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A Note on Health Benefits of Some Underutilized Plant Species from Katepurna Wildlife Sanctuary, Maharashtra, India

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Abstract

Katepurna Wildlife Sanctuary, located in Akola district of Maharashtra. It harbours rich biodiversity including several underutilized plant species with significant nutritional and medicinal potential. Despite their availability, these plants remain neglected in mainstream diets and healthcare practices. The present study documents and theoretically evaluates the nutritional profiles and ethnomedicinal uses of underutilized species in the sanctuary. Field surveys, ethnobotanical interviews with local communities, and literature reviews were conducted. A total of 11 species belonging to 9 families were identified. Species such as *Amranthus spinosus, Boerhavia diffusa, Buchanania lanzan, Butea monosperma, Cassia tora, Cleome viscosa, Cordia dicotoma, Dioscorea bulbifera, Mucuna prurience, Ruellia tuberosa, Zizipua mauritiana* were found rich in micronutrients and bioactive compounds. The study highlights the potential of these species in addressing malnutrition, lifestyle diseases, and promoting sustainable use of local biodiversity.

Keywords: Katepurna Wildlife Sanctuary, Health Benefits, Underutilized Plants.

1. Introduction

Underutilized plant species, often referred to as “neglected” or “orphan” crops, have historically played a critical role in human nutrition and healthcare, especially in rural and tribal communities (Padulosi, 2013; FAO, 2018). These species are typically adapted to local environments, require minimal inputs, and are resilient to climatic variability. Despite their nutritional richness and medicinal potential, they are increasingly marginalized in modern agriculture and dietary practices due to the dominance of a few staple crops (Bharucha & Pretty, 2010; Chivenge et al., 2015).

Katepurna Wildlife Sanctuary, located in Akola district of Maharashtra, India, encompasses approximately 73.69 km² of tropical dry deciduous forest dominated by teak (*Tectona grandis*) and associated species (Naik, 1998). The sanctuary supports diverse flora, including several underutilized edible and medicinal plants that have been traditionally consumed by indigenous communities such as the Korku, Gond, and Kolam tribes. These plants not only serve as seasonal food sources but also act as remedies for various ailments in local healthcare systems, thus contributing to dietary diversity, food security, and primary healthcare (Kala, 2009).

Previous studies in different parts of India have demonstrated that underutilized species such as *Amaranthus spinosus*, *Boerhavia diffusa*, *Buchanania lanzan*, and *Ziziphus mauritiana* are rich in essential micronutrients (iron, calcium, vitamin C) and bioactive compounds (phenolics, flavonoids, saponins) that confer antioxidant, anti-inflammatory, and antimicrobial activities

(Kumar, 2017; Muthaiyah 2020). These properties make them promising candidates for combating malnutrition and preventing non-communicable diseases. However, systematic documentation of such species from Katepurna Wildlife Sanctuary, along with their nutritional and ethnomedicinal values, remains scarce.

The present study addresses this gap by documenting and theoretically evaluating the nutritional composition and health benefits of selected underutilized plant species from KWS. The findings aim to strengthen biodiversity-based nutrition strategies and promote the sustainable utilization of local plant resources in line with global food security goals. The major goal of this study is to document the underutilized edible and medicinal plant species present in Katepurna Wildlife Sanctuary through field surveys and ethnobotanical interviews and their nutritional and health benefits to local peoples.

2. Materials and Methods

2.1 Study Area

Katepurna Wildlife Sanctuary is situated in Akola district of Maharashtra, India, between 20°35′–20°45′ N latitude and 77°05′–77°15′ E longitude. It spans an area of approximately 73.69 km² and is characterized by tropical dry deciduous forests dominated by *Tectona grandis*, interspersed with species such as *Anogeissus latifolia*, *Terminalia tomentosa*, and *Lagerstroemia parviflora*. The sanctuary experiences a tropical climate with annual rainfall ranging from 800 to 1,000 mm, and mean annual temperatures between 20°C and 42°C. The forested terrain, combined with seasonal streams, supports rich floral diversity, including several wild edible and medicinal plant species (Naik, 1998).

2.2 Ethnobotanical Survey

Field surveys were conducted from October 2022 to March 2024 during peak availability of edible plant parts. A purposive sampling approach was used to select knowledgeable respondents, including traditional healers, elderly community members, and forest-dependent households from fringe villages such as Adgaon, Akoli Jahangir, Fetra, Dhotarkhed, Kasmar and Katepurna.

Semi-structured interviews and guided field walks were employed to document plant names (local and botanical), edible parts, modes of consumption, harvest season, and ethnomedicinal uses. The “walk-in-the-woods” method (Martin, 1995) was used to facilitate accurate species identification in situ.

2.3 Plant Collection and Identification

Representative plant specimens were collected with the assistance of local guides. Voucher specimens were prepared following standard herbarium protocols (Jain & Rao, 1977) and deposited in the Department of Botany, Shri Dr. R. G. Rathod College of Arts and Science, Murtizapur, District- Akola (MS). Species identification was performed using Flora of Marathwada (Naik, 1998).

2.4 Data Compilation and Literature Support

Field-collected ethnobotanical data were compared with published literature to validate uses and nutritional composition (Bharucha & Pretty, 2010; Muthaiyah et al., 2020). Nutritional and medicinal properties were cross-referenced with the Indian Council of Medical Research (ICMR) food composition database and peer-reviewed sources from Scopus, WoS, and other high indexed journals.

