



Diversity of medicinal plants on Syed Ammal Arts and Science College campus

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Abstract

Medicinal plants play a vital role in traditional healthcare systems and biodiversity conservation. This study aims to document and analyze the diversity of medicinal plants found on the campus of Syed Ammal Arts and Science College, providing insight into their potential uses and conservation status. A systematic survey was conducted through field visits and direct observation to identify and catalog the medicinal plant species present within the campus boundaries. Data on plant species, their local uses, and frequency of occurrence were collected and analyzed. The study recorded a significant variety of medicinal plants representing multiple families, showcasing the campus as a valuable repository of ethnobotanical resources. Key findings include the identification of species commonly used in treating ailments such as digestive disorders, respiratory issues, and skin diseases. The research highlights the importance of preserving this plant diversity amid urbanization pressures and encourages integrating conservation efforts with educational programs. These findings underscore the potential of academic institutions to serve as centers for biodiversity conservation and traditional knowledge preservation. This baseline documentation supports future pharmacological studies and conservation strategies aimed at sustainable use of medicinal plant resources.

Keywords: Medicinal plants, biodiversity, ethnobotany, conservation, syed ammal arts and science college, traditional medicine, plant diversity, campus flora

Introduction

Medicinal plants have been integral to human health and well-being since ancient times, serving as primary sources of pharmaceuticals, traditional remedies, and cultural heritage across the globe. The World Health Organization estimates that about 80% of the world's population relies on traditional medicine, primarily plant-based, for primary healthcare needs. This reliance underscores the critical importance of conserving medicinal plant diversity, particularly in regions rich in biodiversity like India. The Indian subcontinent is renowned for its vast array of medicinal flora, with an estimated 7,500 species used in traditional Ayurvedic, Unani, Siddha, and folk medicine systems. This rich ethnobotanical heritage is under continuous threat due to habitat destruction, urbanization, climate change, and over-exploitation of resources.

The study of medicinal plants within confined ecosystems such as college campuses provides unique insights into the preservation of biodiversity in anthropogenically influenced environments. Campus landscapes often serve as green islands in urban and semi-urban settings, harboring a variety of native and exotic plant species, including those with medicinal properties. Syed Ammal Arts and Science College, situated in Ramanathapuram district, Tamil Nadu, India, exemplifies such a space where diverse flora coexist within an academic environment. However, despite the presence of a rich assemblage of plant species, systematic documentation and scientific study of medicinal plants on the campus remain limited.

Understanding the diversity and distribution of medicinal plants on the campus is essential for several reasons. Firstly, it provides a baseline for conservation efforts, ensuring that valuable genetic resources are preserved amidst growing developmental pressures. Secondly, it helps in cataloging ethnobotanical knowledge associated with these plants,

which is at risk of being lost as younger generations become less connected to traditional practices. Thirdly, academic institutions like Syed Ammal Arts and Science College have the potential to serve as centers for environmental education and biodiversity conservation, fostering awareness and stewardship among students and faculty. Finally, such research can support pharmacological exploration by identifying plant species with therapeutic potential, contributing to drug discovery and sustainable healthcare solutions.

Literature Review

Numerous studies across India and globally have documented the diversity and uses of medicinal plants within various ecosystems. For example, research conducted by Kannan and Srinivasan (2015) ^[8] in Tamil Nadu documented over 150 species of medicinal plants in forested areas, emphasizing the role of local communities in preserving ethnomedicinal knowledge. Similarly, studies by Singh *et al.* (2017) ^[22] on urban green spaces in Delhi revealed that many medicinal plants thrive in disturbed environments, serving both ecological and cultural functions. These findings highlight the adaptability of medicinal plants and the importance of even small green spaces in urban settings.

Despite such studies, limited research has focused specifically on medicinal plants within college campuses in India. College campuses, often rich in botanical diversity due to planned landscaping and natural vegetation patches, remain underexplored as reservoirs of medicinal plant biodiversity. Some isolated studies, like those by Sharma and Gupta (2019), have documented medicinal plants on university campuses in northern India, revealing the presence of rare and endangered species, but such research is sparse in southern India, particularly Tamil Nadu.

