



## Documentation and assessment of medicinal plants in Mayurbhanj District of Odisha, India

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### Abstract

This research investigates the medicinal plant diversity of Odisha's Mayurbhanj district, centered on the Similipal Biosphere Reserve. Despite modern medical advancements, indigenous groups like the Santhal, Kol, and Bhumij continue to depend on traditional knowledge (TK) for their primary healthcare. Through botanical surveys and consultations with local Baidyas (healers), this study identifies between 150 and 340 species, with the Fabaceae and Asteraceae families being most prevalent. To measure cultural significance and treatment reliability for conditions such as malaria and gastrointestinal issues, quantitative metrics like Use Value (UV) and the Informant Consensus Factor (ICF) were utilized. The analysis indicates that while leaves and roots are the primary medicinal components, unsustainable harvesting practices threaten regional biodiversity. Furthermore, the study notes a decline in the transmission of oral traditions to younger generations. This work establishes a foundation for the pharmacological validation of these plants and advocates for conservation policies to safeguard North Odisha's unique biocultural legacy.

**Keywords:** ethnobotany, traditional knowledge (TK), quantitative indices, phytomedicine

### Introduction

Located in northern Odisha, the Mayurbhanj district serves as a vital biocultural sanctuary, dominated by the UNESCO-recognised Similipal Biosphere Reserve. This vast landscape is a site of deep ecological and cultural integration, where indigenous tribes such as the Santhal, Kol, Bhumij, Gond, and Mankidia have resided for millennia. For these communities, the forest functions as a "living pharmacy," providing essential resources for survival and a sophisticated system of natural medicine.

Ethnobotany in Mayurbhanj reflects a profound connection between the local population and their botanical environment. Through generations of oral tradition, traditional knowledge (TK) has allowed healers, or Baidyas, to address various health issues-from respiratory ailments to critical conditions like malaria and snakebites. In remote areas where modern medicine is either physically or culturally inaccessible, these botanical remedies remain the primary healthcare resource. However, this ancestral expertise is currently under threat. Urbanisation and changing social dynamics have caused a rift in knowledge transmission, leaving the younger generation increasingly detached from their heritage. Furthermore, deforestation, climate change, and exploitative harvesting for commercial gain are endangering the survival of many medicinal species.

Formal documentation is essential to safeguard this wisdom against permanent loss and to protect the intellectual property rights of tribal groups. By applying quantitative ethnobotanical indices-such as Use Value (UV), Fidelity Level (FL), and Informant Consensus Factor (ICF)-this study moves beyond simple observation to scientifically measure the cultural and medicinal importance of specific plants. This research provides a roadmap for bioprospecting and pharmacological validation, ultimately advocating for a conservation strategy that protects both the biodiversity of Similipal and the cultural identity of its people.

### Literature Review

The academic discourse surrounding medicinal plants in Mayurbhanj is primarily anchored in the Similipal Biosphere Reserve (SBR). Researchers identify this area as a vital ethnobotanical hub where high levels of floral endemism intersect with the diverse cultural practices of numerous tribal groups.

### Taxonomic Trends and Floral Diversity

Studies consistently demonstrate the vast therapeutic richness of the region's flora.

- **Species Richness:** Documentation varies by scope, with findings ranging from 77 to 340 medicinal species. For instance, Rout *et al.* (2009) <sup>[12]</sup> identified 77 species within 73 genera, whereas broader investigations by Saxena & Brahman (2024) catalogued more than 300 vascular plants essential for survival and medicine.
- **Prevalent Families:** The Fabaceae family is frequently cited as the most represented taxonomic group, followed by Asteraceae, Euphorbiaceae, and Combretaceae. This reflects the natural ecological composition of Similipal's tropical moist deciduous forests (Kumar, 2025 <sup>[4]</sup>).

### Tribal Ethnomedicinal Knowledge

Research highlights that traditional knowledge (TK) is specialized and varies among the district's 53 tribal communities.

