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Assessment of floristic diversity of tree species and medicinal value in College Campus of Maharaja Purna Chandra Autonomous College, Odisha, India

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Abstract

An assessment was conducted at Maharaja Purna Chandra Autonomous College, Takhatpur, Baripada (21°93'N; 86°76'E) in Mayurbhanj, Odisha, India, from September 2024 to February 2025 to examine the diversity of tree species and their medicinal applications. Plant specimens were collected using random sampling methods and identified through standard floras and herbarium references. A total of 44 tree species with recognized medicinal value were recorded and classified based on their families, life forms and ecological attributes. These species were distributed among 24 plant families, with Fabaceae being the most dominant (7 species), followed by Arecaceae (5 species), Moraceae (4 species), and Myrtaceae (3 species). Families such as Rubiaceae, Sapotaceae, Lamiaceae, Apocynaceae and Rutaceae each contributed two species, while the remaining 15 families including Rosaceae, Rhamnaceae, Araucariaceae, Anacardiaceae, Cycadaceae, Caricaceae, Annonaceae, Euphorbiaceae, Sapindaceae, Meliaceae, Malvaceae, Achariaceae, Simaroubaceae, Cornaceae and Oleaceae were represented by a single species each. *Mangifera indica*, *Tectona grandis* and *Neolamarckia cadamba* were identified as the most prevalent species in the campus, whereas *Nyctanthes arbor-tristis* and *Saraca asoca* were noted as rare and in need of conservation efforts. Information on medicinal uses was obtained through literature review and informal consultations with local herbal practitioners and traditional healers. The study revealed that many of these species are traditionally used to treat a wide range of ailments, including fever, skin diseases, digestive disorders, respiratory problems, and inflammation. The diversity of tree species observed in the study area is likely shaped by a combination of environmental and biological factors such as local flora, soil conditions, topography, climate, and ecological dynamics.

Keywords: Flora, ecological attributes, herbal practitioners, topography, ecological dynamics

Introduction

Biodiversity is a fundamental component of the Earth's life-support system, encompassing the diversity of life at genetic, species, and ecosystem levels. Among its many aspects, floristic diversity, particularly tree diversity, plays a vital role in maintaining ecological balance, supporting wildlife and offering ecosystem services such as carbon sequestration, soil stabilization, and climate regulation (Heywood & Watson, 1995) ^[1]. Within this floristic framework, medicinal plants represent a highly valued group due to their relevance in traditional healthcare systems like Ayurveda, Siddha, and Unani, which have been practiced in India for centuries (Kumar *et al.*, 2013) ^[2]. Increasingly, college and university campuses are being recognized as overlooked repositories of plant biodiversity. The relatively undisturbed green spaces and limited anthropogenic pressure in such environments provide favorable conditions for the conservation of diverse plant species, including those with medicinal value (Chavan & Pawar, 2011) ^[3]. These protected academic landscapes not only contribute to local ecological stability but also offer opportunities for education, research and the documentation of traditional botanical knowledge. The significance of local-level floristic surveys in biodiversity conservation has been long established. Jain and Rao (1997) ^[4] argued that such efforts are essential to preserving both plant diversity and associated traditional knowledge systems. Similarly, Gadgil and Guha (1995) ^[5] highlighted the critical need for community-level biodiversity assessments, particularly in the context of increasing urbanization and the unregulated transformation of natural habitats. Their work emphasized the importance of conserving green spaces within human settlements as integral components