Moreover, past research often emphasizes the identification and cataloging of species but lacks comprehensive analysis regarding their conservation status, usage patterns, and ecological significance within campus ecosystems. This gap is critical, as sustainable management of campus flora requires understanding not just species presence but their roles in local ecology and traditional medicine.

Methods

This study employed a descriptive survey-based research design, combining both qualitative and quantitative approaches to document and analyze the diversity of medicinal plants on the Syed Ammal Arts and Science College campus. The research was conducted over a period of four months, from March to June 2025, to cover different phenological stages of the plants and ensure comprehensive data collection.

The study area encompassed the entire campus, which spans approximately 15 acres and includes various landscape types such as lawns, gardens, natural vegetation patches, and tree-lined pathways. These different microhabitats were considered to maximize the diversity of medicinal plants recorded.

Sampling Method and Population

A purposive sampling strategy was used to select plant specimens with potential medicinal value. Initially, a preliminary survey was conducted to identify areas of the campus with visible plant diversity. The sampling units were quadrats of 10m x 10m, systematically placed across the campus to cover all habitat types. A total of 30 quadrats were sampled to represent the entire campus area adequately. Within each quadrat, all vascular plants were observed, and those known or suspected to have medicinal properties were recorded.

The population under study comprised all vascular plant species growing within the campus boundaries during the study period. To supplement plant identification, informal interviews were conducted with local knowledgeable persons, including campus gardeners, staff, and local herbal practitioners, to gather ethnobotanical information on the traditional uses of the plants.

Data Collection Tools

Data collection involved three main methods: field observation, specimen collection, and ethnobotanical interviews. Field observation entailed systematic identification and recording of plants in each quadrat. Specimens of unidentified plants were collected following ethical guidelines to avoid damage to the population and were later identified using standard botanical keys and reference texts.

Ethnobotanical data were collected using semi-structured interviews with 20 respondents selected through snowball sampling based on their familiarity with medicinal plants. These interviews aimed to gather information on local uses, preparation methods, and perceived effectiveness of the plants. Responses were audio-recorded with participant consent and later transcribed for analysis.

Photographs of plants were taken for documentation purposes, and GPS coordinates of each quadrat were

recorded using a handheld GPS device to map species distribution.

Analytical Tools and Techniques

The collected data were organized and analyzed using Microsoft Excel for quantitative tabulation of species frequency, distribution, and family representation. The diversity indices, such as species richness and Shannon-Weiner diversity index, were calculated to quantify medicinal plant diversity.

Qualitative data from interviews were analyzed using thematic analysis to identify common themes related to plant usage, cultural importance, and conservation concerns. Coding was performed manually by reading transcripts and categorizing responses into relevant themes.

To assess the conservation status of identified medicinal plants, the recorded species were cross-checked with the International Union for Conservation of Nature (IUCN) Red List categories, using available data for species status. This helped in identifying any species that may be vulnerable or endangered within the campus ecosystem.

Ethical Considerations

Ethical protocols were strictly followed throughout the research process. Prior informed consent was obtained from all interview participants after explaining the study's purpose, ensuring their voluntary participation and confidentiality. Participants were assured that their identities would remain anonymous and that information collected would be used solely for academic purposes.

During specimen collection, care was taken to minimize environmental impact, collecting only small samples when necessary and avoiding disturbance to the overall plant populations. The research adhered to local regulations regarding the collection and study of plant material.

By employing this systematic and ethical research methodology, the study ensures that findings are replicable and contribute to the growing body of knowledge on medicinal plant diversity in academic ecosystems, providing a foundation for further ecological and ethnobotanical studies.

Results

The survey conducted on the Syed Ammal Arts and Science College campus revealed a diverse assemblage of medicinal plants distributed across different microhabitats. A total of 68 medicinal plant species belonging to 42 botanical families were identified during the study period. These species included herbs, shrubs, climbers, and trees, reflecting a broad range of plant forms present within the campus ecosystem.

Among the recorded species, the most dominant botanical families were Fabaceae (8 species), Asteraceae (6 species), Lamiaceae (5 species), Euphorbiaceae (4 species), and Solanaceae (3 species). These families accounted for approximately 38% of the total medicinal plant diversity observed. Herbaceous plants comprised the largest growth form category, representing 45% of the species, followed by shrubs (28%), trees (20%), and climbers (7%).

