Ethno-Medicinal Study of Common Plants with Special Reference to Giridih District, Jharkhand, India: Traditional Knowledge and Conservation Perspectives

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ABSTRACT

Ethnobotanical studies play a crucial role in documenting traditional medicinal knowledge and preserving indigenous plant-based healthcare practices. This study explores the ethno-medicinal use of common plants in Giridih district, Jharkhand, India, emphasizing the local knowledge of tribal and rural communities. Through structured and semi-structured interviews with 31 respondents, including traditional healers and local inhabitants, data were collected on plant usage, preparation methods, and therapeutic applications The study highlights the strong correlation between biodiversity conservation and socio-economic development, stressing the urgent need for conservation strategies to protect valuable medicinal plant species from overexploitation and habitat loss. The findings provide a foundation for further pharmacological validation and sustainable utilization of medicinal plants in local healthcare systems.

Keywords: Ethnobotany, Medicinal Plants, Traditional Knowledge, Giridih District, Tribal Medicine, Socio-Economic Impact, Jharkhand

1. Introduction

Plants have been an essential part of human civilization, providing resources for medicine, food, and shelter. Ethnobotany, which explores the relationship between people and plants, plays a crucial role in preserving traditional knowledge and integrating it with modern science[1-7]. Indigenous communities in India have long relied on plant-based remedies for treating various ailments, passing down this knowledge through generations[8-10].

Jharkhand, particularly Giridih district, is home to rich biodiversity and numerous medicinal plants[11-13]. Local tribal communities have developed extensive traditional healing practices using plant-based treatments for digestive disorders, respiratory infections, and skin diseases[14]. However, due to modernization, deforestation, and declining interest among younger generations, this invaluable knowledge is at risk of being lost[15].

This study aims to document and analyze the ethno-medicinal knowledge of common plants in Giridih district. It identifies medicinal plant species, evaluates their therapeutic applications. The research also examines the socio-economic impact of medicinal plant conservation and emphasizes sustainable harvesting practices to protect these valuable natural resources.

2. Study Area

Located between 24.18°N–24.53°N and 85.92°E–86.47°E, Giridih district spans 4,962 sq. km, featuring rich biodiversity, hilly terrain, and dense forests, making it ideal for medicinal plant research.

3. Methodology

Structured and semi-structured interviews, direct observations, and focus group discussions were used to record plant names, parts used, preparation methods, and medicinal applications. Respondents were selected based on their expertise in traditional healing. Collected plant specimens were identified using botanical keys and verified by taxonomic experts.

4. Results and Discussion

The study highlights the rich biodiversity of Giridih and the significant reliance of local communities on medicinal plants for traditional healthcare. The plants documented possess diverse therapeutic properties and are used judiciously by Vaidyas and local practitioners to treat ailments ranging from infections to chronic diseases. However, the increasing anthropogenic activities and lack of awareness about conservation pose a threat to these medicinal plants. Efforts to conserve and preserve rare and endangered species are crucial to sustain the traditional knowledge and biodiversity of the region. Further research on pharmacological validation and sustainable utilization is recommended.

The survey in Giridih District documented diverse medicinal plants across forests, grasslands, and agricultural lands, with forests hosting the highest species richness. Key plants like Neem and Ashwagandha showed adaptability, while factors like soil type and moisture influenced plant distribution. Ethnobotanical studies highlighted traditional knowledge, with plants such as Tulsi and Turmeric widely used for medicinal purposes. Conservation concerns emerged, with several species at risk due to overharvesting and habitat loss, emphasizing the need for sustainable practices. The study, conducted from 2020 to 2023, involved 31 respondents (16 men, 15 women) aged 25–80, focusing on experienced individuals to capture deep-rooted ethnobotanical knowledge. Face-to-face interviews ensured detailed insights, with multiple visits allowing for seasonal observations. The study primarily engaged tribal and village communities, whose longstanding relationship with the ecosystem preserves and transmits medicinal plant knowledge across generations.

The results of this study shed light on the extensive knowledge and use of medicinal plants by local communities, showcasing both the variety of species utilized and the deep-seated cultural practices surrounding traditional medicine. Fifty-four plant species from 33 families were documented, representing a broad spectrum of the plant biodiversity present in the region. These plants serve as the foundation for treating various ailments, with particular reliance on the elders and traditional healers who pass on this ethnopharmacological knowledge orally.

