

## USES OF BARK-BASED MEDICINAL PLANTS BY THE TARAO COMMUNITY OF MANIPUR

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### ABSTRACT

Traditional medicinal plant knowledge was documented during 2024-2025 to record bark-based medicinal plant use among the Tarao community of the Chandel and Tengnoupal districts of Manipur, with the objective of preserving indigenous knowledge and assessing the ethnomedicinal significance of tree bark in traditional healthcare systems. The study recorded a total of 40 medicinal plant species belonging to 26 families and 35 genera, in which bark was the primary plant part utilized. Trees represented the dominant life form (34 species), followed by shrubs and small trees (6 species), indicating a strong dependence of local communities on woody taxa for medicinal purposes. The most represented families were Fabaceae, Moraceae, Combretaceae, and Meliaceae, reflecting both ecological availability and cultural preference. Bark-based remedies were predominantly used to treat gastrointestinal disorders such as diarrhoea, dysentery, stomach pain, and ulcers, followed by skin diseases, wound healing, fever, inflammatory conditions, and metabolic disorders including diabetes. Frequently cited species included *Holarrhena pubescens*, *Terminalia arjuna*, *Terminalia chebula*, *Spondias pinnata*, *Azadirachta indica*, and *Ficus benghalensis*, many of which are supported by existing pharmacological evidence. Decoction was the most common mode of preparation, suggesting effective traditional extraction of bioactive compounds such as tannins, flavonoids, and phenolics. The study also highlighted conservation concerns, as several medicinal tree species (*Oroxylum indicum*, *Garcinia pedunculata*, *Toona sinensis*) were recorded as vulnerable or near threatened, raising issues related to unsustainable bark harvesting. Overall, the findings emphasized the significance of bark-based traditional medicine in the Tarao community and underline the need for scientific validation, sustainable harvesting practices, and conservation-oriented management of medicinal tree species.

(Key words: Traditional healthcare, bark-based medicine, Tarao community, medicinal plants, conservation)

### INTRODUCTION

Medicinal plants have been the foundation of traditional healthcare worldwide, particularly among indigenous and rural communities that rely on local biological resources for primary healthcare. The World Health Organization reports that a substantial portion of the global population still depends on plant-based traditional medicine for disease prevention and treatment. In India, a mega-biodiversity country, traditional medicinal knowledge is deeply intertwined with cultural practices and ecological landscapes. Indigenous communities have developed sophisticated healthcare systems based on empirical observations and long-term interactions with forests, making ethnomedicinal documentation essential for preserving this knowledge (Singh *et al.*, 2025a).

Among plant parts, tree bark holds a unique role in traditional medicine. Bark, as the tree's protective tissue,

accumulates bioactive secondary metabolites including tannins, flavonoids, alkaloids, saponins, phenolics, and glycosides. These compounds exhibit diverse pharmacological activities, such as antimicrobial, anti-inflammatory, antidiarrhoeal, antioxidant, cardioprotective, hepatoprotective, and antidiabetic effects. Consequently, bark-based remedies are widely used in treating gastrointestinal disorders, skin diseases, wounds, fever, and chronic ailments. Pharmacological studies validating antioxidant and bioactive potential of medicinal plants from Northeast India further support the scientific basis of such traditional uses (Khan and Sharma, 2024; Khan *et al.*, 2024a; Khan *et al.*, 2025).

Northeast India is one of the richest biocultural regions, with complex topography, varied climates, and exceptional floristic diversity. Manipur, within this biodiversity hotspot, supports a rich diversity of medicinal plants and strong indigenous healthcare traditions. Recent

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ethnobotanical and phytochemical studies from the region highlight the importance of systematic documentation of plant resources for sustainable utilization and conservation (Singh *et al.*, 2025a; Singh *et al.*, 2025b). Despite this, bark-based ethnomedicinal practices remain poorly documented for many ethnic groups, risking the erosion of traditional knowledge due to socio-economic changes, modernization, and declining intergenerational knowledge transfer.

