ASIAN JOURNAL OF ETHNOBIOLOGY
Volume 9, Number 1, June 2026 E-ISSN: 2580-4510
Pages: 14 DOI: 10.13057/asianjethnobiol/y090121

Quantitative documentation of ethnomedicinal plants used by Mising Tribe inhabiting the forest fringe villages of Nameri National Park, Assam, India

SATYA NATH DOLEY[1,2,♥], RUBY DOLEY[3], MANOJ BARTHAKUR[4]

[1]Department of Botany, Gauhati University. Jalukbari, Guwahati 781014, Assam, India. Tel.: +91-361-257-0415, ♥email: satyadoley369@gmail.com
[2]Department of Botany, Arya Vidyapeeth College (Autonomous). Gopinath Nagar, Guwahati 781016, Assam, India
[3]Department of Botany, North Gauhati College, Amingaon, Guwahati 781031, Assam, India
[4]Department of Botany, B. Borooah College (Autonomous). Ulubari, Guwahati 781007, Assam, India

Manuscript received: 24 January 2026. Revision accepted: 14 April 2026.

Abstract. *Doley SN, Doley R, Barthakur M. 2026. Quantitative documentation of ethnomedicinal plants used by Mising Tribe inhabiting the forest fringe villages of Nameri National Park, Assam, India. Asian J Ethnobiol 9 (1): y090121. https://doi.org/10.13057/asianjethnobiol/y090121.* Assam is one of the states of the northeast region of India, renowned for its abundant natural resources and rich diversity of ethnic groups, including the Mising Tribe. The Mising Tribe of Assam, primarily residing in riparian and forest-fringe areas, maintains unique ethnomedical practices that are integral to both healthcare and biodiversity conservation. This study aimed to document the ethnomedicinal plants used by the Mising Tribe inhabiting the forest fringe of Nameri National Park (NNP), Assam, India. Ethnobotanical information was gathered from 58 informants (males 38 and females 20) of four fringe villages of NNP through semi-structured interviews during the period of March 2022 to March 2025. In the results, a total of 109 medicinal plant species belonging to 58 families were recorded. Among these, a total of 19 species is a new record of ethnomedicinal plants that have not been previously reported for the Mising Tribe. The dominant family was Rutaceae (7 species), followed by Asteraceae, Moraceae, and Solanaceae (4 species for each). Most of the plants were herbaceous (37%), and the majority of remedies were prepared from leaves (28%). High Informant Consensus Factor (ICF) values were observed for connective disorders (0.97), respiratory (0.89), and skin disease (0.86). These findings emphasize the importance of preserving ethnomedicinal knowledge of the Mising community inhabiting ecologically sensitive forest-fringe areas and highlighting crucial plant species for pharmacological validation and conservation.

Keywords: Ethnomedicine, Mising, Nameri National Park, use value, informant consensus factor

INTRODUCTION

The Northeast (NE) India represents one of the most biodiverse and culturally rich regions of the country, and Assam is a state of this region. This region overlaps two biodiversity hotspots: Eastern Himalaya and Indo-Burma, home to unique flora and fauna. Meanwhile, this region supports different indigenous communities whose lifestyles and healthcare systems are deeply rooted in local biological resources (Sharma and Pegu 2011). As a result, NE India serves as an outstanding repository of ethnomedicinal knowledge, where each indigenous community maintains its distinct ethnomedicinal practices shaped by long-term ecological interactions. NE India harbours about 825 species of medicinal plants, from which about 9225 phytochemicals have been identified across 561 plants (Kiewhuo et al. 2022).

The Misings are the second most populous tribe in Assam. They belong to the Tibeto-Burman linguistic family and occupy a prominent position in Assam's ethnocultural landscape. Historically referred to as '*miri*', the tribe is officially recognised under this designation in the Constitution of India (Doley and Medak 2019). Primarily inhabiting the riverine tracts of Upper Assam, the Mising people have developed sophisticated traditional ecological knowledge systems that enable the sustainable utilisation of regional plant resources. Their traditional therapeutic system highly relies on locally available plant resources and plays an important role in the treatment of various ailments. For the majority of Mising households, traditional medicine still serves as the first line of healthcare, especially in rural areas and among the elderly. However, the transfer and persistence of this indigenous knowledge are seriously threatened by generational changes, fast socioeconomic development, and growing reliance on allopathic medicine, highlighting the necessity of thorough documentation.

The present study area is situated in the forest fringe villages of Nameri National Park (NNP), located in the Sonitpur District of Assam, India. Covering ~200 km² along the northern bank of the Brahmaputra River, NNP is traversed by the Jia-Bhoreli (Kameng) River and its tributaries, including Diji, Dinai, Doigurung, Nameri, Dikorai, and Khari. Declared a Tiger Reserve in 2000, the park lies in the foothills of the Eastern Himalayas and supports tropical evergreen, semi-evergreen, and moist deciduous forests interspersed with bamboo and cane brakes, along with narrow riparian grasslands. Fringe villages surrounding NNP form transitional socio-ecological zones where human settlements directly interface with protected forest ecosystems. These villages, comprising revenue villages, forest villages, and encroached settlements within buffer zones, are predominantly inhabited by indigenous tribal communities, with the Mising Tribe forming the most prominent social group. As a riverine community residing along the Jia-Bhoreli River, the Misings have adapted their livelihoods to the dynamic fluvial environment, fostering a strong dependence on surrounding forest resources for food, medicine, and cultural practices (Doley 2014). Their traditional healthcare system remains an essential component of primary health management, particularly in remote fringe settings with limited access to formal medical infrastructure.

Several ethnobotanical studies have previously documented the medicinal, wild edible fruits, and subsistence plant use of the Mising community across Assam (Dutta et al. 2016; Sarma and Devi 2016; Sarma et al. 2016; Pame et al. 2021; Das and Pegu 2023). Recent quantitative approaches have further highlighted the socio-economic reliance of forest fringe communities on indigenous plant resources (Kutum et al. 2011; Buragohain et al. 2024). Despite these efforts, a significant documentation gap persists regarding ethnomedicinal plant use in the ecologically sensitive buffer zones of protected areas, such as NNP. Compared to non-protected landscapes, forest fringe communities face distinct ecological challenges, conservation constraints, and livelihood vulnerabilities that influence their plant-use practices. However, there is still a lack of documentation on ethnomedical knowledge from such ecologically sensitive interfaces, especially when it comes to the use of standardised quantitative indicators that enable cross-regional comparison and the ranking of culturally significant taxa.

In light of the aforementioned fact, the present study aims to document, analyze, and preserve the indigenous phytotherapeutic knowledge of the Mising Tribe inhabiting the forest-fringe villages of Nameri National Park (NNP). Specifically, the study seeks to record the diversity of ethnomedicinal plants used by the community, evaluate their therapeutic significance through quantitative measures, such as Use Value (UV), and assess informant agreement across different disease categories using the Informant Consensus Factor (ICF). The findings are expected to contribute to the preservation of traditional knowledge, provide a scientific basis for future pharmacological validation, and inform conservation strategies in ecologically sensitive forest-fringe landscapes.

MATERIALS AND METHODS

Data collection

The ethnobotanical survey was conducted in four Mising-dominated fringe villages of Nameri National Park (NNP), located in the Sonitpur District of Assam, India, such as Gargaon Mising Village, Dukkep Mising Village, Chotai Mising Village, and Sonaipum Mising Village (Figure 1), from March 2022 to March 2025. All relevant data, including information on the traditional uses of medicinal plants by the Mising community of the fringe areas of NNP, were collected through a purposive sampling method by following the International Society of Ethnobiology Code of Ethics (ISE 2006). Using a specially designed questionnaire, data were collected through personal interviews as well as Focused Group Discussions (FGDs) involving a total of 58 informants (38 males and 20 females) with an age group ranging from 30 to 79 years. The interviews were conducted in both Assamese and Mising languages to make it easier for the respondents to explain themselves. Most informants were engaged in diverse livelihood activities, including farming, social work, teaching, shopkeeping, and household management. The illiteracy rate among the respondents was 27.59%, while 37.93% had attained primary to secondary-level education, and 34.48% possessed graduate-level or higher qualifications (Table 1). Annually, three visits per village were made at different time intervals for primary data collection. Based on the information provided by the ethnic community, key informants were identified. With their cooperation, plant specimens were collected from the forest, and the local names of the plants were documented in a structured questionnaire that included scientific name, family, local name, plant parts used, application, method of preparation, and route of administration were recorded in a notebook.

