

A Study on Angiospermic Medicinal Plants in Mata Jwalamukhi Region of Kangra District, Himachal Pradesh, India

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ABSTRACT

Angiosperms represent the most diverse group of terrestrial plants and are fundamental to ecosystem functioning as well as human survival. The present study investigates the diversity, distribution, and ethnobotanical significance of angiospermic plants in the Mata Jwalamukhi region of Kangra district, Himachal Pradesh. This region, situated in the Western Himalaya, is characterized by rich biodiversity, varied topography, and strong cultural-religious traditions that contribute to the conservation of natural vegetation. Field-based observations and literature analysis reveal that local communities rely extensively on plant resources for food, medicine, fodder, fuel, and socio-religious practices. The study emphasizes the importance of documenting traditional knowledge, which is largely transmitted orally and is at risk of erosion. Herbarium preparation and systematic documentation of plant species were undertaken to support future research and conservation. The findings underscore the need for sustainable utilization and conservation of angiospermic diversity in the Jwalamukhi region.

Key Words: Angiosperms, Diversity, Ethnobotany, Jawalamukhi

INTRODUCTION

Plants have been indispensable to human civilization since ancient times, providing essential resources such as food, medicines, shelter, fuel, and raw materials for industries (Gopal et al., 2004; Pandey, 2001). Even today, a large proportion of rural populations depend on plant-based resources for their daily needs and primary healthcare (Nautiyal et al., 2001; Rana and Masoodi, 2013). Traditional knowledge associated with plant utilization continues to play a crucial role in sustaining livelihoods in remote regions of the Himalayas. Himachal Pradesh, located in the Indian Himalayan Region, is known for its remarkable biodiversity due to variations in altitude, climate, and topography (Samant et al., 2007; Prakash et al., 2021). The state harbors thousands of plant species, including a significant proportion of angiosperms, many of which possess medicinal, nutritional, and economic value (Badola and Aitken, 2003; Lal et al., 1996). The diverse ecosystems ranging from subtropical forests to alpine meadows support a rich floristic composition.

The Mata Jwalamukhi region, situated in Kangra district, is one of the prominent Shakti Peethas of India and holds immense religious significance. Sacred landscapes associated with temples often act as refugia for biodiversity, where traditional beliefs contribute to conservation practices (Rawat and Kumar, 2024). Such sacred groves and temple surroundings protect a variety of plant species, including several angiosperms of ecological and medicinal importance. Angiosperms, commonly known as flowering plants, are the most advanced group in the plant kingdom and exhibit remarkable adaptability across diverse habitats, from aquatic ecosystems to arid environments (Saini, 2016). They originated during the Cretaceous period and have since diversified extensively, dominating most terrestrial ecosystems (Dhand, 2016). Their ecological significance is immense, as they form the primary producers in food chains and contribute to nutrient cycling and habitat stability. Economically, angiosperms are indispensable, providing major food crops such as cereals, legumes, fruits, and vegetables, as well as raw materials like timber, fibres, oils, and pharmaceuticals (Gopal et al., 2004; Pandey, 2001). In the Himalayan context, many angiospermic species are used in traditional medicine systems for treating ailments such as respiratory disorders, digestive problems, and skin diseases (Rathore and Singh, 2025). Ethnobotany, the study of the interaction between plants and local communities, plays a vital role in documenting indigenous knowledge and sustainable resource use (Jain, 1994; Kecher, 2016). In Kangra district, several studies have reported the use of numerous plant species for medicinal purposes, with over 100 species documented in ethnomedicinal surveys (Sharma et al., 2014; Prakash et al., 2021). These practices are deeply rooted in cultural traditions and are often transmitted orally across generations. The rural inhabitants of the Jwalamukhi region possess extensive knowledge

regarding plant utilization, including identification, preparation, and dosage of herbal remedies. Common methods of preparation include decoctions, powders, pastes, and direct consumption. Plant species are also used for fodder, fuelwood, timber, and religious rituals, reflecting their multifaceted importance (Chauhan et al., 2023). Despite their significance, traditional knowledge systems are gradually declining due to modernization, urbanization, and lack of documentation. Additionally, anthropogenic pressures and habitat degradation pose serious threats to plant diversity in the region (Cook, 1996; Srivastava, 2003). Therefore, systematic documentation and conservation of angiospermic diversity are essential. The present study aims to explore the diversity and ethnobotanical importance of angiospermic plants in the Mata Jwalamukhi region of Kangra district. The specific objectives are to document the diversity of angiospermic plants in the study area, to record ethnobotanical uses of plants by local communities and to prepare herbarium specimens for scientific documentation and future reference.

MATERIALS AND METHODS

Field Survey and Data Collection: The present study was conducted through systematic field surveys in selected locations of the Mata Jwalamukhi region of Kangra district, Himachal Pradesh. Multiple visits were carried out across different seasons to ensure comprehensive documentation of angiosperm's diversity. Primary data were collected through direct interaction with local inhabitants belonging to different age groups, occupations, and educational backgrounds. Special emphasis was given to elderly individuals, traditional healers, and knowledgeable villagers, as they possess extensive understanding of indigenous plant resources. A structured questionnaire was designed and used to record information related to plant identification, local names, uses, parts utilized, methods of preparation, and therapeutic applications. Informal discussions and interviews were also conducted to validate the information obtained. Collected plant specimens were identified using a combination of local knowledge, standard floristic literature, and reference materials. Authentication of species was further supported by comparison with preserved specimens available in the Herbarium of Career Point University, Hamirpur, as well as relevant botanical manuals and taxonomic keys.

