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Research Article

Ethno-Medico-Food importance of wild tubers used by indigenous people of Uttarakhand and Odisha states of India during winter

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Abstract: Wild tubers play a vital role in the subsistence, nutrition, and healthcare of indigenous communities across India. This study documents ten species of wild tuberous plants traditionally used as food and medicine during winter in the states of Uttarakhand and Odisha. Field-based ethnobotanical surveys and literature reviews revealed that the documented species not only serve as energy-rich food source but also possess therapeutic properties useful against ailments such as digestive disorders, rheumatism, dysentery, and skin infections. The study underscores the importance of conserving these lesser-known tuberous species and integrating traditional knowledge into sustainable food and health systems.

Keywords: Ethnobotany, food medicine continuum, indigenous knowledge, Odisha, Uttarakhand, wild tubers

Introduction

Traditional food plants form the backbone of indigenous food systems and represent a living link between culture, nutrition, and ecology (Sarkar et al., 2019). Across India, a country renowned for its biocultural diversity, these plants have been indispensable in sustaining rural and tribal communities for generations (Singh et al., 2021). Among the plant species, the wild tubers mainly serve as both staple and supplementary foods, particularly during the winter season and periods of food scarcity (Kumar et al., 2013). These underground storage organs rhizomes, roots, corms, and tubers are used as reservoirs of nutrients such as carbohydrates, starch, fibre, and essential minerals, making them

valuable sources of sustenance and energy when agricultural produce is limited (Chandrasekara and Josheph, 2016). In addition to their nutritional importance, wild tubers also play a therapeutic role in traditional healthcare systems (Anwar et al., 2024). Many indigenous groups employ these plants as home remedies for common ailments such as digestive troubles, joint pain, skin infections, and respiratory problems (Raj et al., 2018). This dual role of tubers serving as both food and medicine reflects the deep ecological knowledge and adaptive strategies of indigenous populations who have learned to utilize these natural resources efficiently (Kumar et al., 2013). The concept of "food-medicine continuum," where food and therapeutic uses overlap, is particularly evident in these communities and highlights the holistic approach to health embedded in traditional lifestyles. The states of Uttarakhand and Odisha represent two geographically and culturally distinct regions of India where such knowledge continues to thrive (Singh et al., 2014; Behera et al., 2025). Uttarakhand, located in the Western Himalaya, is characterized by mountainous terrain, temperate climate, and a long tradition of ethnobotanical practices among indigenous groups such as the Bhotiya, Tharu, and Jaunsari (Balodi et al., 2018). In contrast, Odisha, situated in the Eastern Ghats, supports rich tropical forests and is home to diverse tribal populations including the Kondh, Saora, and Juang, who depend heavily on forest resources for food and medicine (Sahoo et al., 2023). Despite their ecological and cultural differences, both regions share a common reliance on wild tubers as seasonal nutritional and medicinal resources, particularly during winter when other edible plants are less available. Previous ethnobotanical studies in India have primarily focused on wild edible plants in general (Thakur et al., 2020; Rymbai et al., 2023; Samkaria and Kumari, 2025), with limited emphasis on seasonal or region-specific tuberous species. Moreover, comparative documentation between ecologically distinct regions such as the Himalayas and the Eastern Ghats remains scarce. Understanding the similarities and differences in tuber use across these regions is crucial not only for preserving traditional knowledge but also for identifying species with potential nutraceutical and pharmacological value. Therefore, the present study aims to document and compare the ethno-medico-food uses of wild tubers traditionally consumed during the winter season by indigenous communities in Uttarakhand and Odisha.

Methodology

Ethnobotanical information on wild tubers used during the winter season was collected from selected tribal and rural communities in the states of Uttarakhand (Pauri Garhwal) and Odisha (Mayurbhanj) through a combination of field surveys, semi-structured interviews, and participatory observations conducted between December 2024 and March 2025 (Kumar et al., 2021; Jena et al., 2025). Specimens of the reported species were collected, photographed, and identified with the help of regional floras (Nayak and Kumar, 2023).