Plant collection, identification, and preservation

Plants were collected with the cooperation of herbal practitioners of the Mising community for proper recognition during their mature stage. Voucher specimens related to ethnomedicinal information were also collected during the reproductive phase (i.e., flowering or fruiting) to ensure accurate identification. The collected specimens were initially tagged with their local names during the survey and later identified using relevant taxonomic literature such as Flora of Assam (Kanjilal et al. 1934-1940), Assam's Flora (Chowdhury 2005), and A Checklist of Angiosperms and Gymnosperms (Barooah and Ahmed 2014). Identification was further validated by comparing the specimens with deposited vouchers at Gauhati University Botanical Herbarium (GUBH), Assam. Digital databases like the International Plant Name Index (https://www.ipni.org) and Plants of the World Online (https://powo.science.kew.org) were used to verify the updated and accepted scientific nomenclature of each specimen.

Disease classification

The ailments treated by the traditional practitioners were categorized according to the International Classification of Primary Care (ICPC)-2 (Kalita et al. 2025).

Data analysis

The chi-squared (X^2) test, a nonparametric approach to the one-way ANOVA, was performed between ethnobotanical knowledge and gender, age, education, healing experiences of the informants (Tamene et al. 2024).

Use Value (UV)

The UV was determined by the formula (Phillips and Gentry 1993):

$UV = \Sigma\, Ui/n$

Where, Ui: Number of Use Reports (UR) for a given species, n: Total number of informants interviewed. UR is the number of citations or mentions of each species by informants for a particular usage.

Informant Consensus Factor (ICF)

The ICF was calculated by the following formula (Heinrich et al. 1998):

$ICF = (N_{ur} - N_t) / (N_{ur} - 1)$

Where, N_{ur}: Number of UR in each disease category, N_t: Number of taxa used in each category. ICF values may range from 0 to 1, with a tendency towards 1 indicating a high degree of informant agreement.

Data handling

The ethnobotanical information was gathered through Focus Group Discussion (FGD) and semi-structured interviews. Before quantitative analysis, URs of plants were reviewed for completeness, consistency, and duplication. The unclear or doubtful information of the informants was eliminated. To authenticate the local names and usage statements of the plants, they were cross-verified across informants and FGD both within and between villages. URs that were stated by a minimum of two informants were considered for analysis. The UV and ICF were computed using Microsoft Excel, while the preparation of the tables and consistency checks were carried out manually. The species reported for the first time in the present study was validated by comparing with previous ethnobotanical studies (Borah et al. 2009; Kutum et al. 2011; Shankar et al. 2012; Das and Pathak 2013; Bhuyan et al. 2015; Pandey et al. 2015; Panging and Sharma 2017; Borah et al. 2021; Buragohain et al. 2024).

Table 1. Demographic characteristics of the informants in the study area

Parameter	Category	Number	Frequency (%)	p-value
Sex	Male	38	65.52	0.018*
	Female	20	34.48	
Healing Experiences	Key informants	33	56.90	0.29
	General informants	25	43.10	
Age in years	30-39	10	17.24	0.009*
	40-49	18	31.03	
	50-59	18	31.03	
	60-69	4	6.90	
	70-79	8	13.79	
Educational level	Illiterate	16	27.59	0.62
	Elementary to Higher Secondary level	22	37.93	
	Graduate and above	20	34.48	

Note: *: Significance association at $p<0.05$

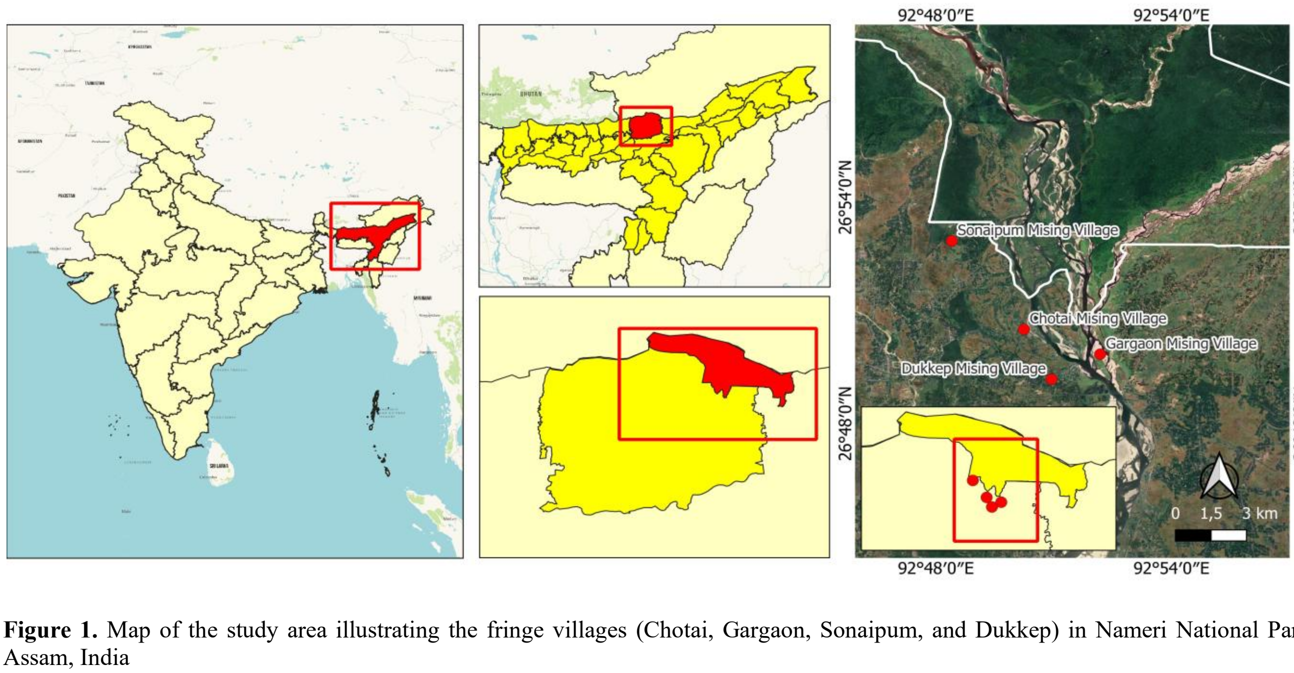

Figure 1. Map of the study area illustrating the fringe villages (Chotai, Gargaon, Sonaipum, and Dukkep) in Nameri National Park, Assam, India

RESULTS AND DISCUSSION

Demographic characteristics

The demographic profile of the informants demonstrates variation in ethnobotanical knowledge distribution across sex, age, healing experience, and educational status. Male informants constituted 65.52% of the respondents, whereas females accounted for 34.48%. Key informants represented 56.90% of the total participants. Age-wise distribution showed that the majority of informants belonged to the 40-59 years age group (62.06%), followed by the 30-39 years group (17.24%), with comparatively lower representation from other age categories. In terms of educational attainment, 27.59% of the informants were illiterate, while 72.41% had received formal education.

Our findings revealed a significant association between the informants' ethnomedicinal knowledge and gender (X^2=5.59, df=1, p-value=0.018), as well as age (X^2=13.38, df=4, p-value=0.018) (Table 1). However, no significant association between ethnomedicinal knowledge and healing experiences, education (p-value=0.29 and 0.62, respectively).

Diversity and habits of medicinal plants

In the present study, altogether 109 plant species belonging to 58 families were documented to be used in ethnomedicinal practices (Table 2). Among them, 19 species are reported for the first time that have not been previously reported for the Mising Tribe (denoted with (*) in Table 2). The dominant family was Rutaceae (7 spp.), followed by Lamiaceae, Asteraceae, Moraceae, and Solanaceae (4 spp. for each), and Acanthaceae, Clusiaceae, Dioscoraceae, Fabaceae, Lamiaceae, Malvaceae, Phyllanthaceae, and Piperaceae (3 spp. for each) (Figure 2). Furthermore, 15 families were represented by 2 species, while 31 families were represented by only a single species. Herbs were the most frequently documented life form (37%), followed by trees (25%), climbers (17%), shrubs (16%), and scandent plants (5%) (Figure 3).

Plant parts used, preparation, and route of administration

The Mising Tribe has a deep native knowledge of the use of different plant parts and their therapeutic properties. The most commonly used plant part was leaf (28%), followed by fruits (20%), stem (15%), whole plant (11%), roots (9%), and so on (Figure 4). Regarding preparation methods, decoction was the primary technique (50%), followed by crushing (45%), pounding (3%), and raw consumption (2%) (Figure 5).