of sustainable development. Odisha, located along the eastern coastline of India, is known for its rich biological and cultural diversity. The state encompasses various ecosystems such as tropical moist deciduous forests, dry deciduous forests, and mangroves (Reddy *et al.*, 2008) ^[6]. Similarly, Mohanty *et al.* (2010) ^[7] documented that tribal communities in the Similipal region—located in the Mayurbhanj district use over 130 plant species to treat common ailments, underscoring the area's ethnobotanical significance. Panda *et al.* (2014) ^[8] identified 62 tree species from 28 families within the campus of North Orissa University, many of which were found to be traditionally used by tribal communities. Similarly, Mishra *et al.* (2012) ^[9] recorded 112 plant species in the Sambalpur University campus, identifying numerous species with therapeutic value, and emphasized the potential of university campuses to act as repositories of ethnobotanical knowledge. In Balasore district, Rout and Panda (2015) ^[10] emphasized the need to document local medicinal knowledge to prevent its erosion, advocating for systematic floristic assessments as a foundation for conservation. Likewise, Behera and Misra (2005) ^[11] drew attention to the gradual loss of traditional botanical knowledge among younger generations in Odisha, urging the integration of biodiversity education into academic curricula. More recently, studies have begun focusing on specific educational institutions in ecologically significant areas. In Baripada, located in Mayurbhanj district near the Similipal Biosphere Reserve, Nayak and Barik (2024) ^[12] examined the floristic diversity and phytosociological structure of grassland communities within the Maharaja Purna Chandra (Autonomous) College campus. In a complementary study, Sethi and Nayak (2025) ^[14] documented the diversity and therapeutic value of herbaceous plant species on the same campus. These efforts have laid a foundation for further biodiversity assessments in the region. Despite the green richness of the Maharaja Purna Chandra (Autonomous) College campus and its location within an ecologically sensitive zone, a systematic study of tree species diversity and their medicinal potential has yet to be conducted. Given the college's proximity to Similipal and its relatively undisturbed vegetation, this research seeks to fill that knowledge gap by assessing the floristic diversity of tree species and evaluating their ethnomedicinal significance. This study not only contributes to the local biodiversity database but also aims to support conservation initiatives and promote awareness about the ecological value of campus green spaces.

Materials and Methods

Geographical description

Maharaja Purna Chandra (Autonomous) College, located in Takhatpur, Baripada, Mayurbhanj, Odisha, was established in July 1948. The campus is approximately 5 km from Bada Dando (the town center), 2 km from Baripada Railway Station, and 1 km from the bus stand. In 2000-2001, the college was granted autonomous status by the UGC and the Government of Odisha. Spread across a sprawling 330-acre campus along the banks of the Budha Balanga River, the college initially received 267 acres for its establishment, with an additional 63 acres generously donated by Maharani Takat Kumari. The built-up area covers 218,996.809 square feet, housing classrooms, laboratories, hostels, administrative buildings, and sports complexes. With approximately 25,000 trees, the campus offers a lush, eco-

friendly environment conducive to academic pursuits (Fig.-1).

Meteorology and soil condition of the study area

The Maharaja Purna Chandra (Autonomous) College campus in Baripada, Odisha, is widely recognized for its eco-friendly and green environment. The presence of small water bodies, open green fields, and well-maintained gardens contributes to a balanced and thriving ecosystem, supporting local bird species and small animals. The college actively promotes environmental conservation and sustainable practices, including waste management and afforestation initiatives led by students and faculty. These efforts have significantly enriched the campus's natural diversity, making it both academically inspiring and environmentally responsible. The region's tropical monsoon climate—characterized by hot summers (35-40 °C), a wet monsoon season (June-September), and mild winters (10-15 °C)—strongly influences the plant diversity on campus. Moisture-loving trees like mango flourish during the monsoon, while drought-resistant species such as neem and banyan thrive during the dry summer months due to their deep root systems. The mild winters support a mix of deciduous and evergreen species, ensuring year-round greenery. Soil diversity further enhances this ecological richness. The campus features a combination of lateritic, alluvial, and red sandy soils, each supporting different vegetation types. Lateritic and red sandy soils allow drought-tolerant and medicinal plants to thrive, while alluvial patches support more water-loving species. This varied soil composition sustains a wide range of native trees, fruit-bearing plants, and medicinal vegetation, reinforcing the college's commitment to a sustainable and biodiverse environment.

Survey design and Plant Identification

A structured tree survey was conducted within the campus of Maharaja Purna Chandra (Autonomous) College campus following a systematic approach. Based on the sampling strategy, the survey aimed to gather detailed data either from the entire campus or from selected representative areas. For this study, a stratified random sampling technique was employed to ensure comprehensive and accurate coverage. The campus was divided into five primary strata—academic area, administrative area, business area, student halls, and religious area. Each stratum was further subdivided into sub-strata to facilitate easier sampling, data collection, and analysis. Within each sub-stratum, random sampling points were selected, and all trees within a defined radius or area around each point were recorded. Each identified tree was documented to the species level, including its scientific name, local name, and family. Fieldwork utilized a range of tools, including quadrats, measuring tapes, cameras, GPS devices, field notebooks, and plant identification manuals. At each sampling site, standardized data were recorded, covering key parameters like location, date, weather conditions, and observer information. Taxonomic identification of plant specimens was performed using recognized botanical references, including the works of Haines (1921) ^[15], Mooney (1950) ^[16], and Saxena & Brahmam (1994) ^[17]. All sampling activities were conducted with minimal disturbance to plants and their natural habitat, ensuring the preservation of the campus's ecological

integrity while enabling comprehensive biodiversity documentation.

