome

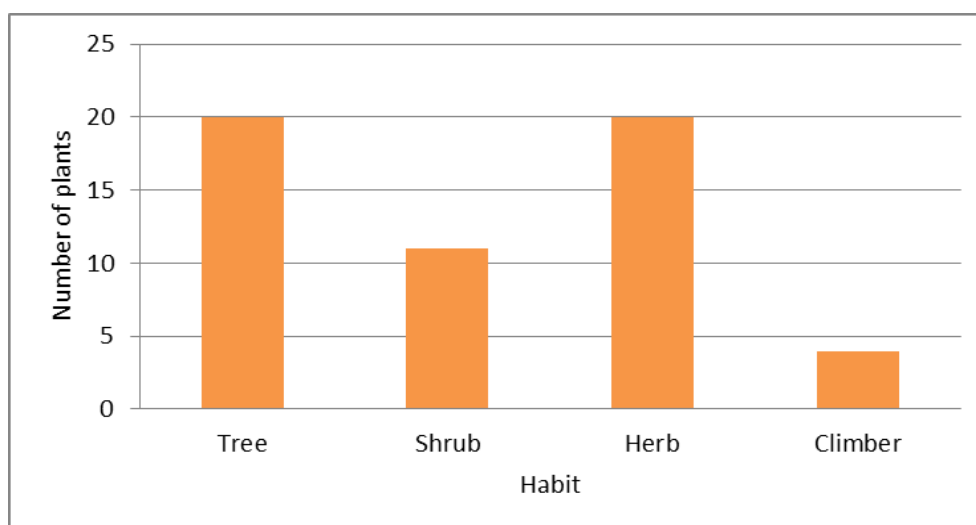


Figure 2. Distribution of plants according to their habit

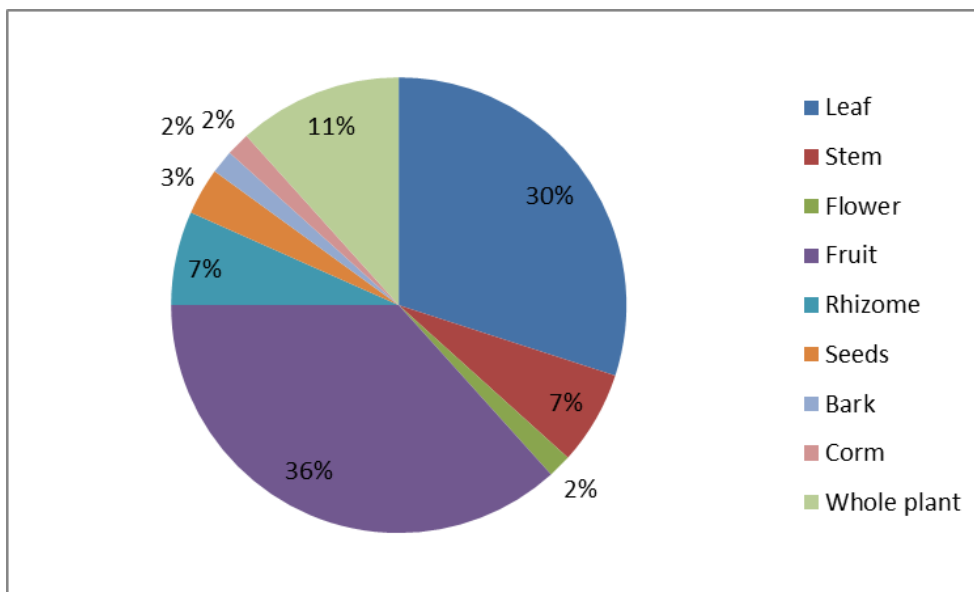


Figure 3. Different parts of plants used against different GI disorders

Table 2. Mode of preparation and dosage composition

Name of the plant	Used against	Mode of preparation and dosage composition
<i>Aegle marmelos</i> (L.) Corr.	Constipation	Ripe fruit is taken orally.
<i>Alocasia indica</i> (Roxb.) Schott	Jaundice Liver disorder	Boiled or cooked corm is taken orally with boiled rice.
<i>Allium sativum</i> L.	Indigestion	2 or 3 pieces of bulb are taken orally with a glass of cold water.
<i>Aloe vera</i> (L.) Burm.f	Acidity	One glass of leaf juice is taken orally once daily for 5-7 days.
<i>Amaranthus spinosus</i> L.	Jaundice Diarrhoea	Cooked or boiled plants are taken orally.
<i>Averrhoa carambola</i> L.	Jaundice Dysentery	Cooked fruit is taken orally with boiled rice
<i>Azadirachta indica</i> Juss.	Worm infestation	1-2 tea-spoon of leaf decoction is taken orally twice a day for a period of 7-10 days. Sometimes, fresh leaf juice is also taken for effective result.
<i>Boerhavia diffusa</i> L.	Indigestion Jaundice Dysentery	Boiled or cooked leaves and stems are taken orally.
<i>Calotropis gigantea</i> (L.) R. Br	Piles	3-4 leaves are crushed and the juice obtained is taken orally twice daily for one month.
<i>Camellia sinensis</i> L. kuntze	Dysentery	Leaf decoction is taken orally
<i>Centella asiatica</i> L.	Dysentery Diarrhea Bowl trouble	Whole plant is grinded into paste or cooked and taken orally
<i>Coriandrum sativum</i> L.	Indigestion	A paste is made by grinding the fresh plant and is taken orally with boiled rice.
<i>Costus speciosus</i> (Koen. Ex Retz.) Smith	Diabetes Jaundice	Rhizome is grinded into paste and taken orally by diabetic patient.  Rhizome is grinded into paste and 50 ml of juice obtained from that paste is taken and an equal amount of cow milk is added to it. This mixture is taken orally for a period of 7-10 days once daily to get effective result against Jaundice.
<i>Curcuma longa</i> L.	Dysentery Abdominal ache	Rhizome is grinded into paste and taken orally with or without honey.
<i>Carica papaya</i> L.	Constipation Acidity	Ripe fruit is useful against constipation.  Boiled or cooked fruit is taken orally with boiled rice for almost one month twice daily to get rid of acidity.
<i>Citrus limon</i> (L.) Osbeck	Acidity	Fruit juice is mixed with water and taken orally
<i>Dillenia indica</i> L.	Diarrhea Bowl trouble	Cooked fruit is taken orally with boiled rice.