Use Value (UV)

The relative cultural significance, frequency of citation, and perceived therapeutic efficacy of the medicinal plants utilised by the Mising Tribe are highlighted by the UV analysis. The UV values were categorized into high >0.80; moderate 0.50-0.80; and low <0.50. *Dimetia scandens* (1.00), *Hydrocotyle sibthorpioides* (1.00), *Piper nigrum* (0.98), *Clerodendrum colebrookeanum* (0.98), *Ocimum tenuiflorum* (0.97), *Sarcochlamys pulcherrima* (0.97), *Zingiber officinale* (0.97), and *Zanthoxylum rhetsa* (0.95), *Centella asiatica* (0.93), *Paederia foetida* (0.93), *Tinospora cordifolia* (0.93), *Blumea lanceolaria* (0.91), *Hellenia speciosa* (0.91), *Zanthoxylum nitidum* (0.91), *Thelypteris opulenta* (0.90, *Acorus calamus* (0.84), *Averrhoa carambola* (0.84), *Cryptolepis sinensis* (0.84), *Houttuynia cordata* (0.84), *Justicia adhatoda* (0.83), *Bischofia javanica* (0.81), and *Meliosma simplicifolia* (0.81) are some of the species with high UVs (>0.80) that are frequently used in ethnomedical practices (Table 2). These taxa play a crucial role in primary healthcare since they are mainly used for common and chronic conditions like diabetes, hypertension, gastrointestinal disorders, respiratory issues, and infections. Many herbs and climbers have moderate UVs ranging from 0.50 to 0.80. Many plants, such as *Gloriosa superba*, *Nelumbo nucifera*, *Ricinus communis*, and many others, exhibited very low UVs (<0.50) (Table 2). Lamiaceae

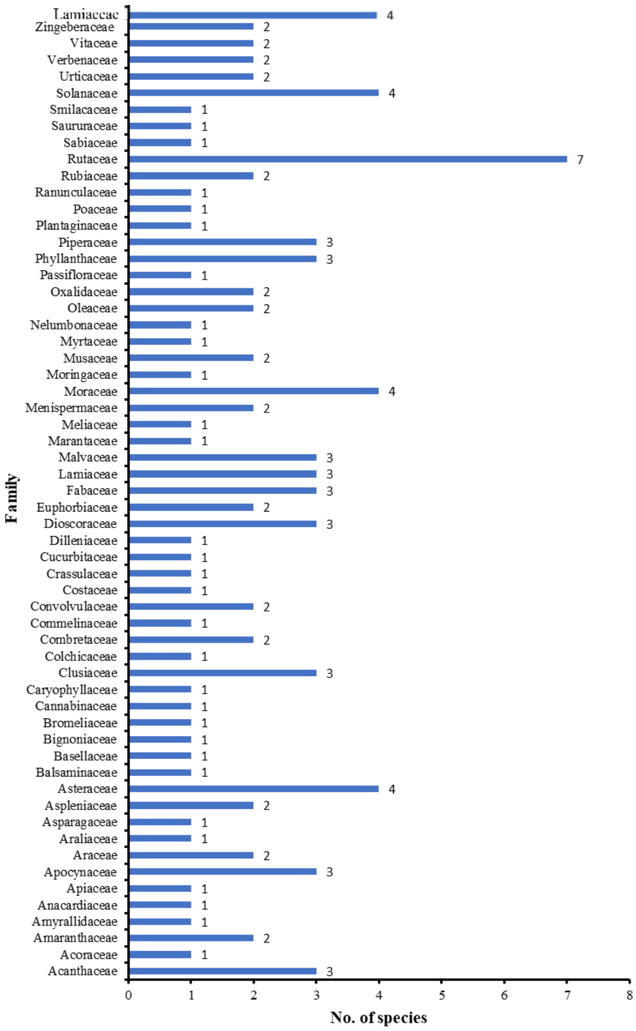

Figure 2. Distribution of recorded plant species among the families

Table 2. Ethnomedicinal profile of plant species collected from the fringe villages of Nameri National Park, Assam, India

Family	Plant species [Voucher No.]	Local name	Habit	Part(s) used	Mode of preparation	Effective against (or as)	Route of administration	UV
Acanthaceae	*Andrographis paniculata* (Burm.f.) Wall. ex Nees[SNB119]	*Sirata*	Herb	Whole plant	Decoction	Indigestion, stomach cramp	Oral	0.72
	Justicia adhatoda L. [SNB161]	*Bahaka*	Shrub	Whole Plant	Decoction	Asthma, cough, bronchitis	Oral	0.83
	Phlogacanthus thyrsiformis (Roxb. ex Hardw.) Mabb. [SNB116]	*Titaphul*	Shrub	Inflorescence	Decoction	Coughs, colds, jaundice, asthma	Oral	0.84
Acoraceae	*Acorus calamus* L. [SNB128]	*Alo-Koni*	Herb	Leaves and rhizome	Crushing	Diarrhea, cough, fever	Oral	0.84
Amaranthaceae	*Alternanthera sessilis* (L.) DC. [SNB36]	*Pa-tang oying*	Herb	Whole plant	Decoction	Dysentery, diarrhea	Oral	0.60
	Amaranthus viridis L. [SNB04]	*Ge-nyak*	Herb	Leaves and stem	Decoction	Diabetes, stomach disorder	Oral	0.40
Amaryllidaceae	*Allium sativum* L. [SNB12]	*Talab*	Herb	Bulb	Crushing	Hypertension, indigestion	Oral	0.79
Anacardiaceae	*Spondias pinnata* (L.f.) Kurz [SNB145]	*Dorge*	Tree	Fruits, bark	Crushing	Gastric ulcers, hypertension, dysentery	Oral	0.67
Apiaceae	*Centella asiatica* (L.) Urb. [SNB22]	*Dangor-manimuni*	Herb	Whole plant	Crushing	Gastric problem, fever, wound, anti-inflammatory	Oral (Gastric problem, anti-inflammatory) or topical (wound)	0.93
Apocynaceae	*Calotropis gigantea* (L.) W.T. Aiton [SNB27]	*Akon-atang*	Shrub	Leaves	Decoction	Rheumatism, knee pain	Topical	0.72
	Cryptolepis sinensis (Lour.) Merr. [SNB74]	*Arjora*	Climber	Leaves	Crushing	Coughs, malaria, hypertension	Topical	0.84
	Rauvolfia serpentina (L.) Benth. ex Kurz* [SNB110]	*Akukusere*	Herb	Roots	Crushing	Epilepsy, hypertension	Oral	0.36
Araceae	*Colocasia esculenta* (L.) Schott [SNB99]	*Enge*	Herb	Tender stem and leaves, Corm	Decoction	Diabetes, fever, pain	Oral	0.45
	Lasia spinosa (L.) Thwaites [SNB167]	*Yudukor*	Climber	Leaves, rhizomes, and corms	Pounding	Gastric problem, constipation, cough	Oral	0.66
Araliaceae	*Hydrocotyle sibthorpioides* Lam. [SNB181]	*Horu-manimuni*	Herb	Whole plant	Crushing	Gastric, fever, wound	Oral (Gastric, fever) or topical (wound)	1.00
Asparagaceae	*Asparagus racemosus* Willd.[SNB113]	*Satmul*	Herb	Roots	Crushing	Indigestion, diabetes	Oral	0.57
Aspleniaceae	*Diplazium esculentum* (Retz.) Sw. [SNB95]	*Okang*	Herb	Leaf and roots	Decoction	Diarrhea, dysentery	Oral	0.40
	Thelypteris opulenta (Kaulf.) Fosberg* [SNB109]	*Rukji*	Herb	Leaves	Decoction	Skin diseases	Topical	0.90
Asteraceae	*Acmella paniculata* (Wall. ex DC.) R.K.Jansen [SNB120]	*Marsang*	Herb	Inflorescence	Crushing	Toothache, oral ulcer, sore throat	Oral	0.78
	Ageratum conyzoides L. [SNB125]	*Gendeli bon*	Herb	Roots and leaves	Crushing	Wound	Topical	0.74
	Blumea lanceolaria (Roxb.) Druce	*Merne-*	Herb	Leaves and stem	Decoction	Respiratory disorder, indigestion	Oral	0.91