- **Santhal and Kol Expertise:** Studies by Panda *et al.* (2011) <sup>[11]</sup> reveal that these tribes hold advanced knowledge regarding chronic ailments, identifying 32 specific species used for gynecological issues and rheumatism.
- **Targeted Therapies:** Regarding fever-related illnesses, Jena *et al.* (2025) <sup>[4]</sup> documented 40 species utilized by



approach, utilizing semi-structured interviews, questionnaires, and "walk-in-the-woods" sessions. Participants included Baidyas (traditional practitioners) and elders aged 40–60. Key data points included

- Vernacular nomenclature (Odia/Santhali).
- Anatomical parts utilized (leaves, bark, roots).
- Preparation and delivery (decoctions, powders, pastes).

### Quantitative Analysis

The cultural significance of the documented flora was assessed using three primary indices:

1. **Use Value (UV):** To measure the relative importance of each species.
2. **Informant Consensus Factor (ICF):** To evaluate the degree of agreement among healers regarding specific disease categories.
3. **Fidelity Level (FL%):** To identify the most preferred species for treating specific ailments.

### Ethical Standards

In compliance with the Biological Diversity Act (2002), Prior Informed Consent (PIC) was secured from all participants. The study prioritizes the intellectual property

rights of the indigenous communities and respects the confidentiality of sacred traditional knowledge.

## Results

### Floral Diversity and Ethnobotanical Utility

The investigation documented a total of 186 plant species actively used across Mayurbhanj, within a broader context of 340 medicinal species reported throughout the Similipal region. The taxonomic composition of these 340 species includes

- **Herbs:** 119 species (35%)
- **Trees:** 102 species (30%)
- **Shrubs:** 86 species (25%)
- **Climbers, Ferns, and Epiphytes:** 33 species (10% combined)

Beyond healthcare, these plants are integral to the tribal subsistence economy. While all 340 species serve medicinal roles, they also provide fodder (52 species), timber (56 species), and fuelwood (12 species). Additionally, the flora supports local livelihoods through edible fruits and vegetables (34 species), fiber for rope making (17 species), and natural dyes (19 species). Cultural and ritualistic significance was noted for 14 species.