The Tarao community, inhabiting Chandel and Tengnoupal districts of Manipur, relies heavily on forest resources for healthcare, nutrition, and cultural practices. Traditional healers employ a wide range of medicinal plants, with bark playing a key role in treating both acute and chronic ailments. Similar ethnobotanical surveys in Manipur have emphasized the richness of indigenous plant knowledge and its relevance for primary healthcare, yet community-specific documentation remains limited (Singh *et al.*, 2025b). Given the growing global interest in ethnopharmacology and natural-product therapeutics, documenting such traditional practices is vital for cultural preservation and identification of pharmacologically promising species.

Bark-based remedies also pose significant conservation challenges. Unsustainable bark harvesting can damage vascular tissues, inhibit regeneration, and ultimately lead to tree mortality. Several medicinal species are categorized as vulnerable or near threatened due to overexploitation and habitat degradation. Therefore, ethnobotanical studies focusing on bark use must also emphasize sustainability, alternative harvesting strategies, and cultivation practices, aligning with broader conservation and agro-diversification approaches advocated in medicinal plant research (Mehta *et al.*, 2022).

The present study documents bark-based medicinal plant use among the Tarao community of Manipur, emphasizing ethnopharmacological significance, disease-treatment patterns, modes of preparation, and frequently cited species with known or potential bioactive properties. By integrating traditional knowledge with pharmacological insights and conservation perspectives, this study provides baseline data for future phytochemical investigations, pharmacological validation, and sustainable management of medicinal tree species. It underscores the importance of preserving indigenous ethnomedicinal knowledge for biodiversity conservation, community healthcare resilience, and natural product-based drug discovery.

## MATERIALS AND METHODS

### Study area

The study was conducted in 2024-2025 in Tarao-inhabited villages of Chandel and Tengnoupal, Manipur, within the Indo-Burma biodiversity hotspot. The hilly, subtropical region with dense forests and high plant diversity supports traditional healthcare and livelihoods, making it suitable for ethnobotanical and ethnopharmacological research.

### Selection of informants

Ethnobotanical data were collected through field surveys and personal interactions with knowledgeable community members. Traditional healers, elderly villagers, and experienced plant users were selected using purposive and snowball sampling, including both men and women mainly above 40 years of age. All information was documented after obtaining verbal prior informed consent, following established ethical guidelines for ethnobotanical research.

### Data collection

Data were collected through semi-structured interviews, group discussions, and field observations, recording local and Sanskrit names, habit, habitat, availability, bark part used, preparation, administration, and medicinal uses. Special emphasis was on bark-based remedies, their therapeutic applications, and usage frequency. Repeated interviews ensured consistency and reliability of the information.

### Plant collection and identification

Medicinal plant specimens were collected during field visits with the assistance of local informants. Only small bark samples were taken to minimize damage to trees. Collected specimens were processed following standard herbarium techniques. Scientific identification was carried out using regional floras, standard taxonomic keys, and published literature, and nomenclature was verified using recognized plant databases. Voucher specimens were prepared and preserved for future reference.

### Data organization and analysis

The collected data were organized in Table 1, including scientific, Sanskrit, and local names, family, habit, distribution, and bark-based medicinal uses. Plants were categorized by family, life form, and therapeutic application, and conservation status was assessed to identify vulnerable or near-threatened species.

### Ethical considerations

The study followed ethical guidelines, respecting cultural values, with documentation intended only for academic purposes, conservation awareness, and future scientific validation.

## RESULTS AND DISCUSSION

Ethnobotanical investigation among the Tarao community of Chandel and Tengnoupal districts, Manipur, documented 40 bark-based medicinal plant species across 26 families and 35 genera (Table 1). Trees were the dominant life form (34 species), followed by shrubs and small trees (6 species), indicating a strong reliance on woody taxa. Most species were deciduous, with a few evergreen taxa, sourced from wild, cultivated, or naturalized habitats, reflecting both forest dependency and managed use, a pattern consistent with ethnobotanical studies from Manipur and adjacent regions (Singh *et al.*, 2025a; 2025b).