3. Results and Discussion

3.1 Diversity of Edible Underutilized Plant Species

A total of 11 underutilized plant species, representing 9 botanical families, were recorded from Katepurna Wildlife Sanctuary (Table 1). The Fabaceae family was dominant with three species (*Butea monosperma*, *Cassia tora*, *Mucuna pruriens*), followed by single species from other families such as Acanthaceae, Amaranthaceae, Anacardiaceae, Boraginaceae, Cleomaceae, Dioscoriaceae, Nyctaginaceae, and Rhamnaceae. The edible parts varied widely, including tubers, leaves, tender shoots, seeds, flowers, and fruits, demonstrating the dietary diversity offered by wild edible flora in the sanctuary.

3.2 Nutritional Composition

The surveyed species exhibit a wide spectrum of macro- and micronutrients important for human health:

- **Leafy greens** such as *Amaranthus spinosus* and *Ruellia tuberosa* were rich in iron, calcium, and dietary fiber, confirming earlier reports that wild leafy vegetables are important for combating iron-deficiency anemia and improving bone health (Shukla et al., 2019; Yadav and Sehgal, 2003).
- **Protein-rich seeds** such as *Buchanania lanzan* (charoli) and *Mucuna pruriens* provide essential amino acids; the latter contains L-DOPA, a well-known precursor for dopamine used in the treatment of Parkinson's disease (Misra and Wagner, 2007).
- **Vitamin-rich fruits** such as *Ziziphus mauritiana* are abundant in vitamin C and antioxidants, supporting immune function and reducing oxidative stress (Pareek, 2001).
- **Tuber crops** like *Dioscorea bulbifera* serve as energy-dense food sources with medicinal properties, including anti-inflammatory and antidiabetic activity (Coursey, 1967; Adepoju & Okonkwo, 2009).
- **Bioactive-rich medicinal herbs** like *Boerhavia diffusa* and *Cleome viscosa* contain flavonoids, alkaloids, and sterols with reported hepatoprotective, antimicrobial, and anti-inflammatory actions (Awasthi & Verma, 2006; Singh, 2010).

3.3 Ethnomedicinal Importance

Ethnobotanical documentation revealed that these species are not only consumed as food but are also integral to local primary healthcare systems:

- *Ruellia tuberosa* tubers are used by local communities for diabetes management, in agreement with pharmacological studies showing its hypoglycemic potential (Anandarajagopal et al., 2011).

- *Boerhavia diffusa* ("Punarnava") is a key plant in Ayurvedic medicine for its diuretic and liver-protective properties (Chaudhary et al., 2012).
- *Cassia tora* leaves and seeds are valued for their laxative effect and antifungal properties, corroborated by studies on anthraquinone glycosides present in the plant (Bhattacharya et al., 2013).
- *Butea monosperma* flowers, consumed as a refreshing beverage, have been reported to contain polyphenolic antioxidants that reduce oxidative damage (Rani,2013).

Table-1: Details of health benefits of some selected underutilized plants from Katepurna Wildlife Sanctuary.

Family	Scientific Name	Vernacular Name	Edible Part	Nutritional Components	Health Benefits
Acanthaceae	*Ruellia tuberosa*	Neelkanthi	Tuber, Leaves	Iron, Calcium, Proteins, Flavonoids	Anti-diabetic, anti-inflammatory, antioxidant
Amaranthaceae	*Amaranthus spinosus*	Kantabhaji	Tender shoots, Leaves	Iron, Calcium, Dietary fiber	Treats anemia, promotes gut health
Anacardiaceae	*Buchanania lanzan* Spreng.	Charoli	Seed kernel	Roasted, in sweets	Protein-rich, skin health
Boraginaceae	*Cordia dichotoma* G. Forst.	Lasoda	Fruit	Pickle, chutney	Digestive aid
Cleomaceae	*Cleome viscosa*	Hurhur	Leaves, Seeds	Omega-3 fatty acids, Vitamins A & E	Anti-rheumatic, antimicrobial, antioxidant
Dioscoriaceae	*Dioscorea bulbifera* L.	Karanda kand	Tuber	Boiled, curry	Energy source, anti-inflammatory
Fabaceae	*Butea monosperma* (Lam.) Taub.	Palash	Flower	Drink	Cooling, antioxidant
Fabaceae	*Cassia tora*	Chakunda	Young leaves, Seeds	Proteins, Carotenoids, Vitamin C	Laxative, hepatoprotective, anti-fungal
Fabaceae	*Mucuna pruriens*	Kavach	Seeds	L-DOPA, Proteins	Parkinson's treatment, aphrodisiac, tonic
Nyctaginaceae	*Boerhavia diffusa*	Punarnava	Whole plant	Alkaloids, Sterols, Antioxidants	Diuretic, anti-asthmatic, liver tonic
Rhamnaceae	*Ziziphus mauritiana* Lam.	Ber	Fruit	Fresh, dried	Vitamin C, immunity booster

4. Conclusion

The present investigation documents and evaluates the nutritional and health-promoting potential of eleven underutilized plant species from Katepurna Wildlife Sanctuary,

Maharashtra. These species, spanning nine botanical families, were found to be rich sources of micronutrients such as iron, calcium, vitamins, proteins, dietary fiber, flavonoids, carotenoids, omega-3 fatty acids, and bioactive phytochemicals like L-DOPA and alkaloids. The documented ethnomedicinal properties — including anti-diabetic, antioxidant, hepatoprotective, antimicrobial, anti-inflammatory, and neuroprotective activities — align closely with previous phytochemical and pharmacological studies, underscoring their potential role in preventing malnutrition and managing lifestyle-related disorders.

Despite their abundance and traditional use among local communities, these plants remain underrepresented in mainstream nutrition and public health programs. Integrating such species into dietary practices and sustainable livelihood strategies could enhance nutritional security, promote biodiversity conservation, and preserve indigenous knowledge systems. Future research should focus on quantitative nutrient profiling, bioavailability studies, and value-addition processing to facilitate their inclusion in functional food development and nutraceutical markets.

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