Ethnobotanical survey

A comprehensive interview was conducted with local healers and community members to gather valuable insights into the medicinal uses of plants within traditional healing practices. The primary aim was to document indigenous knowledge, understand the significance of plants in natural medicine, and support efforts to preserve traditional healing systems. To ensure clarity and cultural sensitivity, the interviews were carried out in local languages, allowing participants to express themselves comfortably. Detailed written notes were maintained to accurately capture the information shared. The collected data was systematically categorized based on plant species, the ailments treated, and the methods of preparation. This ethnobotanical study highlights the deep connection between the local community and their environment and underscores the importance of preserving this traditional ecological knowledge for future generations.

Results and Discussion

The campus of Maharaja Purna Chandra Autonomous College exhibits notable floristic richness, particularly in terms of medicinally valuable tree species. A total of 44 such tree species were recorded, belonging to 24 distinct plant families. The Fabaceae family emerged as the most dominant, contributing 7 species (15.91%), followed by Arecaceae with 5 species (11.36%), Moraceae with 4 species (9.09%), and Myrtaceae with 3 species (6.82%). Five families—Rubiaceae, Sapotaceae, Lamiaceae, Apocynaceae, and Rutaceae—each accounted for 2 species (4.55%). The remaining 15 families, namely Rosaceae, Rhamnaceae, Araucariaceae, Anacardiaceae, Cycadaceae, Caricaceae, Annonaceae, Euphorbiaceae, Sapindaceae, Meliaceae, Malvaceae, Achariaceae, Simaroubaceae, Cornaceae, and Oleaceae, were each represented by a single species (2.27%). Among the most frequently occurring species were *Mangifera indica*, *Tectona grandis*, and *Neolamarckia cadamba*, while *Nyctanthes arbor-tristis* and *Saraca asoca* were found to be rare and in need of conservation efforts. Comprehensive details including botanical names, local names, family classifications, and medicinal applications of these 44 tree species are presented in Table 1 and represented in Figures 2.



Fig 1: The Campus of M.P.C. (Autonomous) College showing study site

Table 1: The botanical name, local name, families and medicinal uses of tree diversity

