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## Medicinal plants used as indigenous herbs for anti-helminthic activity of North-Eastern region of India

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### Abstract

Gastrointestinal helminthosis is a serious health issue. The current study could be used to find prospective anthelmintic botanicals and create new anthelmintic medications with improved properties and efficacy that have been used in north east of India. The eight states, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura make up the north-eastern region of India. It is arguably the most lavish collection of medicinal plants in existence. Nearly 80% of the world's population relies on conventional medicines for basic medical services, which include the use of extracts from medicinal plants. It is thought that the foundation of conventional medicine is made up of medicinal plants.

**Keywords:** Anthelmintic activity, medicinal plants, livestock, vermifuge and vermucidal

### Introduction

Since ancient times, medicinal plants have been used to treat parasitism and other human and animal illnesses, and this is still the case in many parts of the world. The World Health Organisation estimates that roughly 1.5 billion people worldwide have soil-transmitted helminthiasis (STHs) in 2015 <sup>[1]</sup>. Indigenous herbal medicine is gaining popularity as a parasite infection prevention method, particularly in developing nations. Helminths and helminthic infections (helminthiasis), which are parasites, continue to be among the most serious health issues affecting billions of people worldwide <sup>[2, 3]</sup>. Helminthiasis, a macroparasitic disease that affects both humans and animals, is also known as worm infestation. The helminths live in both human and animal intestines, but they can also penetrate different organs and cause infections in the liver (fasciolosis), lung (paragonimiasis), muscle (cysticercosis), skin (strongyloidiasis), lymph nodes (filariasis), eye (river blindness), and brain (paragonimiasis), among other organs.

Helminthiasis is spread by consuming infected food or drink, as well as by mosquitoes and flies. For the treatment of helminthiasis in a large population today, there are not enough allopathic medications available, and those that are available have either developed resistance or are ineffective. The use of ayurvedic medications for the treatment of helminthiasis has no significant negative effects, and the use of plant-based products in Ayurveda requires scientific support <sup>[4]</sup>.

The north-eastern region, which lies between the latitudes of 87°32'E and 97°52'E and 21°34'N and 29°50'N, is part of two biodiverse hotspots in India and is noted for its genetic resources around the world. It is also regarded as the bio-geographical gateway to India. The people of this region, especially the ethnic groups, have a form of custom where they use plants and plant parts like leaves, bark, roots, etc. to treat various diseases. About 300 plant species are found in the Eastern Himalaya alone out of the estimated 800 species that are used as food plants in India. Despite its biological diversity, the area continues to have appallingly little data on a wide range of plant taxa <sup>[3]</sup>.

### Traditional medicine

Ethnomedicine is the name given to a traditional method of healing used by indigenous peoples with regard to human health. It took hundreds of years of brave investigation using the trial and error approach before some herbs, animals, and minerals with therapeutic and palliative effects were known to one generation before being passed on to the next.

All other medical systems, including Ayurveda, Siddha, Unani, Naturopathic medicine, and even modern medicine, are descended from ethnomedicine.

### Scope and importance of traditional medicine

The scientists and urban population are still mostly unaware of the extensive knowledge of herbal medicine amassed by the peasants and tribal people. Numerous plant species found in rural areas are on the edge of extinction and are listed as vulnerable. Rural residents are being displaced from their natural habitats as a result of deforestation, urbanisation, and modernity, and their knowledge, particularly with regard to herbal medicines, is gradually vanishing. Our main priority right now is keeping this information safe, most of the knowledge in existence today is restricted to previous generations. It is believed that everyone has access to conventional medical knowledge and that practising it doesn't require any special education or training. In some families, nearly every member is familiar with one or more herbal medicines. The traditional healers are experts in specific fields of medicine. Thus, we find that some medical professionals specialise in physical healing, particularly the employment of incantations, while others also specialise in spiritual healing, including the setting of bones, the healing of wounds, the treatment of poisonous bites, the treatment of neurological problems, etc.

### Status of traditional medicine in world

Situation of traditional medicine globally in some nations like Russia, Africa, and a few European nations, traditional medicine or ethnomedicine is being studied by folklorists, anthropologists, and medical professionals alike. In Russia, there have been considerable attempts to do scientific research on herbal and natural medicines used in traditional medicine during the post-revolutionary era. It is well known that in Russia, when a successful home treatment for a serious illness is discovered, it is typically celebrated and

publicised at the highest medical level. This is a very positive tendency that isn't as widespread in other nations. Treatises written by Chopra et al., Nadkarni, and Kirtikar, as well as Basu, are well-known in India [5].