	[SNB33]	*Kutung*						
	Eclipta prostrata (L.) L. [SNB118]	*Keyaras*	Herb	Whole Plant	Crushing	Liver tonic, kidney, skin diseases	Oral (Liver tonic, kidney) or topical (skin diseases)	0.60
Balsaminaceae	*Impatiens tripetala* Roxb. ex DC. [SNB171]	*Po-kkor*	Herb	Whole plant	Decoction	Urinary disorder, menstruation problem	Oral	0.76
Basellaceae	*Basella alba* L. [SNB78]	*Puroi*	Climber	Leaves	Decoction	Indigestion, cold, respiratory infection	Oral	0.40
Bignoniaceae	*Oroxylum indicum* (L.) Kurz [SNB179]	*Bat gila*	Tree	Root bark, stem bark, fruit, seeds	Decoction	Fever, diarrhea, respiratory problems	Oral	0.40
Bromeliaceae	*Ananas comosus* (L.) Merr. [SNB111]	*Keteki-Kontal*	Herb	Fruits	Decoction	Menstrual disorder, headache	Oral	0.78
Cannabaceae	*Cannabis sativa* L. [SNB37]	*Bang*	Shrub	Leaves	Decoction	Nerve disorder, chronic pain, vomiting, nausea	Oral	0.74
Caryophyllaceae	*Drymaria cordata* (L.) Willd. ex Schult. [SNB17]	*Laijabori*	Herb	Whole Plant	Crushing	Peptic ulcers, sinusitis, headache, fever	Oral	0.64
Clusiaceae	*Garcinia cowa* Roxb. ex Choisy [SNB55]	*Tekera*	Tree	Fruit	Crushing	Diabetes, coughs, fever, hypertension, indigestion	Oral	0.78
	Garcinia pedunculata Roxb. ex Buch.-Ham. [SNB57]	*Bor-Tekera*	Tree	Fruit	Crushing	Diabetes, digestion, dysentery	Oral	0.86
	Garcinia xanthochymus Hook.f. ex T.Anderson [SNB59]	*Tepor tenga*	Tree	Fruit	Crushing	Diabetes, digestion, dysentery	Oral	0.38
Colchicaceae	*Gloriosa superba* L. [SNB141]	*Agnilata*	Herb	Tender stems and leaves	Crushing	Body pain, cough, malaria, wounds	Topical	0.21
Combretaceae	*Terminalia bellirica* (Gaertn.) Roxb. [SNB100]	*Bhomora*	Tree	Fruit	Crushing	Diarrhea, constipation, piles, flatulence	Oral	0.67
	Terminalia chebula Retz. [SNB166]	*Ilika*	Tree	Fruit	Crushing	Diabetes, cardiovascular disorder, bloating, constipation	Oral	0.78
Commelinaceae	*Commelina benghalensis* L. [SNB82]	*Kona ximolu*	Herb	Tender stems and leaves	Crushing	Digestive issues, stomach cramps	Topical	0.38
Convolvulaceae	*Ipomoea aquatica* Forssk. [SNB189]	*Kol-Mou*	Herb	Young leaves	Decoction	Jaundice, diabetes, diarrhea, constipation	Oral	0.24
	Ipomoea batatas (L.) Lam.* [SNB173]	*Pakli*	Climber	Tender leaves	Decoction	Diabetes, asthenia, stomach disorder	Oral	0.38
Costaceae	*Hellenia speciosa* (J.Koenig) S.R.Dutta [SNB149]	*Peki-Jig-Jig*	Herb	Tender stems and leaves	Decoction	Diabetes, fever, urinary problems, intestinal worms	Oral	0.91
Crassulaceae	*Kalanchoe pinnata* (Lam.) Pers. [SNB153]	*Duportenga*	Herb	Leaves	Crushing	Diarrhea, ulcers, fevers, headache	Oral	0.67
Cucurbitaceae	*Coccinia grandis* (L.) Voigt [SNB66]	*Porok-tuppet*	Climber	Fruit	Decoction	Stomach disorder	Oral	0.59
Dilleniaceae	*Dillenia indica* L. [SNB15]	*Sompa*	Tree	Fruit	Decoction	Diabetes, hypertension	Oral	0.90
Dioscoreaceae	*Dioscorea alata* L. [SNB25]	*Ali*	Climber	Tuber	Decoction	Diabetes, liver disorder	Oral	0.55
	Dioscorea esculenta (Lour.) Burkill* [SNB30]	*Ali*	Climber	Rhizome	Decoction	Diabetes, contraceptive	Oral	0.74
	Dioscorea pentaphylla L.* [SNB91]	*Ali*	Climber	Tuberous roots	Decoction	Dysentery, ulcer, skin infection	Oral	0.57

				and leaves				
Euphorbiaceae	*Euphorbia hirta* L. [SNB127]	*Gakhirioti*	Herb	Whole Plant	Crushing	Gastric problem, dengue fever, urinary issues	Oral	0.57
	Ricinus communis L. [SNB197]	*Enera*	Shrub	Fruits	Crushing	Intestinal worms	Oral	0.19
Fabaceae	*Entada rheedei* Spreng.* [SNB121]	*Bakur-guti*	Scandent	Seed	Decoction	Stomach disorder, skin disease	Oral	0.84
	Guilandina bonduc L. [SNB143]	*Bekur-guti*	Scandent	Leaves	Decoction	Pneumonia, urinary disorder, asthenia	Oral	0.57
	Tamarindus indica L. [SNB89]	*Teteli*	Tree	Fruit	Crushing	Indigestion, hypertension, liver problems	Oral	0.50
Lamiaceae	*Clerodendrum colebrookeanum* Walp. [SNB31]	*Pakkom*	Shrub	Leaves	Decoction	Hypertension, diabetes, gastritis	Oral	0.98
	Clerodendrum glandulosum Lindl. [SNB07]	*Dopat tita*	Shrub	Leaves	Decoction	Pneumonia, hypertension, diabetes	Oral	0.74
	Leucas lavandulifolia Sm. [SNB157]	*Dorun*	Herb	Leaves	Crushing	Headache, sinus, fever	Oral	0.78
	Ocimum tenuiflorum L. [SNB183]	*Tulsi*	Herb	Leaves and stem	Crushing	Cough, oral ulcer	Oral	0.97
Malvaceae	*Bombax ceiba* L. [SNB39]	*Singii*	Tree	Bark and roots	Decoction	Diarrhea, dysentery	Oral	0.50
	Hibiscus sabdariffa L. [SNB144]	*Ku-Suk*	Shrub	Leaves, fruit	Decoction	Hypertension, constipation, skin disease	Oral (Hypertension, constipation)or topical (skin disease)	0.40
	Sida acuta Burm.f. [SNB130]	*Sidaakuta*	Shrub	Leaves, roots, stem	Decoction	Menstrual disorder, headache, fever, stomach problems	Oral	0.40
Marantaceae	*Phrynium pubinerve* Blume [SNB001]	*Kou Paat*	Herb	Leaves, Rhizome	Decoction	Cough, fever, stomach problem	Oral	0.43
Meliaceae	*Azadirachta indica* A.Juss. [SNB96]	*Neem*	Tree	Whole Plant	Crushing	Hypertension, skin infection, malaria, diabetes, tonsillitis	Oral (hypertension, malaria, diabetes, tonsillitis) or topical (skin infection)	0.79
Menispermaceae	*Cissampelos pareira* L.* [SNB44]	*Tubuki lota*	Climber	Roots, stem, leaves, and flowers	Raw	Bone fracture, stomach pain, menstrual disorder	Topical	0.81
	Tinospora cordifolia (Willd.) Hook.f. & Thomson [SNB112]	*Oguni lota*	Tree	Stem	Crushing	Diabetes, indigestion	Oral	0.93
Moraceae	*Artocarpus heterophyllus* Lam. [SNB11]	*Belang*	Tree	Fruits	Crushing	Hypertension	Oral	0.41
	Ficus auriculata Lour. [SNB129]	*Takuk*	Tree	Leaves	Decoction	Diarrhea, dysentery, cuts, and wounds	Oral	0.55
	Ficus hispida L.f. [SNB131]	*Takpiya*	Tree	Leaves and Fruits	Decoction	Jaundice, diabetes, diarrhea	Oral	0.40
	Ficus racemosa L. [SNB133]	*Tajik*	Tree	Leaves	Decoction	Hearing loss, headache	Oral	0.74
Moringaceae	*Moringa oleifera* Lam. [SNB102]	*Sojina*	Tree	Tender Leaves, drumsticks	Decoction	Diabetes, jaundice, dysentery, hypertension	Oral	0.72
Musaceae	*Musa balbisiana* Colla [SNB191]	*Kopak*	Herb	Fruit	Pounding	Diabetes, jaundice, dysentery	Oral	0.55