Table 2. Continuous

<i>Eclipta prostrata</i> L.	Jaundice Acidity	Leaves are grinded to paste and juice is taken orally
<i>Garcinia cowa</i> Roxb. Ex DC.	Dysentery Digestive disorder	Ripe fruits are cut into slices and sun dried. 3-4 such slices are dipped into a glass of cold water and kept it overnight. This water is then taken orally
<i>Garcinia pedunculata</i> Roxb.	Dysentery Digestive disorder Jaundice	Ripe fruits are cut into slices and sun dried. 3-4 such slices are dipped into a glass of cold water and kept it overnight. This water is then taken orally
<i>Houttuynia cordata</i> Thunb.	Dysentery Diarrhea Bowl trouble	Fried leaves are taken orally with boiled rice.
<i>Hydrocotyle sibthorpioides</i> L.	Bowl trouble	Cooked plants are taken orally.
<i>Hyptis suaveolens</i> (L.) Poit.	Bowl trouble	Seeds are dipped in a glass of cold water and taken orally.
<i>Ipomea mauritiana</i> Jacq.	Liver disorder	Rhizome is grinded into paste and taken orally for a week twice daily.
<i>Justicia adhatoda</i> L.	Jaundice Piles	3-4 leaves are crushed and the juice is taken orally twice daily for a period of 10-15 days for Jaundice and a month or 45 days to get cure from piles.
<i>Leea asiatica</i> (L.) Rid.	Worm infestation Jaundice	Roots are grinded to paste and taken orally
<i>Leucas aspera</i> (Willd.) Link	Jaundice	Cooked leaves and stems are taken orally.
<i>Mentha spicata</i> L.	Acidity Bowl trouble	Whole plants are grinded into paste and taken orally.
<i>Machilus bombycina</i> King ex Hook. F.	Piles	3-4 leaves are crushed and juice is taken orally for almost one month twice daily.
<i>Marsilea minuta</i> L.	Worm infestation	Cooked plants are taken orally.
<i>Meyna spinosa</i> Roxb. Ex Link.	Dysentery Bowl trouble Liver disorder	Leaves are crushed and juice is taken orally.
<i>Momordica charantia</i> L.	Diabetes	One glass of fruit juice is taken orally twice or thrice a week.
<i>Moringa oleifera</i> Lam.	Diabetes	Cooked or fried fruits, flower and leaves are useful against diabetes.
<i>Murraya koenigii</i> L. Sprengel	Constipation Acidity Bowl trouble	Fresh leaves are made into paste and taken orally with boiled rice for 5-7 days. Sometimes, fried or cooked leaves are also taken to get rid of the problem.
<i>Musa paradisiaca</i> L.	Dysentery Bowl trouble	Ripe fruit is cut into slices and dipped into a glass of cold water and kept overnight and the water is taken orally.  2-3 tea-spoon of the juice from the lower body part of the plant is taken orally for a period of 3-5 days.
<i>Musa sapientum</i> L.	Dysentery	Boiled fruit is taken orally with boiled rice.
<i>Oxalis corniculata</i> L.	Bowl trouble	Cooked plants are taken orally.
<i>Ocimum sanctum</i> L.	Dysentery	7-10 fresh leaves along with equal number of leaves of <i>Punica granatum</i> L. and <i>Psidium guajava</i> L. are crushed together and the juice obtained is taken orally twice or thrice a day until recovery.
<i>Paderia scandens</i> (Lour.) Merr.	Dysentery Bowl trouble	Cooked leaves and stems are taken orally with boiled rice.
<i>Piper nigrum</i> L.	Indigestion	Mature fruits are dried and grinded to powder. 1 tea-spoon of this powder with 1 tea-spoon of honey taken orally with a glass of lukewarm water
