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Exploring the Ethano-Medicinal Use of *Piper Longrum* in Association with Other Plant Species by Various Ethnic Tribes of Assam, India

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Abstract: Assam is situated in northeast India, primarily within the Eastern Himalayas and Indo-Burma biodiversity hotspots, and is recognized as one of the country's richest biodiversity regions. Its landscapes encompass grasslands, tropical rainforests, wetlands, and riverine ecosystems that support a vast array of flora and fauna. Alongside this ecological wealth, Assam is renowned for its tribal and ethnic diversity, including communities like the Bodo, Mising, Karbi, Ahom, Deori, and others. These tribes possess profound ethno-medicinal botanical knowledge, using diverse plants often in combinations to treat various diseases and ailments. A prominent example is longum, widely employed across these groups for remedies against cough, cold, ulcers, diabetes, dysentery, and more. The present study documents the folklore medicinal practices associated with Piper longum and its associate plants among 15 different tribal communities of Assam.

Keywords: Ethano botany, Folklore medicine, Piper longrum, Assam, Tribes.

1. INTRODUCTION:

Assam, located in northeastern India, is dominated by the broad floodplains formed by the Brahmaputra and Barak rivers. Its terrain features extensive river plains, low rolling hills, and a close-knit network of streams, which are commonly categorized into the Brahmaputra valley, the Barak valley, and adjoining hill regions. Geographically, the state lies between about 24°–28° N latitude and 89°–96° E longitude and shares its borders with Bhutan, Arunachal Pradesh, Nagaland, Manipur, Meghalaya, Tripura, Mizoram, West Bengal, and Bangladesh. Assam has a warm, humid, monsoon-driven climate, receiving heavy rainfall that supports dense vegetation and remarkable biological richness. Assam is inhabited by diverse indigenous tribes including Bodo, Mising, Karbi, Rabha, Dimasa, Tiwa, Deori, and Sonowal Kachari, each boasting distinctive dialects and traditions. These populations depend extensively on native vegetation for nutrition, healing, rituals, and everyday tools,forming the core of their deep-rooted ethnobotanical insights Their customs feature herbal cures, wild plant foraging, holy woodland conservation, and sacred flora in rites, with ancestral lore shared by word of mouth and woven into their environmental views and heritage. Assam has around 4273+ different kind plant species out of which approximately 952+ plant species were found to have medicinal properties directly or indirectly (Barooah C. and Ahamed I., 2014) (ENVIS Centre: Assam Status of Environment and Related Issues, 2025). One of the most widely and extensively used medicinal plant species by various tribal tribes of assam is Piper longrum.

Botanical Description:

Piper longum L. is a climbing vine from the Piperaceae family, thriving in South Asia, especially India. It is a perennial climber or subshrub and grows primarily in the temperate biome. People have long used its dried fruit clusters as a spice, in traditional medicine, and for various remedies (Chanchal, C. & Thongam, B., 2013).

Classification:

Kingdom Plantae
Phylum- Streptophyta
Class- Equisetopsida
Subclass- Magnoliidae
Order- Piperales
Family- *Piperaceae*
Genus- *Piper*

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Species- *Piper longum*

Numerous plants are used in folklore medicine by different tribal and rural communities of Assam for curing various diseases. one of them is *Piper longrum* also known as pipoli or long pepper vernacularly. It is primarily associated with the traditional management of a wide range of conditions, including cough, sore throat, paralysis of tongue, fever, chronic bronchitis, headache, constipation, including cough, sore throat, paralysis of tongue, fever, chronic bronchitis, headache, constipation, asthama, gonorrhea, diarrhea, cholera, ulcer, chronic malaria, respiratory infections, stomach ache, spleen disorders, and various tumors etc (Biswas et al., 2022). A comprehensive study has been conducted to document all folklore medicinal practices associated with Piper longum performed by various tribal communities or tribes of Assam.

2. MATERIALS AND METHODS:

Study-site

The present study was conducted in different districts and villages of assam based on tribal tribe's availability in different locations. Field studies were conducted between January 2024 to December 2025. Ethno-medico-botanical information on folklore practices were gathered following

the methodologies proposed by (Schultes., 1962) and (Jain., 1963), primarily through interviews and cross-verification with local inhabitants of different tribal tribes.

Fig: Study site highlighted in Assam map.

3. RESULTS:

After field survey, practical demonstration and application results are enumerated below. Different tribes of assam uses Piper longrum in combination with different plants and then process it differently according to illness or disease. Various tribal tribes and there use of P. longrum is describe below:

Table1: List of tribes and their use of P.longrum for different illness and diseases in different part of Assam.