	Musa paradisiaca L. [SNB150]	*Kopak*	Herb	Inflorescence	Crushing	Iron deficiency, epilepsy	Oral	0.57
Myrtaceae	*Syzygium cumini* (L.) Skeels [SNB79]	*Kola jamun*	Tree	Fruit	Crushing	Hypertension, liver tonic	Oral	0.67
Nelumbonaceae	*Nelumbo nucifera* Gaertn.* [SNB192]	*Elup*	Herb	Seeds, rhizome	Decoction	Skin diseases	Topical	0.21
Oleaceae	*Jasminum multiflorum* (Burm.f.) Andrews* [SNB175]	*Injari*	Shrub	Leaves and stem	Decoction	Skin disease	Topical	0.21
	Nyctanthes arbor-tristis L. [SNB194]	*Sewali*	Tree	Tender leaves, flowers	Crushing	Fever, cough, constipation, ringworms, arthritis	Oral	0.60
Oxalidaceae	*Averrhoa carambola* L.* [SNB123]	*Kordoi*	Tree	Fruits	Decoction	Indigestion, hypertension	Oral	0.84
	Oxalis corniculata L.[SNB195]	*Tengesi tenga*	Climber	Whole plant	Crushing	Stomach problems, hypertension, piles, fistula	Oral	0.57
Passifloraceae	*Passiflora foetida* L.[SNB137]	*Junuka-lota*	Climber	Leaf, fruit stem	Crushing	Stomach disorder, insomnia, and indigestion	Topical	0.55
Phyllanthaceae	*Antidesma acidum* Retz.* [SNB115]	*Helonch*	Tree	Leaves, tender shoots, fruit	Crushing	Fatigue, dysentery, diabetes, headache	Oral	0.41
	Bischofia javanica Blume [SNB65]	*Takkir*	Tree	Bark, Fruits	Crushing	Hypertension, diabetes	Oral	0.81
	Phyllanthus androgynus (L.) Chakrab. & N.P.Balakr. [SNB103]	*Oti-oying*	Shrub	Leaves	Crushing	Diabetes, eye sight improvement	Oral	0.50
Piperaceae	*Piper betleoides* C.DC. [SNB159]	*Jangi jaluk*	Climber	Fruit	Crushing	Anticancer, anti-inflammatory agents	Oral	0.33
	Piper longum L. [SNB117]	*Pipoli*	Climber	Leaves, fruit	Crushing	Asthma, cough, indigestion, and boosting immunity	Oral	0.59
	Piper nigrum L. [SNB113]	*Jaluk*	Climber	Fruit	Crushing	Kidney stones, urinary tract infection, diabetes, fever, digestive issues	Oral	0.98
Plantaginaceae	*Scoparia dulcis* L. [SNB40]	*Jalukbon*	Herb	Tender stem and leaves, roots	Crushing	Diabetes, digestive issues	Oral	0.66
Poaceae	Cynodon dactylon (L.) Pers. [SNB46]	*Dubori-bon*	Herb	Whole plant	Crushing	Fever, menstrual problem, jaundice	Oral	0.74
Ranunculaceae	*Clematis zeylanica* (L.) Poir.* [SNB147]	*Ramnam Kusere*	Climber	Stem and leaves	Crushing	Wound, ulcer	Topical	0.38
Rubiaceae	*Dimetia scandens* (Roxb.) R.J.Wang* [SNB69]	*Mongistha*	Scandent	Whole plant, roots, stem	Crushing	Urinary disorder, diabetes	Oral	1.00
	Paederia foetida L. [SNB114]	*Bongki-rupuk*	Climber	Young leaves	Crushing/ decoction	Gastric, stomach pain, Pneumonia	Oral	0.93
Rutaceae	*Aegle marmelos* (L.) Corrêa [SNB170]	*Bel*	Tree	Leaves and Fruit	Decoction	Diarrhea, constipation, fever	Oral	0.21
	Bergera koenigii L.* [SNB67]	*Norohinga*	Tree	Tender Leaves	Crushing	Diarrhea, diabetes, stomachache	Oral	0.60
	Citrus limon (L.) Osbeck [SNB09]	*Nemu*	Shrub	Fruit	Decoction	Anticancer, antioxidant, cold, cough	Oral	0.62
	Citrus × taitensis Risso* [SNB06]	*Golnemu*	Tree	Fruit	Decoction	Anticancer, antioxidant, cold, cough	Oral	0.57
	Citrus maxima (Burm.) Merr. [SNB02]	*Singkin*	Tree	Fruit	Decoction	Antioxidant, cold, cough	Oral	0.40
	Zanthoxylum nitidum (Roxb.) DC. [SNB124]	*Rikom*	Scandent	Stem	Crushing	Oral ulcer	Oral	0.91

	Zanthoxylum rhetsa (Roxb.) DC. [SNB134]	*Onger*	Tree	Roots, bark, fruits	Decoction	Toothache, diarrhea	Oral	0.95
Sabiaceae	*Meliosma simplicifolia* (Roxb.)Walp [SNB136]	*Gurban-ising*	Tree	Leaves	Decoction	Stomach disorder, indigestion	Oral	0.81
Saururaceae	*Houttuynia cordata* Thunb. [SNB180]	*Mosundori*	Herb	Whole plant	Crushing	Stomach problem, diarrhea	Oral	0.84
Smilacaceae	*Smilax ovalifolia* Roxb. ex D.Don [SNB60]	*Yo-rit*	Climber	Roots	Decoction	Arthritis, rheumatism	Oral	0.62
Solanaceae	*Solanum anguivi* Lam. [SNB1105]	*Bangko*	Shrub	Seed	Decoction	Hypertension, toothache, asthma	Oral	0.74
	Solanum lasiocarpum Dunal* [SNB106]	*Bangko*	Shrub	Fruit	Decoction	Stomach disorder	Oral	0.59
	Solanum nigrum L. [SNB90]	*Pokmou*	Shrub	Tender stem and leaves, Fruit	Decoction	Gastric ulcers, constipation, colitis, dysentery	Oral	0.40
	Solanum torvum Sw. [SNB172]	*Bangko*	Shrub	Fruit	Decoction	Hypertension, diabetes	Oral	0.55
Urticaceae	*Dendrocnide sinuata* (Blume) Chew * [SNB13]	*Peji*	Shrub	Tender Leaves	Decoction	Diabetes, indigestion	Oral	0.38
	Sarcochlamys pulcherrima (Roxb.) Gaudich* [SNB71]	*Ombe*	Shrub	Leaves	Decoction	Diarrhea, dysentery	Oral	0.97
Verbenaceae	*Phyla nodiflora* (L.) Greene [SNB05]	*Aluki-misri*	Herb	Whole plant	Decoction	Eczema, boils, urine disorder, jaundice, gastric problem	Oral (urine disorder, jaundice, gastric problem) or (Eczema, boils)	0.55
Vitaceae	*Cissus quadrangularis* L. [SNB34]	*Ganglong*	Climber	Stem	Raw	Bone fracture	Topical	0.84
	Tetrastigma angustifolium (Roxb.) Planch.* [SNB107]	*Nekung*	Scandent	Tendered shoot	Decoction	Analgesic, anxiolytic	Oral	0.78
Zingiberaceae	*Alpinia nigra* (Gaertn.) Burtt [SNB10]	*Taleng-ising*	Herb	Leaves and tender Stem	Decoction	Gastric problems, bronchitis	Oral	0.59
	Curcuma longa L. [SNB81]	*Alodi*	Herb	Rhizome	Crushing	Joint pain, cuts, indigestion	Oral (indigestion or topical (joint pain, cuts)	0.59
	Curcuma zedoaria (Christm.) Roscoe * [SNB77]	*Yakan aldi*	Herb	Rhizome and leaves	Crushing	Loss of appetite	Oral	0.53
	Zingiber officinale Roscoe [SNB49]	*Take*	Herb	Rhizome	Crushing	Cough, indigestion, respiratory disease	Oral	0.97
	Zingiber zerumbet (L.) Roscoe ex Sm.* [SNB152]	*Adi-take*	Herb	Leaves/Rhizome	Crushing	Skin, hair conditioner, inflammation, fever	Oral	0.41

Note: UV: Use Value, * : The new record of ethnomedicinal plants that have not been previously reported for the Mising Tribe in of Nameri National Park, Assam, India

Informant Consensus Factor (ICF)

The ICF value ranges from 0 to 1, i.e., a high value (close to 1) indicates that relatively few taxa are used by a large proportion of people, while a low value (close to 0) indicates that the informants disagree on the taxa to be used in the dealing within a category of illness (Dangwal et al. 2024). In the present study, the ICF values varied significantly between disease categories, suggesting that informants' levels of shared ethnomedical knowledge differed (Table 3). Respiratory disorders (0.89), connective diseases (0.97), and skin diseases (0.86) all had high ICF values, indicating that informants strongly agreed on the choice of plants for these conditions. Conversely, lower ICF values were found for cancer-related conditions (0.33) and ENT disorders (0.56), suggesting less standardised information and restricted agreement, perhaps as a result of fewer use reports, specialised therapies, or lower occurrence.