<i>Psidium guajava</i> L.	Dysentery	7-10 fresh leaves along with equal number of leaves of <i>Punica granatum</i> L. and <i>Ocimum sanctum</i> L. are crushed together and the juice obtained is taken orally twice or thrice a day until recovery.
<i>Phyllanthus emblica</i> L.	Indigestion Acidity Bowl trouble Constipation Stomach ulcer	A powder is made from the dried fruits of this plant and mixed with the powder made from dried fruits of <i>Terminalia bellerica</i> and <i>Terminalia chebula</i> . This mixture is locally known as TRIFALA. 1-2 tea-spoon of TRIFALA is taken orally with or without a glass of water. Sometimes, 1 tea-spoon of <i>Curcuma longa</i> powder and 1 tea-spoon of honey are mixed with 1-2 tea-spoon of TRIFALA for effective result against indigestion, acidity and constipation and stomach ulcer.

Table 2. Continuous

<i>Punica granatum</i> L.	Dysentery Diarrhea	7-10 fresh leaves along with equal number of leaves of <i>Ocimum sanctum</i> L. and <i>Psidium guajava</i> L. are crushed together and the juice obtained is taken orally twice or thrice a day until recovery.
<i>Solanum torvum</i> Sw.	Worm infestation Bowl trouble	3-5 mature fruits are given orally to the child having infection early in the morning for a period of 7-10 days.
<i>Solanum ferox</i> L.	Worm infestation	3-5 mature fruits are given orally to the child having infection early in the morning for a period of 7-10 days.
<i>Solanum lycopersicum</i> L.	Bowl trouble	Cooked or boiled fruits are taken orally.
<i>Spondias pinnata</i> (L. f.) Kurz	Dysentery Bowl trouble	Cooked fruits are taken orally with boiled rice
<i>Swertia chirayita</i> (Roxb. ex Fleming)	Worm infestation	3-4 pieces of stems of length 5-6 inch are dipped in a glass of cold water and kept it overnight. 2-3 tea-spoon of that water is given to the child having infection orally twice daily for 7-10 days.
<i>Syzygium cumini</i> (L.) Skeels	Diabetes	Ripe fruits are taken orally.  Bark is grinded into paste and 2-3 tea-spoon of the juice obtained from that paste is taken orally once daily to control high blood glucose level.
<i>Terminalia bellerica</i> (Gaertn.) Roxb	Indigestion Acidity Bowl trouble Constipation Stomach ulcer	1-2 tea-spoon of TRIFALA is taken orally with or without a glass of water.  Sometimes, 1 tea-spoon of <i>Curcuma longa</i> powder and 1 tea-spoon of honey are mixed with 1-2 tea-spoon of TRIFALA and taken for a period of 20-30 days once daily for effective result against stomach ulcer.
<i>Terminalia chebula</i> Retz.	Indigestion Acidity Bowl trouble Constipation	1-2 tea-spoon of TRIFALA is taken orally with or without a glass of water. Sometimes, 1 tea-spoon of <i>Curcuma longa</i> powder and 1 tea-spoon of honey are mixed with 1-2 tea-spoon of TRIFALA for effective result.
<i>Vitex negundo</i> L.	Bowl trouble	Boiled or cooked leaves are taken orally
<i>Vigna mungo</i> (L.) Hepper	Bowl trouble	Boiled seeds are taken orally with boiled rice
<i>Vitex peduncularis</i> Wall.	Jaundice	Roots are grinded into paste and taken orally thrice a day for a period of 10-15 days.
<i>Zinziber officinale</i> Roscoe	Indigestion Bowl trouble	Thin slices of rhizomes with normal salt are taken orally thrice a day for 2-3 days for effective result.