Sl. No.	Botanical Name	Local Name	Family	Medicinal Properties
1.	<i>Prunus dulcis</i> (Mill.) D.A. Webb	Pesta badam	Rosaceae	Digestive issues, Respiratory problems, Haircare and Pharmaceuticals
2.	<i>Artocarpus heterophyllus</i> Lam.	Panasa.	Moraceae	Antioxidant properties, Wound healing, Respiratory problems and Skincare
3.	<i>Dalbergia sissoo</i> Roxb. ex-DC.	Sissu	Fabaceae	Antibacterial, Anti-inflammatory, Fever reduction and Digestive issues
4.	<i>Psidium guajava</i> L.	Pijuli	Myrtaceae	Anti-cancer, Anti-microbial, Wound healing and Digestive issues
5.	<i>Ziziphus mauritiana</i> Lam.	Koli	Rhamnaceae	Anti-inflammatory, Antipyretic, Antioxidant and Thrombolytic activity
6.	<i>Syzygium cumini</i> (L.) Skeels	Jammu	Myrtaceae	Digestive issues, Bleeding disorder, Antioxidant and Anti-inflammatory
7.	<i>Neolamarckia cadamba</i> (Roxb.) Bosser	Kadamba	Rubiaceae	Anti-diabetic, Anti-microbial, Fever relief and Wound healing
8.	<i>Roystonea oleracea</i> (Jack.) O.F.Cook	Royal palm	Arecaceae	Respiratory issues, Skin conditions, Anti-diabetic and Fever relief
9.	<i>Araucaria heterophylla</i> (Salisb.) Franco	Norfolk pine	Araucariaceae	Anti-inflammatory, Antioxidant, Anti-microbial and Insect bites
10.	<i>Mangifera indica</i> L.	Amba	Anacardiaceae	Antifungal, Antioxidant, Anthelmintic, Anticancer and Anti-inflammatory
11.	<i>Mimusops elengi</i> L.	Baula	Sapotaceae	Gastrointestinal issues, Cardiovascular health, Antioxidant and Oral health
12.	<i>Delonix regia</i> (Bojer ex Hook.) Raf.	seetachuda	Fabaceae	Gastric problem, Antioxidant, Anti-microbial and Anti-inflammatory
13.	<i>Dyopsis lutescens</i> (H.Wendl.) Beentje & J.Dransf.	Gua	Arecaceae	Cardiovascular health, Antioxidant, Anti-inflammatory and Digestive issues
14.	<i>Tectona grandis</i> L.f.	Shaguan	Lamiaceae	Digestive issues, Respiratory problems, Antioxidant and Anti-diabetic
15.	<i>Saraca asoca</i> (Roxb.) Willd.	Ashoka	Fabaceae	Genitourinary issues, Uterine health, Menstrual disorder and Anti-cancer
16.	<i>Cycas revoluta</i> Thunb.	Oruguna	Cycadaceae	Antipyretic, Anti-inflammatory, Skin conditions and Gastrointestinal
17.	<i>Ficus elastica</i> Roxb. ex Hornem.	Rabar	Moraceae	Respiratory problems, Digestive issues, Oral health and Anti-microbial
18.	<i>Carica papaya</i> L.	Papia	Caricaceae	Anti-inflammatory, Antibacterial, Wound healing and Fever relief
19.	<i>Monoon longifolium</i> (Sonn.) B.Xue R.M.K.Saunders	Debadaru	Annonaceae	Helminthiasis, Anticancer, Anti-diabetic and Skin conditions
20.	<i>Codiaeum variegatum</i> (L.) A.juss.	Kaptan	Euphorbiaceae	Digestive issues, Anti-inflammatory, Wound healing and Fever relief
21.	<i>Litchi chinensis</i> Sonn.	Lichu	Sapindaceae	Anti-inflammatory, Antioxidant, Anti-microbial and Digestive issues
22.	<i>Alstonia scholaris</i> (L.) R.Br.	Saptaparna	Apocynaceae	Antimalaria, Skin diseases, Antioxidant and Anti-inflammatory
23.	<i>Borassus flabellifer</i> L.	Tala	Arecaceae	Immunomodulatory, Wound healing, Antioxidant and Anti-microbial
24.	<i>Morus alba</i> L.	Tuthkuli	Moraceae	Anti-diabetic, Cardiovascular health, Skin conditions and Antioxidants
25.	<i>Azadirachta indica</i> A.Juss.	Neema	Meliaceae	Anti-inflammatory, Antioxidant, Anti-microbial and Wound healing
26.	<i>Vitex negundo</i> L.	Begunia	Lamiaceae	Respiratory problems, Digestive issues, Skin conditions and Pain relief
27.	<i>Bombax ceiba</i> L.	Simili	Malvaceae	Hypoglycemic, Diuretics, Antibacterial and Antioxidants
28.	<i>Cascabela thevetia</i> (L.) Lippold	Koniyari	Apocynaceae	Skin condition, Fever relief, Heart problem and Wound healing
29.	<i>Hydnocarpus kurzii</i> (King) Warb.	Chalmugra	Achariaceae	Anti-diabetic, Hypolipidemic, Anti-microbial, Skin diseases and Leprosy
30.	<i>Phoenix dactylifera</i> L.	Khajura	Arecaceae	Digestive issues, Respiratory problems, Wound healing and Antioxidants
31.	<i>Ficus carica</i> L.	Dimiri	Moraceae	Antispasmodic, Anti-inflammatory, Respiratory issues and Gastrointestinal
32.	<i>Syzygium jambos</i> (L.) Alston	Golapajamu	Myrtaceae	Anti-diabetic, Anti-microbial, Antioxidant and Anti-inflammatory
33.	<i>Simarouba glauca</i> DC.	Laxmitaru	Simaroubaceae	Anti-cancer, Anti-microbial, Anti-inflammatory and Antioxidants
34.	<i>Acacia mangium</i> Willd.	Akashi	Fabaceae	Anti-HCV, Anti-diabetic, Antioxidant and Anti-inflammatory
35.	<i>Indopiptadenia oudhensis</i> (Brandis) Brenan	Gainti	Fabaceae	Emetic, Antidote, Child weaning and Laxative