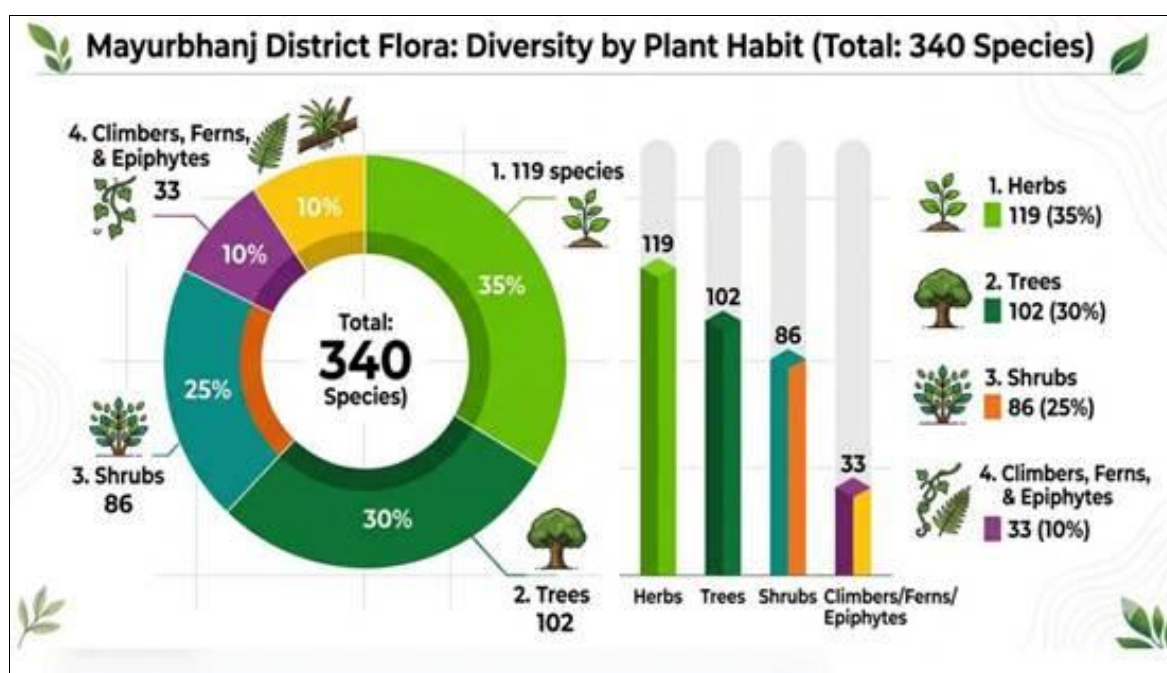


Fig 2: Distribution of floral habitat in Mayurbhanj District.

### Analysis of Plant Parts Used

Local communities utilize various plant components for therapeutic preparations. Out of the 186 primary medicinal plants

- **Leaves:** Most frequently used (169 species).
- **Roots and Bark:** Significant usage in 115 and 96 species, respectively.
- **Whole Plant:** Employed in 49 species.
- **Others:** Seeds (52), flowers (33), and oils (26) also feature prominently, alongside specialized uses of latex, gum, and resins (Fig. 3).

### Therapeutic Applications and Disease Categories

The study identified that gastrointestinal issues are the most common ailments treated with traditional remedies,

followed by dermatological and gynecological conditions. Key findings include

- **Gastrointestinal Disorders:** 66 species are used for conditions like diarrhea, dysentery, and stomach pain.
- **Skin Diseases:** 36 species treat infections, including leprosy, scabies, and chronic wounds.
- **Gynecology & Urology:** 23 species address menstrual and reproductive health, while 22 species treat urinary tract infections and diabetes.
- **Respiratory & Febrile Illness:** 20 species are used for cough and asthma, and 12 for fevers, including malaria.
- **Other Uses:** Plants are also utilized as antidotes for snake and scorpion bites (17 species) and for treating fractures and blood-related disorders.

### Analysis of Plant Part Utilization (Fig. 3)

The donut chart illustrates that healers in Mayurbhanj frequently use multiple parts of a single plant, with a clear preference for certain components

- **Leaves (91%):** By far the most common resource (169 species). Their dominance is due to their year-round availability and high concentration of medicinal compounds.

- **Roots (62%) and Bark (52%):** These are the next most significant parts. However, as noted in your research, high reliance on roots and bark is a conservation concern because it involves "destructive harvesting" that can kill the plant.
- **Seeds (28%) and Flowers (18%):** Used for more specialized treatments, such as skin conditions or respiratory issues.