Tribes (district/study location)	Scientific name of Plant in association with *P.longrum* L.	Part used	Illness/disease	Preparation procedure	Dosage

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1. Bodo (kokrajhar)	*Phyllanthus niruri* L.	Leafs and fruits	a. Ulcer in mouth	Fruit of *P. longrum* and parts of *P. nururi*, a paste is made and applied in ulcer area.	3 gm is applied for 1 week
			b. Immunity enhancer	A herbal tea is prepared using the leafs and fruit of *P. nururi* and dry fruit of *P. longrum*	100 ml, 4 days per week
	Pouzolzia zeylanica (L) Benn.	Whole plant	c.stomachache	Whole plant extract is used (basically stem and leaf) is mixed with root paste of *P.longrum* and consumed.	5ml of plant extract of *P zeylanica* is added in 5gm of root paste of *p.longrum.*
2. Mising (Gohpur,Lakhimpur)	*Zingiber officinale* Roscoe	Rhizome	a. Dysentry	Both rhizome of *Z. officinale* and fruit of *P. longrum* is boiled and then pinch of salt is added and then drunk.	200 ml is usually used during dysentry
			b. Sore throat	A herbal tea is prepared using the rhizome of *Z. officinale* and dried fruit powder of *P. longrum*	In 200ml of water 10gm of crush rhizome of *Z. officinale* and 3 gm of dried fruit powder of *P. longrum* is added and boiled till the water reduced to 100 ml and then consumed

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3. Karbi (Dima Hasao)	*Catharanthus rosesus*(L.) G.Don	Leafs and flower	a. Diabetes	A fine paste is made of both plants part i.e, leafs and flower of *C. rosesus* and fruit of *P. longrum.*	1 table spoon (approximately 5-6 gm)
			b. Menstural pan	Amature leaf bud of *C. rosesus* and amature leaf of *P.longrum* is chewed and taken together.	1 leaf bud and 1 amature leaf is taken.
4. Tiwa (Morigaon)	*Dillenia indica* L.	Bark	a. Analgesic	Dry bark powder of *D.indic*a and dry powder of *P.longrum* fruit is mixed in luke warm water together and then taken	Both powder is mixed in equal ratio to form 5-6 gm, then added in 150 ml water.
			b. Digestion	Pulp of *D.indica* fruit and powder of *P.longrum* is mixed and taken	2 ml pulp and 4 gm powder of *P.longrum* is mixed and made in form of capsule and consumed.
5. Dimasa (Karimganj and hailakandi)	*Aegle marmelos* (L.) Corrêa	Fruit pulp	a.Constipation	Pulp of *A.marmelos* and dry powder of *P.longrum* is mixed and consumed.	2gm *P.longrum* powder is mixed in 100 ml of pulp 100 ml is taken twice a day
			b. Diarrhea	Same treatment is used.	5 gm dried bark powder of

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		a. Bark			*A.scholari* is mixed in 5ml *P.longrum* extract and then both are mixed in 100ml luke warm water.
6. Rabha (Goalpara)	*Alstonia scholaris* (L) R.B.r	b. Leafs and flower	Malaria Skin irritation (fungal)	Dried bark power of *A.scholaris* and is mixed with *P.longrum* fruit extract. Flower and leaf of *Alstonia scholaris* is crushed and mixed with root paste of *P.longrum* and applied in affected area.	5gm of crushed mixer of Flower and leaf of *Alstonia scholaris* is mixed with 5gm root paste of *P.longrum.*
7. Deori (Dibrugarh)	*Ocimum sanctum* L.	Leafs and leaf bud	a. Cough b. Fever	Leaf extract of *O.sanctum* is mixed with fruit of *P.longrum* powder and honey then consumed. Leaf extract of *O.sanctum* is mixed with fruit of *P.longrum* powder and giner extract and consumed.	3gm leaf extract of *O.sanctum* mixed with 1 table spoon of honey and 2gm of *P.longrum* powder. 3gm leaf extract of *O.sanctum* mixed with 2gm of *P.longrum* powder and 3gm of ginger extract.

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8. Garo (Goalpara)	*Calotropis procera* (Aiton) W.T.Aiton	Leafs	Bone pain and sciatic nerve injury	A paste of *P.longrum* leafs and *Cucurma longa* is made and then is gently heated and bandaged using *C.procera* leaf in pain bone region.	A paste of 10gm *P.longrum* leafs and 30 gm *C. longa* is bandaged using *C.procera* leaf in pain region . leafs are gently heated before use.
9. Sonowal kachari (Dhemaji)	*Clerodendrum infortunatum* L.	Leafs	Bronchitis	Leaf extract of *C. infortunatum* is mixed with powder of *P.longrum* powder and consumed.	2gm of *P.longrum* powder is mixed in 5ml of leaf extract of *C.infortunatum*
10. Tea-Garden Community (Biswanath)	*Leucas aspera* (Willd.) Link	Whole plant	Asthama	Plant extract of *L. aspera* is mixed with *P.longrum* powder or stem extract and then consumed.	5gm of L.aspera extract mixed with 2gm of *P.longrum* powder.
11. Khasi (Goalpara)	*Cleome rutidosperma* DC.	Leafs	a.Convulsions b. Digestion	Leaf extract of *C. rutidosperma* and root extract *P.longram* is mixed and consumed. Leaf extract of *C. rutidosperma* and root extract *P.longram* or dried powder is mixed and consumed.	5ml of leaf extract is mixed with 2gm of root extrct 5ml of leaf extract is mixed with 2gm of root extrct or powder.