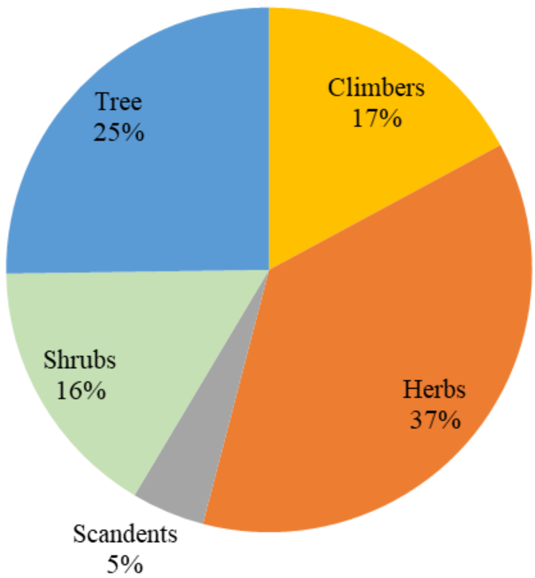

Figure 3. Distribution (%) of life forms of recorded plants

Table 3. Informant Consensus Factor (ICF) of disease category in Fringe villages of Nameri National Park, Assam, India

Sl. No.	Disease category	Ailments	N_t	N_{ur}	ICF
1	Connective disease	Muscle swelling, rheumatoid arthritis	2	30	0.97
2	Respiratory disease	Asthma, cough, Pneumonia, Bronchitis	15	124	0.89
3	Skin disease	Rash, eczema, boil, itchiness	9	59	0.86
4	Symptomatic disease	Fever, cold, headache, dizziness	15	67	0.79
5	Metabolic disease	Diabetes	23	80	0.72
6	Injury	Wounds, burns, cuts, bone fractures	6	19	0.72
7	Cardiovascular disease	Hypertension	18	60	0.71
8	Urogenital or renal	Kidney stone, urinary infection	3	50	0.70
9	Gynecological problems	Menstrual problem, anemia	5	36	0.68
10	Digestive disease	Abdominal pain, stomachache, constipation, diarrhea	41	120	0.66
11	ENT disease	Conjunctivitis, earache	5	10	0.56
12	Cancer	Cancer	3	4	0.33

Note: Nt: Number of taxa, N_{ur}: Number of use value, ICF: Informant Consensus factor

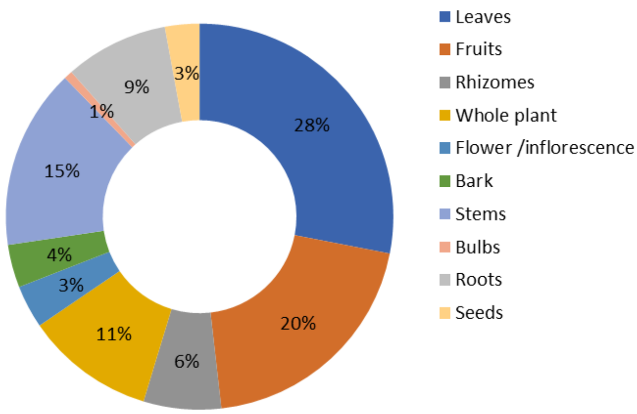

Figure 4. Distribution (%) of plant parts used among the recorded plant species

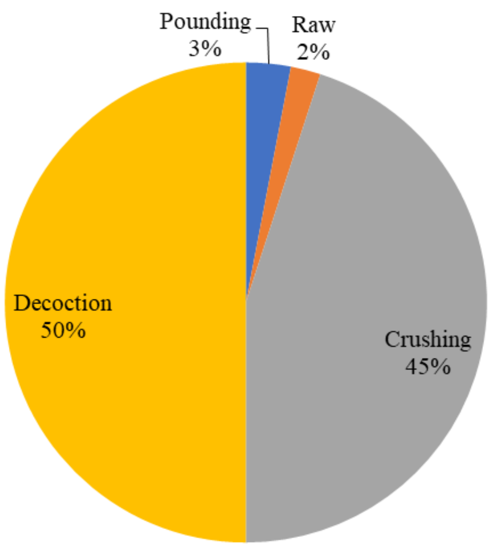

Figure 5. Distribution (%) of different modes of preparation of remedies

Discussion

In this study, the majority of male informants involved in the ethnomedical system within the Mising community display a socio-cultural scenario where males are more actively participative than females. This predominance of males may be attributed to the gender-based ethnotherapeutic practices and forest-based activities. However, the significant association between ethnomedicinal knowledge and gender reflects that knowledge is not evenly distributed between the genders, highlighting the need to further explore the role of women in ethnomedicinal practices. The high percentage of the age groups of 40-59 years indicates that middle-aged individuals act as primary practitioners of the traditional healthcare system, whereas the lower participation of young-aged individuals indicates the potential gaps in the transfer of intergenerational knowledge. However, this finding is similar to reports of the number of studies conducted abroad (Beltrán-Rodríguez et al. 2014; Sharma et al. 2019; Amjad et al. 2020; Khakurel et al. 2022; Tamene et al. 2024). The significant association between ethnomedicinal knowledge and age further suggests that knowledge increases with age, but may decrease in younger ages due to modernization or cultural assimilation. Meanwhile, the high number of key informants suggests the importance of experienced individuals in ensuring the reliability and validity of ethnobotanical documentation (Kassawmar et al. 2026). Among the informants, the literate was dominant than the illiterate. Despite this variation, no significant association was found between educational qualification and ethnomedical knowledge. This indicates that the knowledge is basically passed orally and through experimental learning rather than formal educational systems.

The record of 109 species of medicinal plants indicates a considerable amount of ethnobotanical knowledge possessed by the Mising community. This high species record suggests a strong and resilient ethnomedicinal practice that has passed down over time as a consequence of long-term interactions between the community and its surrounding ecosystem. The wide species distribution further highlights that the selection of medicinal plants is influenced by generations of cultural transmission and practical skill rather than being random.

The predominance of Rutaceae can be ascribed to the abundance of bioactive chemicals, such as alkaloids, flavonoids, tannins, and essential oils, which may be the possible reason for the adoption of species belonging to this family (Sultana et al. 2024). However, this trend is consistent with previous ethnomedical research from other tropical areas, where Rutaceae regularly appears as a significant medicinal family, highlighting its cultural significance and therapeutic adaptability (Gras et al. 2021; Nadaf et al. 2023). Similarly, the substantial representation of Lamiaceae, Asteraceae, Moraceae, and Solanaceae reflects both ecological richness and therapeutic adaptability. Asteraceae plants are frequently used in primary healthcare because they are easily available, widely distributed, and often herbaceous. Furthermore, Solanaceae is well reported for its biologically active alkaloids that can be linked to its dominance in usage. However, the dominance of both Asteraceae and Solanaceae is similar to the previous reports of Mekonen et al. (2015) and Buragohain et al. (2024).

The record of 31 families with only a single species and 14 families with two species indicates a notable taxonomic heterogeneity. This outcome demonstrates the specialised and case-specific use of medicinal plants, where many species are adopted for highly targeted diseases or in specific cultural contexts (Hylander et al. 2024). Because their usage may be restricted to a few practitioners or certain regions.

The high preference for herbs (37%) agrees with previous studies documenting ethnomedicinal plants conducted in tropical and subtropical regions, including NE India (Buragohain et al. 2024; Kalita et al. 2025). The dominance of herbaceous species may be endorsed by their rapid growth and short life cycle, which makes it possible for repeated harvesting with minimal ecological impact (Bucharova et al. 2025). Additionally, they are easy to collect due to their occurrence in home gardens, fallow fields, and forests. From the phytochemical aspect, herbs are well-known to contain comparatively high quantities of bioactive metabolites, such as alkaloids, flavonoids, phenolics, and terpenoids (Yeshi et al. 2022). These metabolites are demonstrated to have antibacterial, anti-inflammatory, and analgesic properties, supporting the belief of traditional healers that herbs have more potent or faster medicinal effects than other plants (Asfaw et al. 2022; Wang et al. 2025). The remarkable use of trees (25%) emphasises the importance of forest resources (e.g., fruits, bark, and roots) in ethnomedicinal practices. However, the adoption of tree species may lead to conservation issues because improper collection of bark and root can damage the entire plant body and lead to population decline. Conversely, shrubs (16%) and climbers (17%) are frequently found in secondary vegetation and forest borders, suggesting a close relationship between ethnomedical knowledge and landscape layout. The low preference of scandent plants (5%) may be due to their limited availability and lack of cultural familiarity.

The high usage of leaf (28%) for ethnomedical practices by the Mising Tribe demonstrates a sustainable approach to traditional healing. This high reliance may be because leaves are often available throughout the year and can be collected without permanently harming the plant (Kalita et al. 2025). In addition, leaves are considered a repository of a wide range of bioactive metabolites, which may account for their perceived effectiveness and high use in medicine (Dar et al. 2023). The notable use of fruits (20%) further demonstrates a sustainable collection, which usually does not jeopardise plant survival. Moreover, the adoption of fruits corresponds to nutritional consumption, evidencing the food-medicine continuity feature in traditional healthcare systems. Although roots are used less frequently (9%), they are found to be linked to the management of severe or chronic illnesses. However, root harvesting may result in conservation issues, underscoring the necessity of sustainable use.

The decoction (50%) as the main mode of preparation may be ascribed to the fact that boiling not only minimizes the toxicity and microbiological contamination but also improves extraction efficiency (Ghisleni et al. 2016; Hlatshwayo et al. 2025). However, the preference for decoction in this study is contradictory to the previous findings of Borah et al. (2021), who reported juice (30%) as the preferred mode of preparation by the Mising community of four districts of Assam. In addition, the high preference for crushing (45%) may be because fresh plant parts are adequate to release active phytochemicals by basic mechanical processing (Kårlund et al. 2014). In fact, crushing enables quick preparation, which makes it appropriate for routine and first-aid treatments. In contrast, raw ingestion (2%) is very low, which may be because of patients' worries about bitterness during the consumption, while less of pounding (3%) may be due to it requiring comparatively more effort and equipment. Overall, the mode of preparation techniques highlights the experience-based traditional knowledge while balancing the therapeutic effectiveness, safety, and ease of preparation.