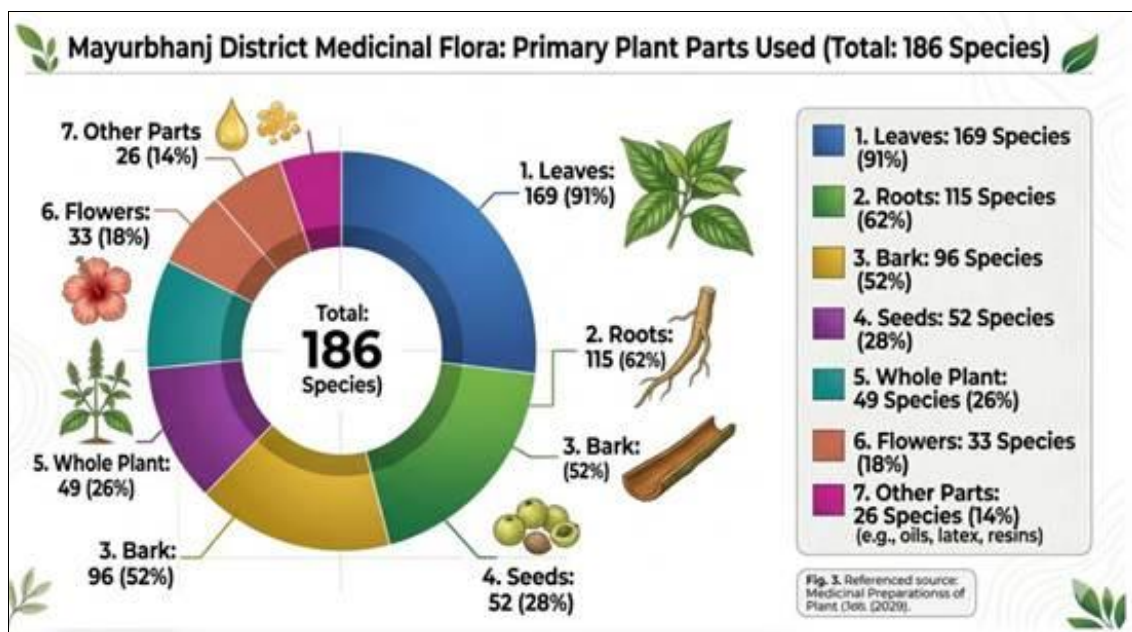


Fig 3: Medicinal flora and the plant parts used in Mayurbhanj District. Medicinal Applications

The table-1 details the specific relationship between these plant parts and health conditions. The "living pharmacy" of Mayurbhanj covers four primary categories

- **Digestive and Gastrointestinal:** This is a major focus. Healers use *Acorus calamus* (Bacha) rhizomes for severe diarrhea, *Acacia leucophloea* bark for common diarrhea, and *Aegle marmelos* (Bela) fruit pulp for general digestive disorders.
- **Emergency and Acute Care:** Indigenous knowledge provides rapid responses for life-threatening issues. *Achyranthes aspera* and *Aristolochia indica* (Iswar-

mula) are cited specifically as critical antidotes for snake and dog bites.

- **Infections and Fevers:** *Andrographis paniculata* (Bhuineem) and *Barleria prionitis* are the primary remedies for Malaria, often administered as leaf infusions or decoctions with honey.
- **Reproductive and Maternal Health:** Plants like *Asparagus racemosus* (Satabari) and *Achyranthes aspera* are used as specialized treatments to facilitate safer or quicker childbirth deliveries.

Table 1: List of plants and their medicinal uses.

Botanical Name & Family	Local Name	Part Used	Medicinal Uses & Mode of Administration
<i>Abrus precatorius</i> L. [Fabaceae]	Kaincha	Whole plant, Root, Seeds	Gonorrhea: 2 spoons of whole plant decoction (oral, 2x/day, 1 week). Bronchitis: Root/seeds. Dysentery: Seeds.
<i>Acacia leucophloea</i> (Roxb.) Willd. [Mimosaceae]	Kanta siriso	Bark	Diarrhea: Overnight cold-water bark decoction (morning). Dental problems: Bark decoction with hot ghee (for children).
<i>Achyranthes aspera</i> L. [Amaranthaceae]	Apamaranga	Whole plant, Root, Fruits	Dysentery: Root juice with sugar. Snake/Dog bite: Fruit paste. Delivery: Root decoction with honey. Veterinary: Plant tied to cattle for maggots.
<i>Acorus calamus</i> L. [Araceae]	Bacha	Rhizome	Severe Diarrhea: Rhizome paste taken internally.
<i>Acronychia pedunculata</i> (L.) Miq. [Rutaceae]	-	Root, Bark, Leaf	Indigestion: 2g fresh leaf paste on empty stomach (2x/day, 10 days).
<i>Adiantum incisum</i> Forssk. [Adiantaceae]	-	Leaves	Hair fall: Paste mixed in coconut oil. Malaria/Bronchitis: Infusion of young fronds. Internal Burning: Leaf powder with butter.
<i>Adiantum philippense</i> L. [Adiantaceae]	-	Leaves	Indigestion: 2g leaf paste on empty stomach (2x/day, 10 days).
<i>Adiantum caudatum</i> L. [Adiantaceae]	-	Whole plant	Wound healing: Frond extract application.
<i>Adiantum lunulatum</i> Burm. f. [Adiantaceae]	-	Leaves, Root	Chest complaints: Decoction. Menstrual cycle: Leaf decoction. Conception: Plant paste given to women.