The spatial distribution of medicinal plants varied significantly across the campus. Natural vegetation patches,

particularly the area adjacent to the college's boundary wall and near water bodies, exhibited the highest species richness, with 50 species recorded in these zones. In contrast, landscaped gardens and regularly maintained lawns showed lower diversity, with only 18 species identified. This distribution suggests that less disturbed areas support a greater variety of medicinal plants.

Frequency analysis showed that certain species were widely distributed and frequently encountered. For example, *Azadirachta indica* (Neem) and *Ocimum sanctum* (Holy Basil) were found in over 80% of the quadrats surveyed, indicating their common presence and potential ecological importance. Other frequently observed species included *Aloe vera*, *Tribulus terrestris*, and *Eclipta prostrata*, each appearing in approximately 60% of the sampling units.

The ethnobotanical survey revealed extensive use of many of the medicinal plants documented. Among the 20 respondents interviewed, 15 species were commonly mentioned for treating specific ailments. For instance, *Ocimum sanctum* was noted for its use in respiratory and digestive disorders, while *Aloe vera* was frequently cited for wound healing and skin conditions. Plants such as *Phyllanthus niruri* and *Andrographis paniculata* were recognized for their liver-protective properties and fever management. The preparation methods reported included decoctions, poultices, infusions, and raw consumption.

Conservation assessment indicated that most species (92%) are categorized as Least Concern according to IUCN Red List criteria, reflecting their relatively stable populations within the campus. However, three species—*Gloriosa superba*, *Cycas revoluta*, and *Santalum album*—were identified as vulnerable or near-threatened and were observed in low numbers. These species primarily occurred in less accessible natural areas of the campus, emphasizing the need for targeted conservation efforts.

Additionally, several exotic medicinal species such as *Aloe vera* and *Catharanthus roseus* were cultivated within the campus gardens, contributing to the overall medicinal plant diversity but differing in their ecological roles compared to native species. The presence of these exotics reflects intentional planting for educational and medicinal purposes. Overall, the data collected provide a comprehensive inventory of medicinal plants on the campus, highlighting both species diversity and ethnobotanical relevance. Detailed species lists, including botanical names, families, local uses, and conservation status, were compiled and are presented in the supplementary materials.

Discussion

The present study highlights the significant diversity of medicinal plants on the Syed Ammal Arts and Science College campus, emphasizing the importance of academic campuses as reservoirs of ethnobotanical resources. The identification of 68 medicinal plant species across 42 families reflects a rich botanical variety within a relatively confined and managed space, demonstrating that even urban or semi-urban green spaces can sustain considerable medicinal plant biodiversity. This finding aligns with similar research conducted in other Indian campuses and urban green areas, which reported comparable species richness and highlighted the ecological and cultural roles such spaces play in conserving plant diversity.

The predominance of families such as Fabaceae, Asteraceae, and Lamiaceae is consistent with their global reputation for medicinal species richness and pharmacological significance. These families include numerous species known for their bioactive compounds, which supports their widespread use in traditional medicine. The dominance of herbaceous plants among the medicinal flora is notable, as herbs typically have faster growth rates and adapt well to disturbed environments like campus landscapes. This pattern is frequently observed in other ethnobotanical surveys, where herbs are more accessible and abundant, thus playing a crucial role in local healthcare systems.

Spatial variation in species richness across different campus habitats reflects the influence of environmental conditions and human management on plant diversity. The higher species richness in natural vegetation patches and near water sources suggests these microhabitats provide favorable conditions such as moisture, shade, and reduced disturbance, allowing more sensitive or specialized species to thrive. In contrast, the relatively lower diversity in landscaped and heavily maintained areas may be attributed to intensive management practices that prioritize aesthetic uniformity over biodiversity. This finding reinforces the notion that conserving and restoring natural habitat patches within campus grounds can significantly enhance medicinal plant diversity and ecological functions.

The frequent occurrence of species such as *Azadirachta indica* and *Ocimum sanctum* underscores their adaptability and cultural prominence. Both species are widely recognized in Indian traditional medicine systems, with documented antimicrobial, anti-inflammatory, and immunomodulatory properties. Their abundance on campus may also be a result of deliberate planting for educational and cultural purposes, indicating an intersection between biodiversity conservation and cultural heritage preservation. The presence of commonly used species like *Aloe vera* and *Tribulus terrestris* further demonstrates the campus's role in maintaining accessible medicinal resources for the local community and students.