The analysis of UV provides crucial information about the perceived therapeutic efficacy and relative cultural significance of medicinal plants (Zenderland et al. 2019). Many species, such as *A. calamus*, *A. carambola*, *B. javanica*, *B. lanceolaria*, *C. asiatica*, *Cissampelos pareira*, *Cissus quadrangularis*, *Dillenia indica*, *D. scandens*, *Entada rheedei*, *Garcinia pedunculata*, *H. speciosa*, *Houttunyia cordata*, *H. sibthorpioides*, *P. nigrum*, *C. colebrookeanum*, *J. adhatoda*, *O. tenuiflorum*, *T. cordifolia*, *Z. nitidum*, *Z. officinale*, exhibited high UVs (>0.80) that reflect regular use in ethnomedicinal practices by the Mising Tribe. The prevalence of these species indicates their efficiency in the management of chronic and frequently occurring disorders (Ndhlovu et al. 2023). The plants with moderate UV values (0.50-0.80) probably represent the selective or condition-specific applications, while plants with low UVs (<0.50), for example, *G. superba*, *N. nucifera*, and *R. communis*, may indicate limited usage, specialised knowledge limited to specific informants (Leonti 2022). Collectively, this UVs distribution pattern underscores their significance in basic healthcare and necessitates further phytochemical research.

The fluctuation of ICF values across disease categories suggests differences in the detail, transmission, and standardization of ethnobotanical knowledge within the studied community (Awoke and Cosendey 2025). High ICF values for respiratory, skin, and connective diseases indicate the prevalence and persistence in the study area, resulting in considerable inter-informant agreement on efficacious treatment. This result also reflects the environmental exposure, dietary practices, and lifestyle as the responsible factors for these diseases. On the other hand, a fragmented or smaller amount of shared knowledge is indicated by the low ICF values seen for ENT and cancer. There were fewer use reports and lower agreement among informants, which indicates certain conditions may be relatively uncommon, difficult to diagnose, or historically treated with specialised therapies. This pattern implies that ethnomedical knowledge is less standardised and potentially more susceptible to erosion for complex or uncommon conditions.

Two ethnomedicinal plant species, such as *Aegle marmelos* and *A. calamus*, categorized as threatened under the IUCN Red List, raise utmost conservation concerns. The leaves and rhizomes of *A. calamus* are frequently used by the Mising community, as reflected by its high UV (0.84). Such frequent collection in an unsustainable manner may lead to the decline in natural populations. Moreover, species with high URs, especially those involving the harvesting of roots, bark, and rhizomes, require urgent attention for sustainable management. Therefore, some conservation measures, such as controlled harvesting, in situ conservation, and ex situ conservation through cultivation in home gardens, herbal nurseries, and botanical gardens, and germplasm preservation, are vital. Further, active community participation in monitoring and sustainable use is also crucial to ensure the long-term survival of these Red-Listed medicinal plants. In addition, it is essential to disseminate awareness among the local people of the study area regarding the risk of extinction of these plant species. In parallel, higher institutional and Non-Governmental Organization (NGOs) frameworks at the policy level are important. For example, implementing rules for sustainable collection, promoting cultivation through financial incentives, training, and extension activities can be fruitful efforts. In addition, aligning these efforts with access-and-benefit-sharing frameworks under the Convention on Biological Diversity (CBD) and broader biodiversity conservation strategies can help ensure equitable utilization while preventing overexploitation.

In conclusion, this study successfully documented a rich and previously under-recorded ethnomedicinal plant for the Mising Tribe. The documentation of these medicinal plants reflects how plant-based medication is shaped by ecological adaptability, long-term empirical experience, and cultural beliefs. Although the pharmacological aspect was out of the objectives, the present ethnobotanical records provide guidance for interdisciplinary study that bridges traditional knowledge with modern therapeutic investigation. Therefore, this knowledge system is an essential part of the local cultural legacy that should be preserved. Overall, these findings provide a critical baseline for prioritizing species with high UVs for pharmacological validation and for developing community-based conservation strategies for threatened taxa.

ACKNOWLEDGEMENTS

The authors are grateful to the local informants and traditional healers of the Mising community of the fringe village of Nameri National Park, Assam, India, for providing valuable data and for their cooperation during the entire field survey. The authors are also grateful to Prof. Kumananda Tayung, Head, Department of Botany, Gauhati University, Assam, for all the necessary help during the study. No external funding was received. The authors declare no conflicts of interest.

REFERENCES

Amjad MS, Zahoor U, Bussmann RW, Altaf M, Gardazi SMH, Abbasi AM. 2020. Ethnobotanical survey of the medicinal flora of Harighal, Azad Jammu, Kashmir, Pakistan. J Ethnobiol Ethnomed 16 (1): 65. https://doi.org/10.1186/s13002-020-00417-w.

Asfaw TB, Esho TB, Bachheti A, Bachheti RK, Pandey DP, Husen A. 2022. Exploring important herbs, shrubs, and trees for their traditional knowledge, chemical derivatives, and potential benefits. In: Husen A (eds.). Herbs, Shrubs, and Trees of Potential Medicinal Benefits. CRC Press, Boca Raton.

Awoke A, Cosendey BN. 2025. Investigate the ethnomedical practices of different indigenous communities: A literature review. Intl J Ethnosci Technol Educ 2 (1): 64-89. https://doi.org/10.33394/ijete.v2i1.13903.

Barooah C, Ahmed I. 2014. Plant Diversity of Assam (A Checklist of Angiosperms and Gymnosperms). ASTEC, Bigyan Bhawan, Guwahati, Assam.

Beltrán-Rodríguez L, Ortiz-Sánchez A, Mariano NA, Maldonado-Almanza B, Reyes-García V. 2014. Factors affecting ethnobotanical knowledge in a mestizo community of the Sierra de Huautla Biosphere Reserve, Mexico. J Ethnobiol Ethnomed 10: 14. https://doi.org/10.1186/1746-4269-10-14.

Bhuyan M. 2015. Traditional health care practice in a Mishing society: A study on ethnomedicine. Intl J Humanit Soc Sci 1 (4): 73-77.

Borah D, Mipun P, Sarma J, Mili C, Narah D. 2021. Quantitative documentation of traditionally used medicinal plants and their significance to healthcare among the Mishing community of Northeast India. Ecol Quest 32 (4): 61-94. https://doi.org/10.12775/EQ.2021.034.

Borah S, Das DR, Borah J. 2009. A note on the use of ethnomedicine in treatment of diabetes by Mishing communities. Ethnobot Leaflet 13: 1348-1352.

Bucharova A, Bossdorf O, Scheepens JF, Salguero-Gómez R. 2025. Assessing limits of sustainable seed harvest in wild plant populations. Conserv Biol 39 (5): e70075. https://doi.org/10.1111/cobi.70075.

Buragohain P, Das B, Nath M, Sarma PJ, Boro M, Roy S, Nath N. 2024. Traditional knowledge of ethnomedicinal plants used by the Mishing community in Sivasagar District, Assam, India. Plant Sci Today 11 (sp1): 184-196. https://doi.org/10.14719/pst.3360.

Chowdhury S. 2005. Assam's Flora: Present Status of Vascular Plants. Assam Science Technology and Environment Council, Guwahati, Assam.

Dangwal LR, Shukla UK, Lal T, Rawat M, Pundir M, Bhujabal B, Panwar A. 2024. Documentation of wild edible ethnomedicinal fruits in the Chamba region of Garhwal Himalaya, India. J Tradit Folk Pract 12 (2): 20-27. https://doi.org/10.25173/jtfp.308.

Dar RA, Shahnawaz M, Ahanger MA, Majid IU. 2023. Exploring the diverse bioactive compounds from medicinal plants: A review. J Phytopharm 12 (3): 189-195. https://doi.org/10.31254/phyto.2023.12307.

Das MR, Pegu A. 2023. An ethnobotanical survey of medicinal plants used by Mising Tribe of the Gohpur Sub-Division of Biswanath District, Assam. J Complement Med Res 14 (2): 233-250. https://doi.org/10.5455/jcmr.2023.14.02.36.

Das RJ, Pathak K. 2013. Use of indigenous plants in traditional health care systems by Mishing Tribe of Dikhowmukh, Sivasagar District, Assam. Intl J Herb Med 1 (3): 50-57.

Doley DM, Medak R. 2019. Quest for Autonomy of the Mishings. Chapala Doley, Kaustabh Printers, Gogamukh, Assam, India.