**Table 1. Ethnobotanical study on medicinal plants with bark-based uses among the Tarao community of Chandel and Tengnoupal districts, Manipur**

Sl. No.	Scientific name	Sanskrit name	Local name	Family	Hab.	Dist.	Bark reported medicinal uses
1	<i>Acacia (Senegalia) catechu</i> (L.F.) Wild	Khadira	Khair	Fabaceae	Deciduous tree	Wild and cultivated	Astringent; bark/heartwood extract (catechu) used for diarrhoea, oral infections and topical wounds.
2	<i>Aegle marmelos</i> (L.) Corrêa	Bilva	Harikhagok	Rutaceae	Deciduous tree	Wild and cultivated	Bark used in decoctions for diarrhoea, dysentery and as a digestive tonic.
3	<i>Ailanthus excelsa</i> Roxb	Mahapatra	Khangra	Simaroubaceae	Deciduous tree	Wild and lanted	Bark used for skin diseases, wound healing and as an anti-inflammatory in folk practice.
4	<i>Alangium salvifolium</i> (L.f.) Wangerin	Ankolaka	Ankola	Comaceae	Deciduous tree	Wild, locally	Bark used for skin diseases, wound healing and as an anti-inflammatory in folk practice.
5	<i>Albizia lebbbeck</i> (L.) Benth	Sirisa	Siris	Fabaceae	Deciduous tree	Wild and planted	Bark used for asthma, skin eruptions, and as an astringent in diarrhoea.
6	<i>Alistonia scholaris</i> (L.) R.Br	SaptaparGa	Dita Tera	Apocynaceae	Evergreen tree	Wild and planted	Bark infusion for fever, diarrhoea, skin diseases, rheumatism
7	<i>Artocarpus heterophyllus</i> Lam	Panasa	Theibong	Moraceae	Evergreen tree	Cultivated and naturalized	Bark decoction used in fever, skin diseases, and as an astringent.
8	<i>Artocarpus lakoocha</i> Roxb	Lakuca	Harikonthong	Moraceae	Deciduous tree	Wild, locally	Bark used for dysentery and skin infections; decoction taken for stomach troubles.
9	<i>Azadirachta indica</i> A. Juss	Nimba	Neem	Meliaceae	Evergreen tree	Common and cultivated	Bark decoction used for fever, malaria, skin infections, and stomach disorders.
10	<i>Bauhinia variegata</i> (L.)	Kancanara	Chingthrao	Fabaceae	Deciduous tree	Wild and cultivated	Bark decoction used in dysentery and as a traditional tonic.
11	<i>Bombax malabaricum</i> DC	Salmali	Tera	Malvaceae	Deciduous tree	Wild, locally	Bark paste/decoction for skin diseases, fever, stomach complaints
12	<i>Butea monosperma</i> (Lam.) Kuntze	Palasa	Panggonglei	Fabaceae	Deciduous tree	Wild, common	Bark/paste used topically for skin diseases and as an anti-inflammatory in folk medicine.
13	<i>Careya arborea</i> Roxb	Khumbi	Kumbhi	Lecythidaceae	Deciduous tree	Wild, locally	Bark decoction/paste used for wound healing, dysentery and as poultice for skin ailments.
14	<i>Cassia fistula</i> (L.)	Aragvadh	Chahui	Fabaceae	Deciduous tree	Wild and cultivated	Bark decoction given for skin diseases, fever, and traditionally as a purgative aid.
15	<i>Cinnamomum tamala</i> (Buch.-Ham.) T.Nees & C.H.Rob	Tamalapatra	Tejpata	Lauraceae	Evergreen tree	Wild and cultivated	Bark/inner bark used as carminative, digestive and in decoctions for cold/respiratory complaints.