4.1. Distribution of Plant Families by Occurrence: A bar chart provides an overview of the frequency of each plant family.

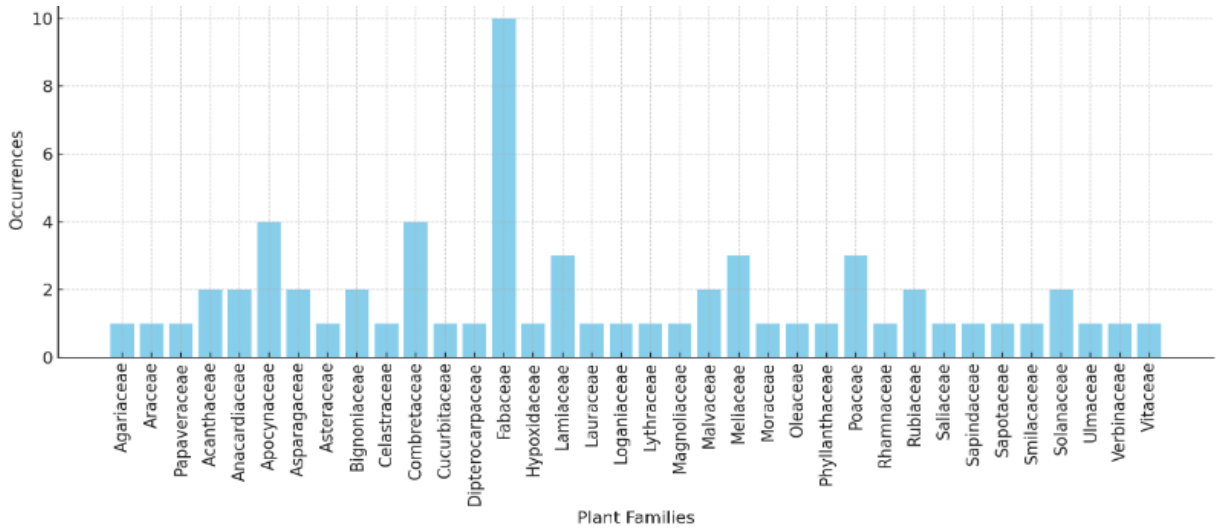

Figure 1 Distribution of plant families by occurrence

In terms of plant structure, shrubs emerge as the most prevalent growth form, comprising 56% of the documented species, followed by trees (28%), herbs (9%), and lianas (7%) shown in Fig2. This distribution suggests a practical approach to plant use, as shrubs and herbs are more accessible and easier to cultivate or harvest sustainably compared to trees. Their prominence in traditional remedies is likely a result of both availability and ease of harvest, making them an essential and sustainable choice for the community. This reliance on smaller, more accessible plants reflects the adaptability of traditional practices to local ecological conditions and supports the conservation of larger, slower-growing trees.