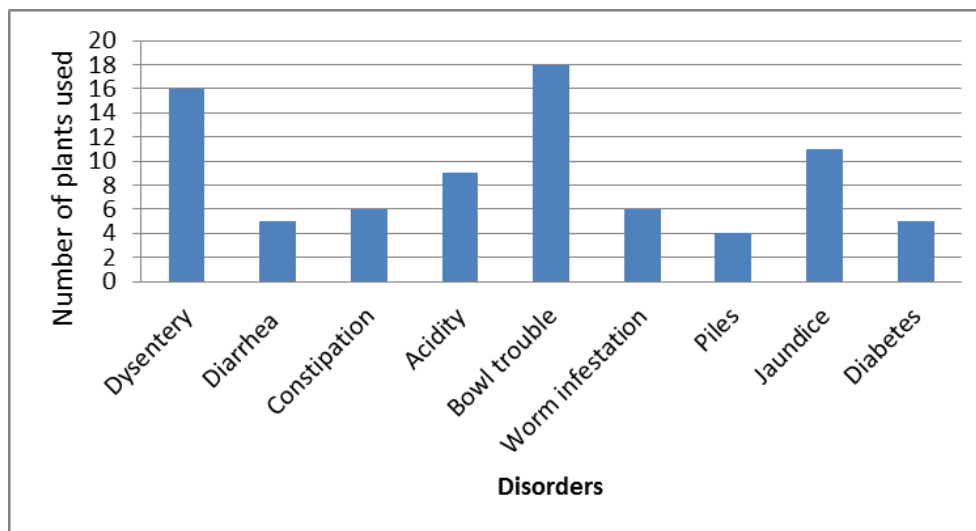


Figure 4. Different plants used against various GI disorders

## 4. Discussion

The evergreen state of Assam was proved to be a home for a large number of ethnobotanically important plant species by several reports. 107 numbers of plants were recorded by Das *et al.* [14] used by the tribal people of

Cachar district of Assam against different human ailments. Hazarika *et al.* [15] reported a total of 84 plant species belonging to 57 families used in medicinal purposes by the people of Assam and Manipur. A total of 85 plant species belonging to 49 families were recorded by Saikia *et al.* [16] which are used by the Assamese people against



skin related anomalies.

Several studies regarding the economically important plant species of Barpeta district of Assam were conducted by different researchers. According to a previous report, more than 750 plants species of economic importance have been recorded and identified from this region [10]. 57 plant species belonging to 36 families having medicinal value were identified and described by a study in the Manas National park situated near the study area [17].

The present study has documented the uses of 55 number of locally available plant species of the study area for treatment of various GI anomalies. It has been observed that most of the remedies consisted of single plant part and more than one method of preparation. Some of the remedies consist of different parts of the same plant to treat single or more diseases. However, in some cases, parts of two or even more different plants are used for curing a particular disease. For example, leaves of *Ocimum sanctum* L., *Punica granatum* L. and *Psidium guajava* L. are crushed together to make a paste and the juice obtained from that paste is used against Dysentery. TRIFALA prepared by the combination of fruits of three plants viz., *Phyllanthus emblica* L., *Terminalia bellerica* (Gaertn.) Roxb and *Terminalia chebula* Retz is extensively used against a range of GI anomalies.