### Potential of ethnobotanical studies in North east Indian region

Herbal medicine has a rich history in North East India. Its rural residents and tribal groups living in secluded or forested areas continue to rely heavily on the native medical and agricultural systems. Studies in this area have only been conducted on a small subset of the North East region's tribes, including the Jaintai, Garo, Monpas, Nishi, Apatani, Reangs, etc. Numerous plants having ethnobotanical efficacy against some serious diseases have been identified, however particular tribal communities in North East India continue to be home to far bigger populations of folk remedies. Therefore, additional in-depth research on the ethnobotanical features of the area may offer useful strategies for the promotion of traditional herbal medicinal plants [6].

### Methodology

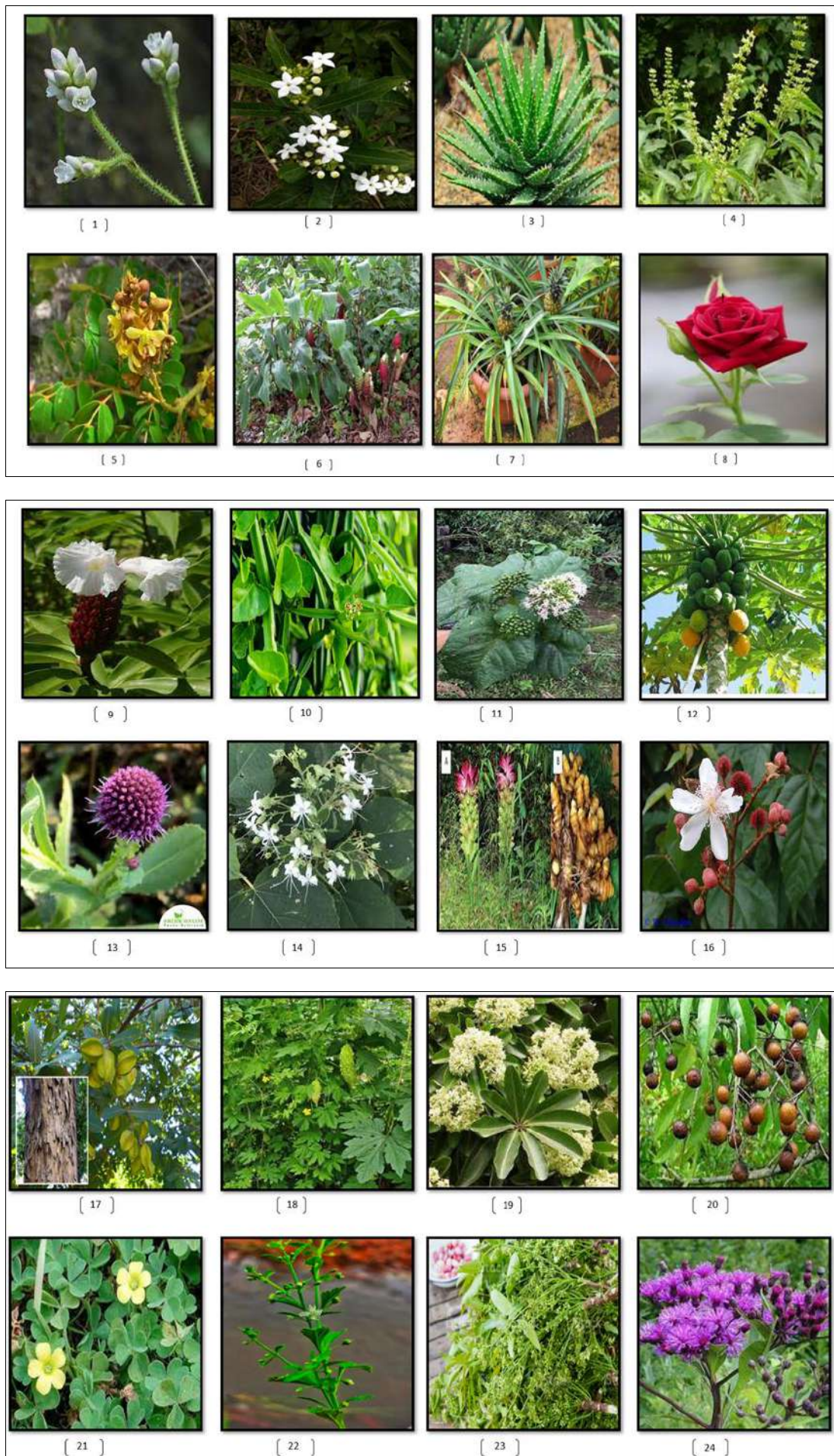
We conducted a comprehensive assessment of the literature in order to compile the most recent data regarding the medicinal plant. The State Medicine Plant Board's website was the primary secondary source from which the data was gathered. For the sake of data interpretation, references from research papers, books, and articles were used. Along with a thorough review of the local resources, some data on the application of conventional herbal therapy was gathered through individual interviews and a literature review. In addition to data collection, the study's main goal was to understand how the community and medicinal plants interacted.