Results and discussion

The study documented a total of ten wild tuberous plant species traditionally utilized as both food and medicine by indigenous communities of Uttarakhand and Odisha. These species belong to six genera, with the genus *Dioscorea* being the most dominant, represented by six species (Figure 1). All the recorded species are primarily consumed for their edible underground parts like rhizomes, tubers, or

corms that serve as important sources of nutrition during the winter months when other food resources are limited. Apart from their dietary role, these tubers exhibit diverse medicinal applications in traditional healthcare systems. It was noticed that *Alpinia galanga* is used to treat throat infections, *Amorphophallus paeoniifolius* aids digestion, while *Dioscorea pentaphylla* and *D. wallichii* are employed against rheumatism and dysentery, respectively. Species like *Chlorophytum borivilianum* and *D. pubera* are valued for their rejuvenating and skin-enhancing properties (Table 1). The findings of present study demonstrated that wild tuberous plants continue to play a vital role in the subsistence, nutrition, and healthcare of indigenous communities in Uttarakhand and Odisha. The widespread use of these plants reflects a deep ecological knowledge passed down through generations, enabling local people to adapt to seasonal food scarcity, particularly during the winter months. Wild tubers serve as readily available and reliable sources of carbohydrates, minerals, and energy, supplementing diets when cultivated crops are limited. Their dual use as food and medicine illustrates the food-medicine continuum, a hallmark of traditional knowledge systems where diet and health are intrinsically linked.