## 5. Conclusion

The present investigation has explored some of the traditionally used medicinal plants to cure various GI disorders from Barpeta district of Assam, North-East India. But, the efficiency of using these traditional medications cannot be judge properly without proper scientific exploration, although the people of the study area are using these plants effectively from long back. In spite of the availability and accessibility of the modern system of medication, most of the people of the study area still depend on herbal medication system provided by traditional drug practitioners. The need of the hour is to harness this traditional knowledge and to preserve this knowledge for the betterment of future mankind.

## Acknowledgement

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## REFERENCES

- [1] Lewington, A. Medicinal plants and plant extracts: a review of their importation into Europe. Traffic International, Cambridge, UK. 1993.
- [2] World health Organization. The Global burden of disease 2004; update. Geneva, WHO. Available at [www.who.int/evidence/bod](http://www.who.int/evidence/bod).
- [3] Mao, A.A., Hynniewta, T.M. and Sanjappa, M. Plant wealth of Northeast India with reference to ethnobotany. Indian Journal of Traditional Knowledge. 8(1): 96-103. 2009.
- [4] Chakraborty, R., De, B., Devanna, N. and Sen, S. North-East India an ethnic storehouse of unexplored medicinal plants. J Nat Prod Plant Resour. 2(1): 143-152, 2012.
- [5] Sajem, A.L., Rout, J. and Nath, M. Traditional tribal knowledge and status of some rare and endemic medicinal plants of North Cachar Hills district of Assam, Northeast India. Ethnobotanical Leaflets, 12: 261-275. 2008.
- [6] Laloo, R.C., Kharlukhi, L., Jeeva, S. and Mishra, B.P. Status of medicinal plants in the disturbed and the undisturbed sacred forests of Meghalaya, northeast India: population structure and regeneration efficacy of some important species. Current science. 90(2): 225-232. 2006.
- [7] Dutta, B.K. and Dutta, P.K. Potential of ethnobotanical studies in North East India: An overview. Indian Journal of Traditional Knowledge. 4(1): 7-14. 2005.
- [8] Bhattacharya, P.C., Muzumder, R. and Sarmah, G.D. Rare medicinal plants of Assam. Ancient science of life. 10(4): 234-238. 1991.
- [9] National Informatics Center (NIC). District profile| Barpeta district| Government of Assam, India. <https://barpeta.assam.gov.in/portlets/district-profile>. (Accessed 5th November, 2020).
- [10] Das, R., 2016. Biodiversity of Ethnomedicinal plants used by the ethnic tribal people of Barpeta district of Assam, North East India. Asian Journal of Pharmaceutical Science and Technology. 6(1): 27-32. 2016.
- [11] Kanjilal UN, Kanjilal PC, Das A and Purkayastha C. Flora of Assam. Vol-I. Bishan Singh and Mahendra Pal Singh, Dehra Dun. 1934.
- [12] Kanjilal UN, Kanjilal PC, De RN and Das A. Flora of Assam. Vol-IV. Bishan Singh and Mahendra Pal Singh, Dehra Dun. 1938.
- [13] Bor, N.L. Flora of Assam. Vol. V. Gramineae. Government of Assam. 1940.
- [14] Das, A.K., Dutta, B.K. and Sharma, G.D. Medicinal plants used by different tribes of Cachar district, Assam. Indian Journal of Traditional Knowledge. 7(3): 446-454. 2008.
- [15] Hazarika, R., Abujam, S.S. and Neog, B. Ethno medicinal studies of common plants of Assam and Manipur. Int J Pharm Biol Arch. 3(4): 809-815. 2012.
- [16] Saikia, A.P., Ryakala, V.K., Sharma, P., Goswami, P. and Bora, U. Ethnobotany of medicinal plants used by Assamese people for various skin ailments and cosmetics. Journal of Ethnopharmacology. 106(2): 149-157. 2006.



- [17] Das, S., Khan, M.L., Rabha, A. and Bhattacharjya, D.K. Ethnomedicinal plants of Manas National Park, Assam, Northeast India. *Indian Journal of Traditional Knowledge*. 8(4): 514-517. 2009.