16	<i>Dalbergia stipulacea</i> Roxb	Timisa	Sal	Fabaceae	Deciduous tree	Wild, locally common	Bark/root in oral health & external traditional medicine
17	<i>Dillenia indica</i> (L.)	Agnimantha	Outenga	Dilleniaceae	Evergreen tree	Wild, common	Bark used in decoctions for dysentery, skin disorders and as an external wash
18	<i>Diospyros montana</i> Roxb	Tinduka		Ebenaceae	Deciduous tree	Wild, locally common	Bark/roots used in some tribal remedies for stomatitis, wounds and digestive complaint.
19	<i>Erythrina variegata</i> (L.)	Mandara	Kurao angamba	Fabaceae	Deciduous tree	Wild and cultivated	Bark decoction used as laxative, febrifuge, and for liver disorders.
20	<i>Ficus benghalensis</i> (L.)	Vama	Khongnang bot	Moraceae	Evergreen tree	Wild and cultivated	Bark used in decoction for diabetes, diarrhoea, and ulcers; paste applied on wounds.
21	<i>Ficus religiosa</i> (L.)	Asvattha	Sana khongnang	Moraceae	Semi-evergreen tree	Wild and cultivated	Bark decoction for ulcers, gastric issues, diarrhoea.
22	<i>Garcinia pedunculata</i> Roxb ex Buch.-Ham	Amlavetasa	Heibung	Clusiaceae	Evergreen tree	Wild, locally common;	Bark/fruit used for digestive disorders, and bark decoction is used as traditional remedy.
						Near Threatened	
23	<i>Gmelina arborea</i> Roxb	Gambhari	Wang	Lamiaceae	Deciduous tree	Wild and planted	Bark used as febrifuge, for diarrhoea and for healing external wounds.
24	<i>Holarrhena pubescens</i> Wall. ex G.Don	Kutaja	Kurchi	Apocynaceae	Deciduous tree	Wild, locally common	Stem bark decoction used for chronic diarrhoea and amoebic dysentery.
25	<i>Holoptelea integrifolia</i> (Roxb.) Planch	Cirabilva	Chilbil	Ulmaceae	Deciduous tree	Wild, common	Bark paste applied to ringworm, eczema, skin eruptions; decoction for rheumatism.
26	<i>Lagerstroemia speciosa</i> (L.) Pers	Jarula	Jarul	Lythraceae	Deciduous tree	Wild and planted	Bark used in some local traditions for diabetes-related remedies and wound-care poultices.
	<i>Oroxylum indicum</i> (L.) Kurz	Syonaka	Shamba	Bignoniaceae	Deciduous tree	Wild, vulnerable	Bark decoction for gastric ulcers, respiratory issues, skin infections, wounds
27	<i>Psidium guajava</i> (L.)	Peruka	Pungthon	Myrtaceae	Evergreen tree	Cultivated and naturalized	Bark decoction as astringent for diarrhoea, dysentery, wounds
28	<i>Mallotus philippensis</i> (Lam.) Müll.Arg	Kampillaka	Kamala	Euphorbiaceae	Deciduous tree	Wild, locally common	Bark or stem exudate used topically for skin infection.
29	<i>Mangifera indica</i> (L.)	Amra	Heinou	Anacardiaceae	Evergreen tree	Wild and cultivated	Bark decoction for diarrhoea, dyspepsia, inflammation
30	<i>Moringa oleifera</i> Lam	Sigru	Sajana	Moringaceae	Deciduous tree	Cultivated	Bark used as stimulant, expectorant, and in some regions for rheumatic pain.
31	<i>Schima wallichii</i> (DC.) Korth	Chilaka		Theaceae	Deciduous tree	Wild, common	Bark used for wound healing, as antiseptic poultice and for rheumatic complaints.
32	<i>Schleichera oleosa</i> (Lour.) Oken	Kosamra	Kusum	Sapindaceae	Deciduous tree	Wild, locally common	Bark used in folk remedies for skin diseases and as a tonic.