Doley J. 2014. The Mising of Assam: A Study of Their Socio-Economic and Cultural Life. Spectrum Publications, New Delhi.

Dutta G, Baruah G, Devi A. 2016. Wild food plants of Mishing Tribe: An ethnobotanical survey. Trop Plant Res 3 (1): 221-223.

Ghisleni DDM, Braga MDS, Kikuchi IS, Braşoveanu M, Nemţanu MR, Dua K, Pinto TDJA. 2016. The microbial quality aspects and decontamination approaches for the herbal medicinal plants and products: An in-depth review. Curr Pharm Des 22 (27): 4264-4287. https://doi.org/10.2174/1381612822666160623070829.

Gras A, Hidalgo O, D'Ambrosio U, Parada M, Garnatje T, Vallès J. 2021. The role of botanical families in medicinal ethnobotany: A phylogenetic perspective. Plants 10 (1): 163. https://doi.org/10.3390/plants10010163.

Heinrich M, Ankli A, Frei B, Weimann C, Sticher O. 1998. Medicinal plants in Mexico: Healers' consensus and cultural importance. Soc Sci Med 47 (11): 1859-1871. https://doi.org/10.1016/S0277-9536(98)00181-6.

Hlatshwayo S, Thembane N, Krishna SBN, Gqaleni N, Ngcobo M. 2025. Extraction and processing of bioactive phytoconstituents from widely used South African medicinal plants for the preparation of effective traditional herbal medicine products: A narrative review. Plants 14 (2): 206. https://doi.org/10.3390/plants14020206.

Hylander K, Nemomissa S, Fischer J, Zewdie B, Ayalew B, Tack AJ. 2024. Lessons from Ethiopian coffee landscapes for global conservation in a post-wild world. Commun Biol 7 (1): 714. https://doi.org/10.1038/s42003-024-06381-5.

International Society of Ethnobiology (ISE). 2006. International Society of Ethnobiology Code of Ethics (with 2008 additions). ISE, Gainesville. https://www.ethnobiology.net/code-of-ethics/.

Kalita CK, Das P, Mech B, Das S, Mili C. 2025. A study on ethnomedicinal plants used by Karbi tribes in West Karbi Anglong district of Assam, India. Vegetos 2025: 1-15. https://doi.org/10.1007/s42535-025-01311-0.

Kanjilal UC, Das A, Kanjilal PC, De RN, Bor NL. 1934-1940. Flora of Assam Vol I-V. Assam Governement, Shillong, India.

Kårlund A, Moor U, Sandell M, Karjalainen RO. 2014. The impact of harvesting, storage and processing factors on health-promoting phytochemicals in berries and fruits. Processes 2 (3): 596-624. https://doi.org/10.3390/pr2030596.

Kassawmar F, Adamu E, Misganaw W, Geta K. 2026. Ethnobotanical study of medicinal plants in Meketewa District, Northwestern Ethiopia. Sci Rep 16: 2841. https://doi.org/10.1038/s41598-025-33571-w.

Khakurel D, Uprety Y, Ahn G, Cha JY, Kim WY, Lee SH, Rajbhandary S. 2022. Diversity, distribution, and sustainability of traditional medicinal plants in Kaski district, Western Nepal. Front Pharmacol 13: 1076351. https://doi.org/10.3389/fphar.2022.1076351.

Kiewhuo K, Gogoi D, Mahanta HJ, Rawal RK, Das D, Sastry GN. 2022. North East India Medicinal Plants Database (NEI-MPDB). Comput Biol Chem 100: 107728. https://doi.org/10.1016/j.compbiolchem.2022.107728.

Kutum A, Sarmah R, Hazarika D. 2011. An ethnobotanical study of Mishing Tribe living in fringe villages of Kaziranga National Park of Assam, India. India J Fundam Appl Life Sci 1 (4): 45-61.

Leonti M. 2022. The relevance of quantitative ethnobotanical indices for ethnopharmacology and ethnobotany. J Ethnopharmacol 288: 115008. https://doi.org/10.1016/j.jep.2022.115008.

Mekonen T, Giday M, Kelbessa E. 2015. Ethnobotanical study of homegarden plants in Sebeta-Awas District of the Oromia Region of Ethiopia to assess use, species diversity and management practices. J Ethnobiol Ethnomed 11: 64. https://doi.org/10.1186/s13002-015-0049-8.

Nadaf M, Amiri MS, Joharchi MR, Omidipour R, Moazezi M, Mohaddesi B, Yazdi MET, Mottaghipisheh J. 2023. Ethnobotanical diversity of trees and shrubs of Iran: A comprehensive review. Intl J Plant Biol 14 (1): 120-146. https://doi.org/10.3390/ijpb14010011.

Ndhlovu PT, Asong JA, Omotayo AO, Otang-Mbeng W, Aremu AO. 2023. Ethnobotanical survey of medicinal plants used by indigenous knowledge holders to manage healthcare needs in children. PLoS One 18 (3): e0282113. https://doi.org/10.1371/journal.pone.0282113.

Pame K, Borah S, Daimary B, Ankita G, Dutta J, Boro PR. 2021. Purposive survey and documentation of wild plants and herbs used in traditional meat products by the Mising Tribe of Assam, India. Pharma Innov J SP-10 (12): 728-732.

Pandey A, Singh S, Singh R, Mavinkurve RG. 2015. Use of indigenous plants in traditional health care systems and economic use by Mishing Tribe of Jorhat, Assam, India. World J Pharm Sci 4 (8): 1277-1289.

Panging SM, Sharma S. 2017. Studies on ethnomedicinal and traditional healing practices among Mishing community of Desangmukh Gaon Panchayat, Sivasagar District of Assam, India. J Med Plant Stud 5 (4): 193-196.

Phillips O, Gentry AH. 1993. The useful plants of Tambopata, Peru: II. Additional hypothesis testing in quantitative ethnobotany. Econ Bot 47 (1): 33-43. https://doi.org/10.1007/BF02862204.

Sarma J, Devi A, Sarma GC. 2016. Exploration of Non-Timber Forest Products (NTFPs) used by the Mishing community in Sonitpur District of Assam, India. Pleione 10 (1): 23-31.

Sarma J, Devi A. 2016. Role of dicot angiosperms in the livelihood of Mishing community in Sonitpur District, Assam, India. Trop Plant Res 3 (3): 662-672. https://doi.org/10.22271/tpr.2016.v3.i3.087.

Shankar R, Lavekar GS, Deb S, Sharma BK. 2012. Traditional healing practice and folk medicines used by Mishing community of North East India. J Ayurveda Integr Med 3 (3): 124-129. https://doi.org/10.4103/0975-9476.100171.

Sharma A, Thakur D, Uniyal SK. 2019. Plant-derived utility products: Knowledge comparison across gender, age and education from a tribal landscape of western Himalaya. J Ethnobiol Ethnomed 15: 67. https://doi.org/10.1186/s13002-019-0346-8.

Sharma UK, Pegu S. 2011. Ethnobotany of religious and supernatural beliefs of the Mising Tribes of Assam with special reference to the "Dobur Uie". J Ethnobiol Ethnomed 7: 16. https://doi.org/10.1186/1746-4269-7-16.

Sultana K, Khattak A, Rizwan M, Hussain Z, Rauf A, Al-Duais MA. 2024. The family Rutaceae: A comprehensive review of its phytochemical and pharmacological perspectives. In: Rauf A, Suleria HAR, Shah SMM (eds.). Phytochemical and Pharmacological Investigation of the Family Rutaceae. Apple Academic Press, New York.

Tamene S, Negash M, Makonda FB, Chiwona-Karltun L. 2024. Influence of socio-demographic factors on medicinal plant knowledge among three selected ethnic groups in South-Central Ethiopia. J Ethnobiol Ethnomed 20 (1): 29. https://doi.org/10.1186/s13002-024-00672-1.

Wang X, Zheng Y, Cui X, Anwar T, Qureshi H, Abdullah. 2025. Perennial plants and traditional medicine: Assessing the socio-demographic impacts on traditional remedies. PLoS One 20 (8): e0328913. https://doi.org/10.1371/journal.pone.0328913.

Yeshi K, Crayn D, Ritmejerytė E, Wangchuk P. 2022. Plant secondary metabolites produced in response to abiotic stresses has potential application in pharmaceutical product development. Molecules 27 (1): 313. https://doi.org/10.3390/molecules27010313.

Zenderland J, Hart R, Bussmann RW, Paniagua Zambrana NY, Sikharulidze S, Kikvidze Z, Kikodze D, Tchelidze D, Khutsishvili M, Batsatsashvili K. 2019. The use of "use value": Quantifying importance in ethnobotany. Econ Bot 73 (3): 293-303. https://doi.org/10.1007/s12231-019-09480-1.