**Table 1:** Plants found in North-East region for anti-helminthic activity

Sl No	Scientific Name	Family	Local name	Parts used	Habitat	Mode of administration	Chemical Constituents	Reference number(s)
1.	<i>Persicaria strigosa</i> Nakai	Polygonaceae	Alari gwja	Leaves	Assam	Raw	Paclitaxel, etoposide, camptothecin	7,35
2.	<i>Morinda angustifolia</i> Roxb	Rubiaceae	Asho	Roots	Assam	Decoction	lucidin 3-O - $\beta$ - primeveroside, 1,3-dihydroxy-2-methylantraquinone	8,35
3.	<i>Aloe barbadensis</i> Mill	Liliaceae	Gheukumari	Whole plant	Sikkim	Gel	5 (hydroxymethyl)-7-methoxy-2-methylchromone, 7-hydroxy-5-(hydroxymethyl)-2-methylchromone	9,37
4.	<i>Ocimum gratissimum</i> L.	Lamiaceae	Tulungsi gidir	Leaves	Assam	Oil	Nepetrin, Quercetin, Rutin, Catechin	10,35
5.	<i>Caesalpinia bonducella</i> Flem	Asclepiadaceae	Lataiguti	Leaves & Barks	Arunachal Pradesh	Extract	$\alpha$ -citral, $\beta$ -citral	11,38
6.	<i>Zingiber zerumbet</i> L.	Zingiberaceae	Bura uth	Tuber	Assam	Infusion	Zerumbone, Humulene epoxide II	12,35
7.	<i>Ananas</i>	Bromeliaceae	Amortui	Leaves	Tripura	Leaf juice	Hemicellulose,	13,39