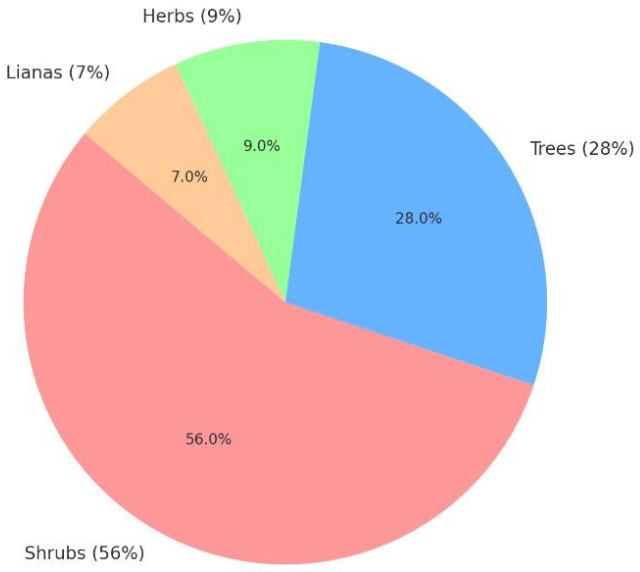

Figure 2 Growth forms of medicinal plants

The study highlights specific plants that are widely recognized and used within the community, with *Myrsine africana* (Seketet) leading as the most commonly mentioned remedy. Its extensive use for various human and animal ailments underscores its perceived efficacy and widespread availability. Following closely are *Carissa edulis* (Lamuriai), *Salvadora persica* (Sekotei), *Albizia anthelmintica* (Lmungutan), and *Clerodendrum myricoides* (Lmakutikuti). These species' popularity may be attributed to their known medicinal properties, ease of access, and cultural significance, establishing them as cornerstone species in traditional healthcare shown in fig3.

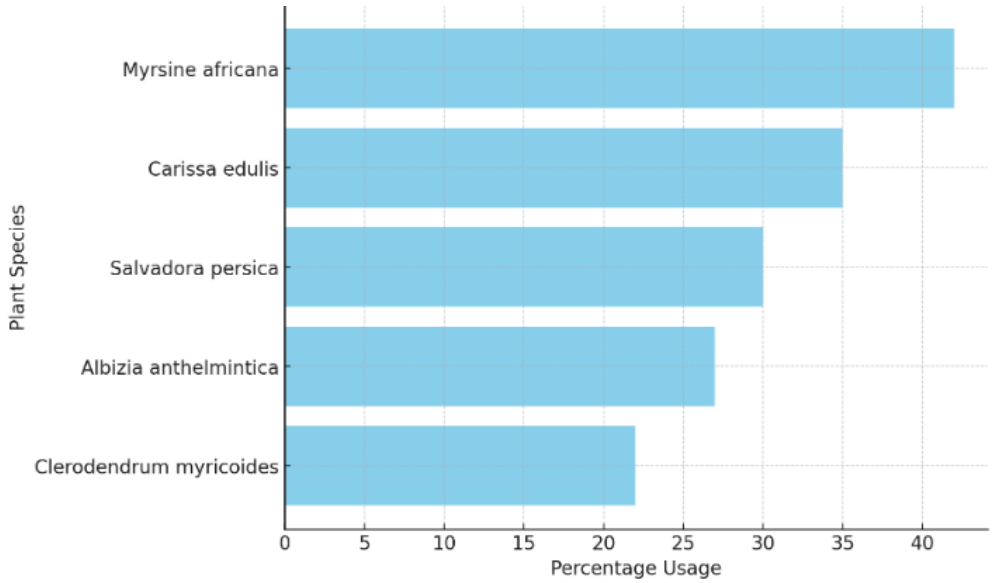

Figure 3 Top medicinal plants species used by locals

The distribution of plant families reveals that the Fabaceae family is the most frequently cited, comprising 15.625% of the documented species, followed by *Apocynaceae* and *Combretaceae*. The prominence of Fabaceae, in particular, aligns with broader ethnobotanical findings, as this family is renowned for its diverse pharmacological properties. The representation of multiple plant families indicates a wide-ranging use of local biodiversity, showcasing the community's in-depth understanding of which families and species offer medicinal benefits.

4.2.Percentage of Major Plant Families Found in Giridih District

The flora of Giridih district is rich in diversity, with a wide array of plant families, each contributing to the region's ecological balance. The plant families found in the district vary in terms of abundance and ecological importance. Based on field surveys, herbarium collections, and various botanical studies, the following is an estimate of the percentage distribution of major plant families found in the Giridih district.

4.3.Major Plant Families Found in Giridih District

4.3.1.*Fabaceae* (Legume Family)

The *Fabaceae* family is one of the largest plant families found in Giridih, comprising a

diverse range of trees, shrubs, and herbaceous plants. These plants play an essential role in fixing nitrogen in the soil, improving soil fertility, and supporting agricultural practices. The percentage of Fabaceae species in the district is estimated to be around **15%**.

4.3.2.*Poaceae* (Grass Family)

The *Poaceae* family is highly abundant in Giridih, especially in grasslands, agricultural fields, and open areas. Grasses are crucial for soil erosion control, fodder, and as a food source for various herbivores. They are estimated to make up **12%** of the total plant species found in the district.