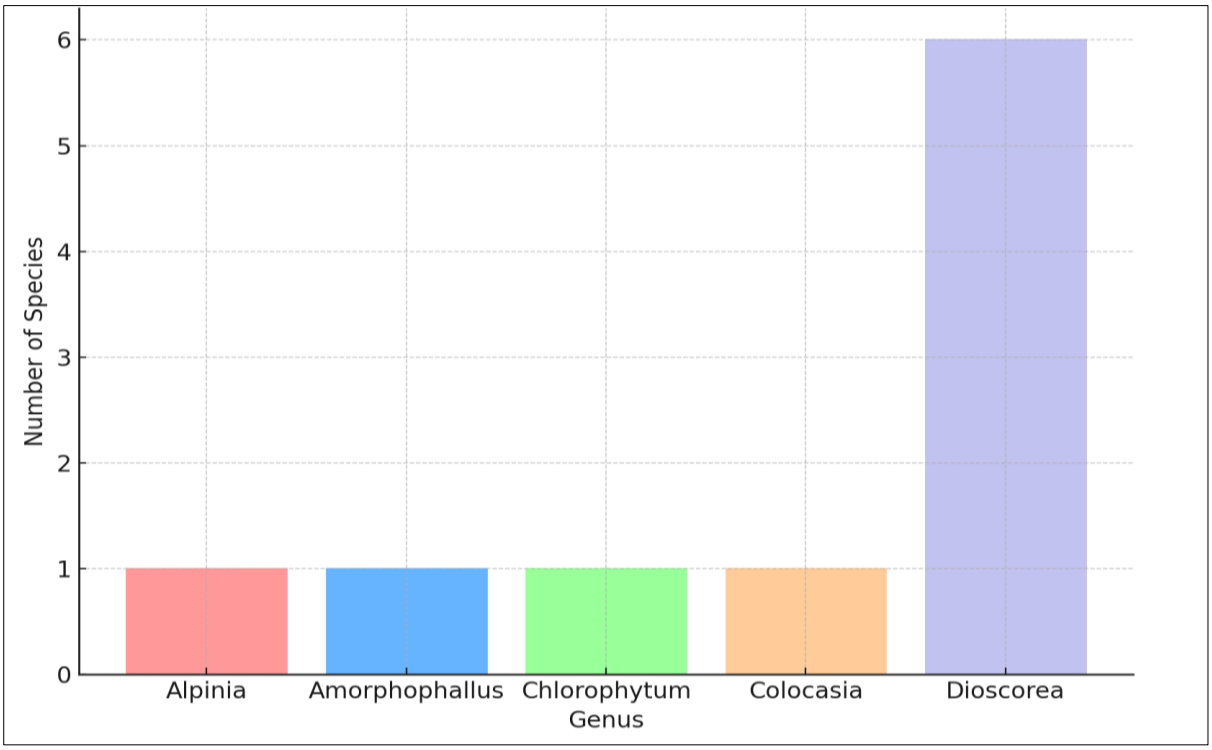

Figure 1: Genus-wise distribution of wild tuber species traditionally used by indigenous communities in Uttarakhand and Odisha, India during winter

Table 1: Some common Ethno-Medico-Food importance of wild tubers used by indigenous people of Uttarakhand and Odisha states of India during winter

Botanical name	Common name	Food values	Medicinal values
Alpinia galanga	Greater Galangal	Rhizome is edible.	Used for throat infections

Amorphophallus paeoniifolius	Elephant Foot Yam	Corm is edible.	Improves digestion.
Chlorophytum borivilianum	Musli	Roots are edible.	Rejuvenative tonic
Colocasia esculenta	Taro	Rhizome is edible.	Promotes strength and digestion
Dioscorea bulbifera	Air potato	Tuber is edible.	Tuber and bulbils used for skin disease.
Dioscorea hispida	Indian bitter yam	Tuber is edible.	Paste is used externally for joint pains.
Dioscorea oppositifolia	Sweet Yam	Tuber is edible.	Promotes digestion.
Dioscorea pentaphylla	Five-leaved yam	Tuber is edible.	Tuber decoction is used for rheumatism.
Dioscorea pubera	Hairy yam	Tuber is edible.	Consumed to improve the skin health.
Dioscorea wallichii	Forest Yam	Tuber is edible.	Used in dysentery.

The dominance of *Dioscorea* species in both regions indicates their ecological abundance and cultural importance. These yams are not only consumed as staple or emergency foods but are also employed to treat ailments such as rheumatism, dysentery, and skin diseases. Such multipurpose use enhances their value in traditional healthcare and contributes to nutritional resilience and self-reliance among tribal households. Other species like *Alpinia galanga* and *Chlorophytum borivilianum* are notable for their pharmacological potential possessing anti-inflammatory, rejuvenative, and digestive properties which makes them promising candidates for nutraceutical and herbal formulations. For tribal communities, these wild tubers are more than just food, they represent cultural identity, survival strategy, and economic potential. In remote areas where access to modern healthcare is limited, these plants provide affordable and effective remedies for common ailments. The sustainable use and conservation of these species can strengthen food and livelihood security, especially through value addition, small-scale processing, and integration into community-based forest management and eco-enterprises. Additionally, the documentation and scientific validation of these plants can help protect traditional knowledge rights and promote bio-cultural heritage conservation.

Conclusion

The present study highlights the remarkable ethno-medico-food significance of wild tubers used by indigenous communities in Uttarakhand and Odisha during the winter season. These tubers not only serve as vital sources of nutrition when cultivated crops are scarce but also function as effective

traditional remedies for a range of ailments, reflecting the holistic health perspective of tribal societies. The study emphasizes that species such as *Dioscorea*, *Alpinia galanga*, and *Chlorophytum borivilianum* are integral for sustaining food security, health care, and cultural continuity among rural and tribal populations. Given their nutritional richness and therapeutic potential, these plants hold great promise for future research, value addition, and community-based livelihood programs. Conservation of these species and the traditional knowledge associated with them is therefore crucial to ensure sustainable utilization and bio-cultural resilience. Integrating this indigenous wisdom with modern scientific approaches can pave the way for developing nutraceutical products, promoting local food sovereignty, and enhancing the well-being of tribal communities while conserving the biodiversity of their native ecosystems.

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