<i>Aegle marmelos</i> (L.) Corr. [Rutaceae]	Bela	Roots, Leaves, Fruits	Digestive disorder: Ripe fruit pulp (morning, 2-3 days).
<i>Agave sisalana</i> Perrine [Agavaceae]	Nalimurga	Leaf	Spermatorrhoea: Leaf juice mixed with sugar (3x/day, 4 days).
<i>Alstonia scholaris</i> (L.) R. Br. [Apocynaceae]	Chatina	Leaves, Bark, Latex	Jaundice: Bark decoction with <i>Mangifera indica</i> and pepper. Spermatorrhoea: Latex with sugar.
<i>Aloe vera</i> L. [Liliaceae]	Gheekuanri	Leaves	Skin Patches: Fresh leaf juice applied in the morning.
<i>Andrographis paniculata</i> (Burm. f.) Nees [Acanthaceae]	Bhuineem	Whole plant	Malaria/Stomach trouble: Leaf infusion. Scabies: Leaf juice mixed with <i>Rauvolfia</i> and <i>Nyctanthes</i> . Warts: Plant powder with honey.
<i>Angiopteris evecta</i> Forst. [Angiopteridaceae]	-	Leaves, Spores	Boils: Leaf paste with salt. Burns: Leaf paste with cow ghee. Leprosy/Skin diseases: Spores.
<i>Anogeissus latifolia</i> (Roxb.) Bedd. [Combretaceae]	Dhaura	Roots, Bark, Leaves	Diarrhea: 5g bark powder (2-3x/day). Economic use: Wood for axe handles and plows.
<i>Argemone mexicana</i> L. [Papaveraceae]	Kantakusuma	Latex	Conjunctivitis: Latex application.
<i>Argyrea nervosa</i> (Burm. f.) Bojer [Convolvulaceae]	Budhadaraka	Leaves, Root	Rejuvenation: Root decoction with sugar candy (for the elderly).
<i>Aristolochia indica</i> L. [Aristolochiaceae]	Iswar-mula	Leaves, Root	Constipation/Colic: Root decoction. Snake-bite: Root paste. Foot disease: Leaf paste.
<i>Asparagus racemosus</i> Willd. [Asparagaceae]	Satabari	Root	Quick Delivery: Root paste on abdomen. Jaundice: Root-tuber paste. Tonic: General health/Aphrodisiac.
<i>Asplenium indicum</i> Sledge [Aspleniaceae]	-	Rhizome	Gonorrhoea: Rhizome paste with milk (3x/day, 7 days).
<i>Asplenium laciniatum</i> D. Don [Aspleniaceae]	-	Root	Leucorrhoea: Root paste with cow urine (empty stomach, 15 days).
<i>Atylosia scarabaeoides</i> (L.) Benth. [Fabaceae]	Ban Kultha	Whole plant	Rheumatism: Roots ground with <i>Vitex negundo</i> , <i>Kaempferia</i> , and <i>Clausena</i> in oil.
<i>Azadirachta indica</i> A. Juss. [Meliaceae]	Nimba	Bark, Leaves, Seeds	Blood purifier/Worms: Leaf extract. Skin diseases: Leaf paste. Hygiene: Twigs used as toothbrushes.
<i>Bacopa monnieri</i> (L.) Pennell [Scrophulariaceae]	Bramhi	Leaves	Memory Power: Leaf paste consumption.
<i>Barleria prionitis</i> L. [Acanthaceae]	Daskerenta	Leaves	Malaria: Leaf decoction with honey (7 days). Wounds: Leaf paste application.
<i>Bauhinia purpurea</i> L. [Caesalpiniaceae]	Debkanchan	Leaves, Seeds	Stamina: Eating leaves for long-distance walking. Food: Buds/seeds eaten as vegetable.
<i>Bauhinia vahlii</i> W&A [Caesalpiniaceae]	Siali	Bark, Leaves, Seeds	Dysentery: Bark paste with lime. Economic use: Ropes (fiber) and plates (leaves).

This research demonstrates that the tribal communities of Mayurbhanj have developed a sophisticated, sustainable healthcare system that is deeply integrated with their ecological surroundings.