4.3.3.*Asteraceae* (Sunflower Family)

The Asteraceae family includes a wide variety of herbs and shrubs that are particularly important for pollinators like bees and butterflies. This family also has numerous species used in traditional medicine. The representation of Asteraceae in Giridih is approximately **10%**.

4.3.4.*Lamiaceae* (Mint Family)

Lamiaceae is another significant family in the district, including plants with aromatic properties that are used in culinary and medicinal practices. These plants contribute greatly to biodiversity and are part of traditional herbal practices in the region. This family accounts for about **8%** of the plant species in Giridih.

4.3.5.*Rubiaceae* (Coffee Family)

Rubiaceae plants are mostly shrubs or small trees that are important for their medicinal properties, as well as for producing fruits like coffee and gardenias. This family represents about **7%** of the plant species in Giridih.

4.3.6.*Malvaceae* (Mallow Family)

The *Malvaceae* family, known for species like hibiscus and marshmallow, has significant cultural and medicinal importance. Plants from this family are often found in the wild or cultivated for their flowers and medicinal uses. They make up about **6%** of the flora in Giridih.

4.3.7.*Euphorbiaceae* (Spurge Family)

Euphorbiaceae is a large and diverse family, with many species known for their ornamental, medicinal, and economic uses. The family contributes to **5%** of the plant diversity in the district.

4.3.8.*Solanaceae* (Nightshade Family)

Solanaceae includes various species of interest, including food crops like tomatoes and eggplants, as well as medicinal plants. This family is estimated to represent **4%** of the total flora of Giridih.

4.3.9*Apocynaceae* (Dogbane Family)

The *Apocynaceae* family includes various shrubs and trees with important medicinal properties. This family accounts for **3%** of the plant species found in Giridih.

4.3.10.*Anacardiaceae* (Cashew Family)

Known for its economic value in the form of fruits and nuts, *Anacardiaceae* species are a significant part of Giridih's flora. They represent about **3%** of the district's plant species.

4.3.11. Other Plant Families

Several other plant families contribute to the flora of Giridih, each representing a small yet significant portion of the region's biodiversity. The *Rutaceae* (Rue family), *Cucurbitaceae* (Gourd family), *Moraceae* (Mulberry family), and *Myrtaceae* (Myrtle family) each account for 2% of the documented plant species. Additionally, the *Sterculiaceae* (Sterculia family) constitutes 1% of the total flora.

4.4.Plant Parts Used in Remedies

The utilization of various plant parts provides insights into preparation techniques and sustainable resource use. *Leaves* are the most frequently used, accounting for **29.56%** of the total occurrences, followed by *bark* (**16.98%**) and *roots* (**14.47%**). *Fruits* (**7.55%**), *flowers* (**6.92%**), and *seeds* (**5.03%**) are also commonly utilized have been summarized in Table. Other plant parts, including *stems* (**3.14%**), *gum* (**3.14%**), *whole plants* (**2.52%**), and *bulbs/tubers* (**1.89%**), contribute to the diversity of medicinal applications. The preference for leaves may stem from their ease of collection, rapid regrowth, and high concentration of bioactive compounds. Additionally, using leaves minimizes ecological impact compared to root harvesting, which can be more detrimental to plant survival. This Table1 presents the various plant parts utilized for medicinal purposes, along with their occurrence and percentage contribution to the total usage. Leaves are the most frequently used, followed by roots, bark, and fruits, highlighting the sustainable harvesting practices and medicinal significance of different plant parts.

Table 1 Distribution of Plant Parts Used in Ethnomedicinal Practices

Part Used	Occurrences	Percentage (%)
Bark	27	16.98%
Leaves	47	29.56%
Flower	11	6.92%
Seeds	8	5.03%
Root	23	14.47%
Fruit	12	7.55%
Stem	5	3.14%
Bulb	3	1.89%
Whole Plant	4	2.52%
Tubers	3	1.89%
Gum	5	3.14%
Sap	1	0.63%
Kernel	1	0.63%
Bulbs	1	0.63%
Tender Branches	1	0.63%
Total	**159**	**100%**

The chart (Fig. 4) illustrates the occurrences of different plant parts utilized for medicinal purposes, highlighting the most commonly used components such as leaves, bark, and roots.