36.	<i>Cocos nucifera</i> L.	Paida	Arecaceae	Digestive issues, Anti-fungal, Anti-inflammatory and Kidney problem
37.	<i>Haldina cordifolia</i> (Roxb.) Ridsdale	Karama	Rubiaceae	Antipyretic, Anti-ulcer, Antibacterial and Anti-inflammatory
38.	<i>Alangium salviifolium</i> (L.f.) Wangerin	Aisha	Cornaceae	Antispasmodic, Anti-diabetic, Anticancer and Anti-inflammatory
39.	<i>Senna siamea</i> (Lam.) H.S.Irwin & Barneby	Kassod	Fabaceae	Anthelmintic, Fever relief, Laxative and Digestive issues
40.	<i>Aegle marmelos</i> (L.) Corrêa	Bela	Rutaceae	Anti-cancer, Digestive issues, Anti-microbial and Antioxidants
41.	<i>Nyctanthes abor-tristis</i> L.	Gangasiuli	Oleaceae	Fever relief, Antipyretic, Skin conditions and Antioxidants
42.	<i>Citrus sinensis</i> (L.) Osbeck	Kamala	Rutaceae	Antioxidant, Kidney problem, Cardiovascular health and Immune support
43.	<i>Caesalpinia pulcherrima</i> (L.) Sw.	Purai phul	Fabaceae	Asthma, Bronchitis, Cholera and Jaundice
44.	<i>Manilkara hexandra</i> (Roxb.) Dubard	Khira koli	Sapotaceae	Anthelmintic, Antioxidant, Anti-inflammatory and Anti-ulcer

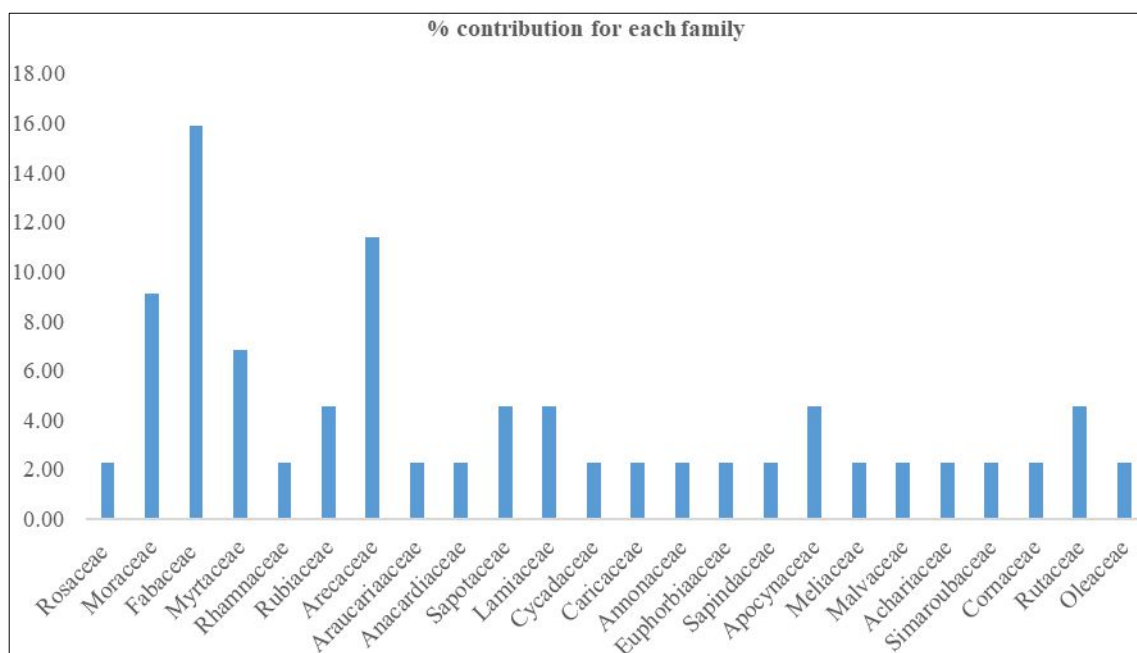


Fig 2: The graph showing percentage (%) contribution for each family

Conclusion

The floristic inventory of Maharaja Purna Chandra (Autonomous) College, Odisha, India campus documents a rich diversity of tree species across 44 families, with Fabaceae emerging as the most dominant. This family, along with other tropical groups like Arecaceae, Moraceae, Myrtaceae, and Rubiaceae, highlights the ecological and medicinal richness of the campus flora. Fabaceae species are particularly notable for their pharmacological benefits and ecological functions, such as nitrogen fixation and carbon sequestration. The study provides a vital baseline for future conservation, research, and education, emphasizing the need for a structured management plan to preserve and sustainably utilize the campus's botanical resources.

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