	<i>comosus</i> L						Lignin	
8.	<i>Rosa indica</i> L	Rosaceae	Gulab	Seed	Meghalaya	Powder	Levogluconan, Pyrogallol	14
9.	<i>Costus speciosus</i> Smith	Zingiberaceae	Betlauree	Roots & Rhizome	Sikkim	Decoction	Lignoceric acid, Octacosanoic acid.	15,37
10.	<i>Cissus quadrangularis</i> L	Vitaceae	Hatjora	Whole plant	Assam	Infusion	Alpha amyirin, Beta sitosterol	16,35
11.	<i>Clerodendrum colebrookianum</i> Walp	Verbenaceae	Ban bhati	Leaves	Arunachal Pradesh	Decoction	Clerodin, l-amyirin, clerodolone	17,38
12.	<i>Carica papaya</i> L	Caricaceae	Paypay	Leaf & Stem	Tripura	Extract	Papain, Carpaine	18,39
13.	<i>Sphaeranthus indicus</i> L	Asteraceae	Gorakhmundi	Seeds & roots	Meghalaya	Decoction	D-cadinene, $\beta$ -ionone, Estragole	14,19
14.	<i>Clerodendrum viscosum</i> Ventenat	Verbenaceae	Killiashak	Leaves	Tripura	Decoction	$\beta$ -sitosterol & $\beta$ -sitosterol glucoside	20,39
15.	<i>Curcuma aromatic</i> Salisb	Zingiberaceae	Fatcheng	Rhizome	Sikkim	Extract	d-camphor, d-camphene	21,37
16.	<i>Bixa orellana</i> L	Bixaceae	Sindoor dongfang	Bark	Assam	Infusion	Bixin	22,35
17.	<i>Terminalia arjuna</i> Roxb	Combretaceae	Myokpha	Bark	Manipur	Powder	Phytosterols, Alkaloids	23
18.	<i>Momordica charantia</i> L	Cucurbitaceae	Gangrauk	Fruits & Twigs	Tripura	Extract	3-coumaric acid & ascorbic acid	24,39
19.	<i>Alstonia scholaris</i> L	Apocynaceae	Sithona	Bark	Assam	Infusion	Scholaricine, vallesamine, & Picrinine	25,35
20.	<i>Sapindus mukorossi</i> Gaertn	Sapindaceae	Ritha	Fruits & root bark	Sikkim	Extract	Mukorosside, Saponin	26,37
21.	<i>Oxalis corniculata</i> L <sup>[27]</sup>	Oxalidaceae	Singri mwkhi fisa	Leaves	Assam	Decoction	Flavonoids, Phlobatannins, Alkaloids	27,35
22.	<i>Scoparia dulcis</i> L <sup>[28]</sup>	Scrophulariaceae	Naipungchewk	Whole plant	Tripura	Decoction	Flavonoids, diterpenoids, Aliphatics	28,39
23.	<i>Azadirachta indica</i> A. Juss <sup>[29]</sup>	Meliaceae	Neem	Leaves	Assam	Raw, decoction	Nimbin, nimbolinin, nimbidol	29,35
24.	<i>Vernonia anthelmintica</i> <sup>[30]</sup>	Asteraceae	Kalijiri, Somaraaj	Seeds	Meghalaya	Powder	Anethole, limonene, thymol, sabinene	14,30
25.	<i>Swertia chirata</i> Ham <sup>[31]</sup>	Gentianaceae	Chireto	Whole plant	Sikkim	Extract	Swertiamarin, amarogentin, gentianine	31,37
26.	<i>Clerodendrum infortunatum</i> L <sup>[32]</sup>	Lamiaceae	Mwkhwna	Leaves	Assam	Decoction	$\beta$ -sitosterol, Fumaric acid, $\beta$ -sitosterol glucoside	32,35
27.	<i>Piper longum</i> L <sup>[33]</sup>	Piperaceae	Simfri fithai	Fruits	Asaam	Raw	Bisabolene, $\alpha$ -zingiberene, $\beta$ -caryophyllene	33,35
28.	<i>Ficus religiosa</i> L <sup>[34]</sup>	Moraceae	Phakhri dongfang	Bark	Assam	Raw	Lanosterol, stigmasterol, lupen-3-one	34,35
29.	<i>Citrus grandis</i> L <sup>[35]</sup>	Rutaceae	Nareng jumbr	Fruits	Assam	Maceration	Limonene, $\beta$ -carotene	35
30.	<i>Amaranthus spinosus</i> L <sup>[36]</sup>	Amaranthaceae	Khuduna su, Khutra	Leaves	Assam	Raw	Quercetin, hydroxycinnamate, kaempferol glycosides	35,36









Plants found in North-East region for anti-helminthic activity

### Conclusion

One of the main factors affecting an animal's health is helminthosis which causes significant and sneaky economic losses. According to our study, there is a significant amount of ethnomedicinal knowledge for treating helminth infections among the north-east region of India. Due to the existence of multiple complex chemicals with varying compositions that are present as secondary plant metabolites in one or more portions of medicinal plants, these plants have therapeutic powers. The treatment of helminthiasis in traditional medicine involves the use of a range of medicinal plants. The medicinal plants utilised in conventional medicine are documented in this study. For phytochemical, pharmacognostical, pharmacological, and therapeutic research, novel substances with active principles are developed using ethnobotanical knowledge as a foundation. There are professionals who use these treatments in every town and community, therefore there is an excellent local health tradition. The market for such drug-producing plants is enormous. The literature survey revealed that the majority of the medicinal plants mentioned in the current study have been scientifically proven to have anthelmintic activity. Compared to commercial anthelmintics, anthelmintic medicinal herbs are more affordable, more widely available, simpler to grasp, and better suited to a particular locale. Because of this, traditional anthelmintic medicinal plants may play a significant role in the management and prevention of parasitic helminths in animals.

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