## Discussion

The present study indicates that Similipal Biosphere Reserve is rich in phytodiversity. Despite gradual socio-cultural renovation, the inhabitants have remarkable knowledge of plants and their uses. The dependence on folk medicines for health care is associated with the lack of modern medicines and medication, poverty and the traditional belief of its effectiveness. Generally local people use varieties of wild plants in traditional ways for their daily requirements as well as primary health care. The medicinal plants found in SBR are very useful to user group members who cannot afford the modern medical care. Documentation of this knowledge has provided novel information from the area. Most of the plants reported here have multiple local uses. Some plant species are commercially important and also possess medicinal value (*Anogeissus latifolia*, *Gmelina arborea*, *Madhuca longifolia* var. *latifolia*, *Pongamia pinnata*, *Pterocarpus marsupium*, *Shorea robusta*, *Terminalia arjuna*, and *Terminalia bellirica*). Some wild plants viz. *Ampelocissus*, *Buchanania*, *Coccinia*, *Diospyros*, *Flacourtia*, *Spondias* etc. are consumed as food and have also medicinal properties. The nutritional value of many of these species has now been confirmed; therefore, their consumption in various manners is beneficial to the health

of local people. The use of some wild edible fruit species like *Bridelia stipularis*, *Clausena excavata*, *Dillenia pentagyna*, *Erycibe paniculata*, *Gardenia gummifera*, *Meyna spinosa*, etc. may be encouraged for their consumption.

Out of 186 identified plant species all have medicinal properties to cure the different ailments and diseases. Most of the species were found having more than a single therapeutic use. Many of the plants that are used for medicinal purpose by local people in SBR are also used in different medicine systems all over the world. For example in Ayurveda *Phyllanthus emblica*, *Terminalia bellirica* and *Terminalia chebula* fruits are used to cure bronchitis, asthma and also used to prepare "Triphala" (which is an important Ayurvedic medicine used in constipation).

Traditionally, the rural women prefer plant medicines rather than modern medicines for abortion, menstrual trouble, conception disorders, sterility, delivery problem etc. Some ethnomedicinal observations made from the tribal area of Mayurbhanj district, revealed valuable phytotherapeutic information on the various gynecological disorders. The important plant species like *Curcuma aromatica*, *Enydra fluctuans*, *Mucuna pruriens*, *Saraca asoca* and *Smilax perfoliata* are used in various gynecological disorders. Similarly, many of the herbs used by the tribal people for the treatment of various joint diseases, like gout, arthritis and rheumatism are very common. Their modes of administration are also simple and convenient. The common man can easily afford to take the treatment without any side

effect. The species like *Gloriosa superba*, *Hemidesmus indicus*, *Vitex negundo*, *Tinospora cordifolia*, *Nyctanthes arbor-tristis* and *Oroxylum indicum* for rheumatic problem. These species play a vital role for families with many children without income, women (gynecological problem), old aged parents (always rheumatic problem) and snake biting problem in rainy season.

Knowledge and uses of herbal medicine for the treatment of various ailments among rural people is still a major part of their life and culture. Therefore, it is not only essential to conserve such a wealth of information hidden among the local people but also to apply them to modern knowledge of science and technology to meet the ever-increasing requirement of mankind.

### Conclusion

The documentation of medicinal plants in Mayurbhanj underscores a vital intersection between biodiversity and cultural heritage. While the Similipal Biosphere Reserve serves as a natural reservoir for hundreds of therapeutic species, the true value lies in the traditional knowledge held by the tribal communities. This study concludes that while the reliance on "forest pharmacies" remains high, this indigenous wisdom is under immediate threat from urbanization and habitat loss. The quantitative assessment proves that species like *Andrographis paniculata* and *Azadirachta indica* hold immense pharmacological potential, yet their survival depends on sustainable harvesting practices. Ultimately, preserving the ethnomedicinal profile of Mayurbhanj is not just a matter of botanical record; it is a necessity for global bioprospecting and the socio-economic empowerment of the local tribes. Integrating this ancient "green wisdom" with modern conservation strategies is the only way to ensure these natural resources remain available for future generations

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