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12. Tai-Ahom (Jorhat)	*Hellenia speciosa* (J.Koenig) S.R.Dutta	stem	a. High blood pressure	The stem of *H.speciosa* is boiled and then root extract of *P.longrum* is added and the water is consumed	5gm of root extract of *P.longrum* is added in 200ml of *H.speciosa* boiled water.
			b. jaundice	Same treatment is used	200ml is taken twice a day.
13. Mech (kokrajhar)	*Ageratum conyzoides* L	Leafs and flower	skin irritation, minor burn and cut.	Leaf and flower extract of *A. conyzoides* is mixed with root extract and then applied in burn, cut region.	5gm of leaf and flower extract of *A.conyzoides* is mixed with 3gm of root extract of *P.longrum*. ratio may change depending upon wound size.
14. Hajong (Goalpara)	*Acacia auriculiformis* A.Cunn. ex Benth.	Bark, leafs and flower.	Cholera	Dried bark of *A.auriculiformis* and stem of *P.longrum* is boiled together and the water is consumed.	In 500ml of water 50 gm of bark of *A.auricliformis* And 10-20 gm of Stem of *P.longrum* is mixed and boiled.
15. Tai-khamti (Dibrugarh)	*Garcinia pedunculata* Roxb. ex Buch.-Ham.	Young leafs, and fruit	a. Piles and Dysentery	Fruit pulp of *G.pedunculata* is mixed with fruit extract of *P.longrum* and consumed	5ml of fruit pulp of *G.pedunculata* added in 2gm of fruit extract of *P.longrum*.
	Curcuma caesia Roxb.	Rhizome	b. Snake or scorpion bite	A paste of rhizome of *C.caesia* is made and mixed with root extract of *P.longrum*.	20 gm rhizome pasted is mixed with 4ml of root extract of *P.longrum*. Then applied in bit region.

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Figure of some associated medicinal plants used by different tribes:

Calotropis procera

Alstonia scholaris

A.auriculiformis

C. rutidosperma

Voucher speciments were collected, photographed and later identified. Identification were done following reference like Hooker (1872-1897), Flora of assam - Kanjilal (1934-1940), and by comparing with pre-identified herbarium specimen in GUBH (Gauhati university botany herbarium).

4. DISCUSSION:

The ethno-medico botanical investigation of the region revealed that the indigenous communities possess extensive traditional knowledge regarding the therapeutic uses of local plant species. However, due to increasing exposure to modernization and changing socio-cultural dynamics, this ancestral wisdom is at risk of gradual extinction. Hence, systematic documentation and scientific evaluation of the ethnobotanical practices of different tribes and sub-tribes are imperative to preserve and utilize this traditional knowledge for future ethno pharmacological and conservation studies. The present study revealed various major tribes of Assam uses different plants combining with *P. longrum* for different diseases and illness. Some studies revealed that the plants used by major tribes has different phytochemical and medicinal properties like *phyllantus nururi* L. has anti-ulcer property (Mostofa et al., 2017), *Calotropis procera* (Aiton) W.T.Aiton possesses anti-arthritic and bone pain remedial property (Zafar et al., 2021)(Mamta et al., 2023). Anti-malarial properties are also observed in the secondary metabolite produced by Alstonia scholaris (L) R.B.r (De et al.,2024). Ocimum sanctum L. also has cough remedial property which has been used by various tribes (Santosh et al., 2024). Garcinia pedunculata Roxb. ex Buch-Ham possesses dysentery remedial property (islam et al., 2021). Due to the presence of precocenes, flavonoids, and terpenoids in Ageratum conyzoides L it possesses anti-inflamatory and wound healing properties (Afariogun.,2025). Hellenia.speciosa (J.Koenig) S.R. Dutta has anti-diabetic and anti-jaundice property (Raveendran.,2019).C rutidosperma DC possesses anti-convulsion property (Trang., 2023).

The present investigation revealed 15 tribal tribes of Assam uses 18 different plant and associate it with P. longrum for curing different diseases and illness. Different parts were being used such as rhizome, stem, leafs, leaf buds, flower, fruit, bark, roots as treatment. These all plants other than medicinal properties have other ethnic significance among the tribal tribes of Assam.

5. CONCLUSION AND FUTURE PERSPECTIVE:

It is found that Piper longrum is used by almost all tribal tribes of Assam. As it it possesses numerous health benefit and medicinal property. Different plant above mention also rich in different phytochemicals possesses anti-inflammatory, antibacterial, anti-cancer and other medicinal properties. Extensive scientific research is urgently needed to validate these folk claims. Further research is required on these ethno-medicinal plants to isolate and identify their active constituents and to evaluate their safety and therapeutic effectiveness, enabling their potential use in modern healthcare applications like drug discovery.

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