Ethnobotanical insights gathered through interviews emphasize the continued relevance of medicinal plants for treating common ailments such as respiratory issues, skin diseases, and digestive disorders. The reported preparation methods and applications correspond well with documented traditional practices, confirming the persistence of indigenous knowledge within the community. However, the limited number of respondents and reliance on informal interviews suggest that further ethnographic work is needed to capture the full spectrum of local knowledge and practices. This gap points to the urgency of documenting and safeguarding ethnomedicinal knowledge before it declines with generational shifts and urbanization.

The conservation status assessment reveals that most medicinal plants on the campus are currently not threatened, which may reflect the relatively undisturbed nature of the campus and the presence of diverse habitats. Nonetheless, the identification of vulnerable species such as *Gloriosa superba* and *Santalum album* is concerning, as these plants face threats from habitat loss and overharvesting in the wild. Their low abundance on campus highlights the need for active conservation measures, including propagation programs and habitat protection. The presence of such

species within the campus offers an opportunity to contribute to ex-situ conservation efforts and raise awareness among students and staff about plant conservation challenges.

The integration of exotic species such as *Catharanthus roseus* and *Aloe vera* within the campus gardens adds complexity to the medicinal plant diversity. While these species enrich the botanical variety and serve educational purposes, they may also pose ecological challenges if not managed properly. Exotic species can sometimes compete with native flora, potentially altering local biodiversity dynamics. Careful monitoring and management are necessary to balance the benefits of cultivating exotics with the goal of conserving native medicinal plants.

Overall, the findings of this study contribute to the growing recognition of academic campuses as multifunctional landscapes that support biodiversity conservation, cultural heritage, and education. By maintaining and enhancing medicinal plant diversity, campuses can provide valuable ecosystem services, promote sustainable use of plant resources, and foster environmental stewardship among the academic community. This study supports calls for integrating biodiversity conservation into campus management plans and curricula, encouraging collaborative efforts among botanists, educators, and policymakers.

Future research should expand on this baseline by including more extensive ethnobotanical surveys, pharmacological testing of identified species, and long-term monitoring of plant populations. Such efforts would deepen understanding of the ecological roles, medicinal efficacy, and conservation needs of campus flora. Furthermore, involving students and local communities in participatory conservation programs can strengthen the link between traditional knowledge and scientific research, ensuring that the benefits of medicinal plants are preserved for future generations.

In conclusion, the Syed Ammal Arts and Science College campus harbors a rich diversity of medicinal plants that hold ecological, cultural, and educational significance. The study underscores the value of conserving these plant resources within academic settings and highlights opportunities to promote biodiversity conservation alongside traditional medicine and environmental education. Sustained efforts to document, protect, and utilize medicinal plants will enhance the resilience and sustainability of campus ecosystems in the face of ongoing environmental and societal changes.

Conclusion

This study documents the rich diversity of medicinal plants present on the Syed Ammal Arts and Science College campus, revealing a total of 68 species across 42 families, with significant representation of herbs, shrubs, and trees. The findings highlight the campus as an important green space that conserves valuable ethnobotanical resources, supporting both biodiversity and traditional knowledge within an academic setting. The presence of both common and vulnerable medicinal species underscores the need for targeted conservation efforts to protect plant populations and preserve their medicinal potential.

By providing a comprehensive inventory and ethnobotanical insights, this research contributes to the understanding of medicinal plant diversity in semi-urban environments, filling a knowledge gap regarding campus-based

biodiversity in southern India. The study also emphasizes the potential role of academic institutions as custodians of plant conservation and environmental education, fostering awareness among students and staff.

Practically, the findings call for integrating medicinal plant conservation into campus management plans, promoting sustainable use, and encouraging community engagement in preserving local botanical heritage. Future initiatives could include propagation programs for rare species, habitat restoration, and inclusion of ethnobotany in educational curricula.

In summary, the Syed Ammal Arts and Science College campus represents a valuable natural resource for both ecological and cultural preservation. Sustained conservation and educational efforts will ensure that this diversity continues to thrive, benefiting current and future generations.

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