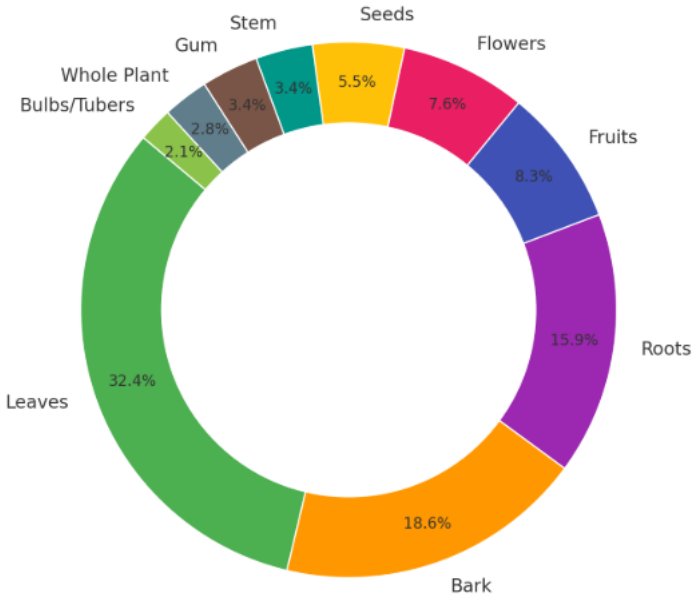

Figure 4 Parts of plants used for medicine

4.5.Preparation and Administration Methods

The preparation methods reflect a mix of indigenous knowledge and practical convenience. The majority of remedies are prepared by hot decoction (48%), followed by cold decoction (19.4%) and homogenization through pounding or powdering (6.5%). Decoctions are a common method in ethnomedicine, as they allow for the extraction of water-soluble compounds, increasing the bioavailability of active ingredients. This method likely persists due to its simplicity and effectiveness, requiring minimal equipment.

The study also highlights the primary routes of administration, with oral administration (8%) being the most prevalent, followed by dermal and nasal routes (20%) shown in fig. Oral administration is common for systemic ailments, while dermal and nasal applications are often used for localized treatments. The selection of administration routes reflects the flexibility and specificity of traditional remedies, tailored to meet different health needs.

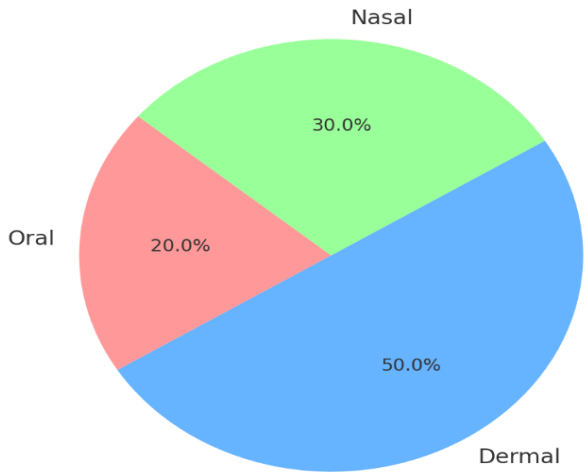

Figure 5 Administration routes for medicinal plants

4.6.Implications and Conservation

The findings of this study underscore the rich ethnobotanical heritage of the study area and the reliance of local communities on medicinal plants for healthcare. However, with modernization, there is a risk that this knowledge could be lost. Conservation of both plant species and traditional knowledge is crucial for preserving biodiversity and sustaining indigenous healthcare practices. Encouraging community-based conservation efforts and fostering collaboration with local healers can help ensure the sustainable use of these medicinal resources.

This research contributes to a growing body of literature on ethnobotany, offering valuable insights for future studies on pharmacological validation and sustainable conservation. By documenting these traditional practices, this study provides a foundation for the possible integration of ethnobotanical knowledge into broader health and environmental policies.

5. Conclusion

This study highlights the rich ethnomedicinal knowledge of Giridih's indigenous communities, emphasizing the vital role of medicinal plants in traditional healthcare. It documents diverse plant species, their therapeutic uses, and the challenges of knowledge erosion due to modernization and habitat loss. Conservation efforts and sustainable practices are crucial to preserving both biodiversity and local livelihoods. Integrating traditional wisdom with scientific research can enhance pharmacological advancements while supporting ecological and economic sustainability. Collaborative efforts among researchers, policymakers, and communities are essential to safeguarding this invaluable heritage for future generations.