33	<i>Tectona grandis</i> (L.f.)	Saka	Chingsoo	Lamiaceae	Deciduous tree	Planted and naturalized	Bark used as an astringent and hemostatic, applied for skin diseases, eczema, and wounds, and taken as a decoction for bronchitis, urinary disorders, dysentery, and headache.
34	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn	Arjuna	Mayokpha	Combretaceae	Deciduous tree	Wild, locally common	Bark decoction as cardiotoxic, for heart ailments.
35	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Bibhitaka	Bahera	Combretaceae	Deciduous tree	Wild, locally common	Bark/fruit parts used as digestive, laxative and wound-healing agent in traditional systems.
36	<i>Terminalia chebula</i> Retz	Haritaki	Manahei	Combretaceae	Deciduous tree	Wild, locally common	Bark/fruit used for digestion, wound healing, tonic.
37	<i>Toona ciliata</i> M.Roem.	Tuni	Tairen (leaflet small)	Meliaceae	Deciduous tree	Wild, locally common	Bark and young shoots used for febrile illness and as anti-parasitic decoction in local ethnomedicine.
38	<i>Toona sinensis</i> (A. Juss.) M. Roem	Tuni	Tairen (leaflet large)	Meliaceae	Deciduous tree	Wild, rare, Near Threatened	Bark of <i>Toona sinensis</i> is traditionally used as a decoction for dysentery, diarrhea, stomach pain.
39	<i>Spondias pinnata</i> (L.f.) Kurz	Amrataka	Heining	Anacardiaceae	Deciduous tree	Wild, locally common	Bark acts as an astringent and tonic; decoction for diarrhea, dysentery, stomach pain, rheumatism; applied for sores, ulcers, wounds; jaundice and liver disorders.
40	<i>Syzygium jambolanum</i> DC	Jambu	Jam	Myrtaceae	Evergreen tree	Wild and cultivated	Bark decoction for diarrhoea, dysentery, diabetes.

Fabaceae (6 species) was the most represented family, followed by Moraceae (4 species), Combretaceae (3 species), and Meliaceae (3 species). These families are well known for bioactive secondary metabolites such as tannins, flavonoids, alkaloids, and saponins, suggesting both ecological abundance and empirical selection by traditional healers (Baruah and Sharma, 2011; Sharma *et al.*, 2018; Kumar *et al.*, 2021).

Bark-based remedies were primarily used for gastrointestinal disorders, including diarrhoea, dysentery, stomach pain, and ulcers, followed by skin diseases, wound healing, fever, inflammatory conditions, and metabolic disorders such as diabetes. This pattern highlights the therapeutic importance of bark and reflects the high prevalence of digestive and dermatological ailments in forest-fringe communities of Northeast India (Singh and Singh, 2003; Sharma *et al.*, 2018; Singh *et al.*, 2025b).

Frequently cited species for gastrointestinal disorders included *Holarrhena pubescens*, *Terminalia chebula*, *Terminalia bellirica*, *Spondias pinnata*, *Psidium guajava*, and *Ficus religiosa*, reflecting their astringent, antimicrobial, and anti-dysenteric properties, as corroborated by pharmacological studies. Bark decoctions were the preferred mode of preparation, facilitating efficient extraction of water-soluble compounds such as tannins and catechins (Kagyung *et al.*, 2010; Alam and Sharma, 2012; Gupta and Tandon, 2004).

Topical applications for skin disorders, wound healing, and inflammatory conditions involved species such as *Azadirachta indica*, *Careya arborea*, *Butea monosperma*, *Schima wallichii*, and *Holoptelea integrifolia*. These treatments likely exploit phenolics, flavonoids, and alkaloids with antiseptic, anti-inflammatory, and wound-healing properties, many of which have been scientifically validated (Gupta and Tandon, 2004; Kumar *et al.*, 2021).

Several species, including *Terminalia arjuna*, *Erythrina variegata*, *Spondias pinnata*, and *Lagerstroemia speciosa*, were used for cardiovascular, liver, and metabolic disorders. The use of *Terminalia arjuna* as a cardiogenic and *Spondias pinnata* for liver ailments aligns with classical Ayurvedic literature and modern pharmacological findings, demonstrating a sophisticated understanding of chronic disease management within indigenous healthcare systems.

From a conservation perspective, the use of vulnerable or near-threatened species such as *Oroxylum indicum*, *Garcinia pedunculata*, and *Toona sinensis* highlights the risks of unsustainable bark harvesting and its impact on regeneration. Sustainable harvesting,

community-based conservation, and domestication of high-demand species are therefore essential (Jain and Rao, 1977; Mehta *et al.*, 2022). Overall, the study underscores the rich ethnomedicinal heritage of the Tarao community and the pivotal role of bark in traditional healthcare. Documentation of 40 species across 26 families preserves indigenous knowledge and highlights promising candidates for future phytochemical and pharmacological research, supporting biodiversity conservation and community well-being (Singh *et al.*, 2025a).

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