References

1. Sharma, A., Patel, S. K., & Singh, G. S. (2024). Revitalizing Traditional Knowledge of the Himalayan Indigenous Tribes: An Ethnoecological and Ethnobotanical

Approach. In *Learning 'from'and 'with'the Locals: Traditional Knowledge Systems for Environmental Sustainability in the Himalayas* (pp. 111-133). Cham: Springer Nature Switzerland.

2. Hemmami, H., Messaoudi, M., Sawicka, B., Zahnit, W., Osmani, N., Benmohamed, M., & Rebiai, A. (2024). The Importance of Traditional Resources in Ethnomedicine. In *Traditional Resources and Tools for Modern Drug Discovery: Ethnomedicine and Pharmacology* (pp. 91-127). Singapore: Springer Nature Singapore.
3. Sharma, A., Patel, S. K., & Singh, G. S. (2024). An Ethnoecological and Ethnobotanical. *Learning 'from'and 'with'the Locals: Traditional Knowledge Systems for Environmental Sustainability in the Himalayas*, 111.
4. Hamilton, A., & Shengji, P. (2024). *History and Future of Plants, Planet and People: Towards a New Ecologically Sustainable Age in People's Relationships With Plants*. CABI.
5. Wanzala, W., & Minyoso, S. I. (2024). Ethnomedicines in the 21st century: challenges and opportunities in the contemporary world. *Journal of Medicinal Herbs and Ethnomedicine*, *10*, 12-36.
6. Öztürk, M., Sridhar, K. R., Sarwat, M., Altay, V., & Huerta-Martínez, F. M. (Eds.). (2023). *Ethnic Knowledge and Perspectives of Medicinal Plants: Volume 2: Nutritional and Dietary Benefits*. CRC Press.
7. Sharma, P. K., Singh, A., & Sharma, N. K. (2022). A socio-ecological critique on India's local health traditions amidst rising incidence of global pandemics. *Journal of Herbal Medicine*, *34*, 100578.
8. Das, P., Bhattacharya, S., Chakraborty, A. J., & Ghosh, A. (2024). Conservation and Management Approaches of Ethno-Medicinal Plants for Livelihood Improvements. In *Sustainable Forest Resources Management* (pp. 29-58). Apple Academic Press.
9. Bhattacharya, S. (2024). Indigenous knowledge for sustainable development: A case study of Kurmi Mahatos. *Indian Journal of History of Science*, 1-12.
10. Pradhan, S., Goswami, S., Aggarwal, N., Pradhan, S. S., Das, S. B., & Murthy, S. (2024). Late Artinskian–Kungurian biodiversity of the Sirka area, South Karanpura Coalfield, Jharkhand, India and their palaeoclimatic connotations. *Journal of Sedimentary Environments*, *9*(4), 791-812.
11. Singh, A., Dhasmana, A., Bandhu, A., Kapoor, R., Baalasubramanian, S., & Ghosh-Jerath, S. (2023). Contribution of natural food environments to nutritional intake and biomarker status: Insights from the women of indigenous santhal communities of Jharkhand, India. *BMC nutrition*, *9*(1), 20.

12. Thakur, B., & Thakur, R. R. (2021). Early and modern paradigms in natural resource management: global and Indian experiences. *Resource Management, Sustainable Development and Governance: Indian and International Perspectives*, 27-58

13. Sahu, G. (2021). Implementation of the Scheduled Tribes and other traditional forest dwellers (Recognition of Rights) act 2006 in Jharkhand: Problems and challenges. *Journal of Land and Rural Studies*, *9*(1), 158-177.

14. Kumar, S., Kushari, S., Sarma, H., & Laloo, D. (2023). Exploring the Traditional System of Medicine With Special Emphasis on the Indigenous Practice of Herbal Remedy by the Tribals of North East India. *Practice and Re-emergence of Herbal Medicine*, *1*, 1.

15. Haokip, P. L. (2024). Environmental Insights from Indigenous People: Northeast India Perspective. *Asian Horizons*, *18*(1), 113-125.