Collection and Identification of Plant Specimens: Plant specimens representing different angiospermic species were collected from the study sites during field visits. Care was taken to collect complete specimens including vegetative and reproductive parts such as leaves, stems, flowers, fruits, and underground structures wherever possible. Preliminary identification was carried out in the field with the help of local informants and experienced individuals. Final identification and confirmation were performed using standard taxonomic literature and herbarium comparisons.

Preparation of Herbarium: Collected plant specimens were processed and preserved following standard herbarium techniques. The specimens were first cleaned and arranged properly, then pressed and dried to retain their morphological characteristics.

Drying was carried out using plant presses consisting of wooden or metal frames, within which specimens were placed between blotting sheets or old newspapers to facilitate moisture absorption. The absorbent sheets were replaced regularly to prevent fungal growth and decay of plant material. After complete drying, specimens were mounted on herbarium sheets of standard size (29 × 41 cm). Each sheet typically contained a single specimen affixed using adhesive or gummed tape. Prior to mounting, specimens were treated with a preservative solution to protect them from insect and fungal damage. Each herbarium sheet was labeled systematically in the lower right corner, providing essential details such as botanical name, family, common name, locality, date of collection, and collector's name. The specimens were then arranged according to a widely accepted system of plant classification for future reference and scientific study (Dhand, 2016).

Data Analysis: The collected ethnobotanical and floristic data were carefully analyzed and cross-verified with available literature. The compiled information was systematically organized and documented to prepare a comprehensive account of angiospermic diversity and their uses in the study area.

RESULTS AND DISCUSSION

The present investigation documented a total of **50 angiospermic plant species** belonging to **26 families** from the Mata Jwalamukhi region of Kangra district, Himachal Pradesh. The floristic composition indicates considerable diversity of useful plant species in the study area, reflecting the ecological richness of the lower Himalayan zone (Samant et al., 2007; Prakash et al., 2021). Among the recorded families, **Fabaceae** was found to be the most dominant, represented by the highest number of species (6 spp.), followed by **Rosaceae** (5 spp.) and **Myrtaceae** (4 spp.). Families such as **Apocynaceae** and **Solanaceae** contributed three species each, while **Acanthaceae**, **Apiaceae**, **Asteraceae**, **Bignoniaceae**, **Cucurbitaceae**, **Lamiaceae**, **Moraceae**, and **Rutaceae** were represented by two species each. The remaining families, including **Anacardiaceae**, **Boraginaceae**, **Brassicaceae**, **Cannabaceae**, **Caricaceae**, **Euphorbiaceae**, **Linaceae**, **Nyctaginaceae**, **Plumbaginaceae**, **Poaceae**, **Polygonaceae**, **Rhamnaceae**, and **Sapindaceae**, were represented by a single species. The predominance of Fabaceae and Rosaceae in the study area is consistent with earlier floristic and ethnobotanical studies conducted in the Himalayan region, where these families are known for their ecological adaptability and economic importance (Gopal et al., 2004; Samant and Pant, 2006). These families include several species that are widely utilized for food, fodder, and medicinal purposes, thereby playing a vital role in rural livelihoods. The ethnobotanical analysis revealed that the majority of the documented species are utilized by local inhabitants for treating a wide range of ailments. Common health conditions addressed using plant-based remedies include **fever, cough, cold, dysentery, jaundice, diabetes, joint pain, and digestive disorders**. Such extensive use of medicinal plants reflects the continued dependence of rural communities on traditional healthcare systems, particularly in regions where access to modern medical facilities is limited (Nautiyal et al., 2001; Rana and Masoodi, 2013). Most of the plant species recorded in this study are used in their **crude or minimally processed forms**, such as decoctions, powders, juices, and pastes. This observation aligns with earlier findings that traditional medicine in Himalayan communities relies largely on simple preparation techniques and locally available resources (Jain, 1994; Kecher, 2016). Leaves were found to be the most frequently used plant part, followed by roots, fruits, seeds, and bark. The preference for leaves may be attributed to their easy availability and higher concentration of bioactive compounds (Guleria and Vasishth, 2009).

Several species documented in the present study, such as *Vitex negundo*, *Momordica charantia*, *Carica papaya*, and *Syzygium cumini*, have also been reported in previous ethnomedicinal studies for their therapeutic properties, thereby supporting the reliability of traditional knowledge (Sharma et al., 2014; Rathore and Singh, 2025). These plants are known to possess pharmacological activities such as antidiabetic, anti-inflammatory, antimicrobial, and antioxidant effects, which have been validated in modern scientific research (Soejarto et al., 2005; Prakash et al., 2021).

The presence of a large number of useful angiospermic species in the Jwalamukhi region can also be attributed to the conservation role of sacred landscapes associated with the temple. Cultural beliefs and religious practices have contributed significantly to the protection of local biodiversity, as sacred groves often serve as reservoirs of native plant species (Chand et al., 2016; Rawat and Kumar, 2024).

However, the study also highlights potential threats to plant diversity and traditional knowledge systems. Increasing anthropogenic pressures, habitat degradation, and changing socio-economic conditions are leading to the gradual decline of indigenous knowledge and plant resources (Srivastava, 2003; Chauhan et al., 2023). Furthermore, the oral transmission of ethnobotanical knowledge makes it vulnerable to loss across generations.

In conclusion, the findings of the present study emphasize the rich diversity and significant ethnobotanical value of angiospermic plants in the Mata Jwalamukhi region. There is an urgent need for **systematic documentation, conservation, and sustainable utilization** of these plant resources. Integrating traditional knowledge with modern scientific approaches can contribute to biodiversity conservation as well as the development of novel plant-based therapeutics.

The present study provides a comprehensive account of the diversity and ethnobotanical significance of angiospermic plants in the Mata Jwalamukhi region of Kangra district, Himachal Pradesh. The documentation of 50 species belonging to 26 families highlights the rich floral diversity of this lower Himalayan landscape and its close association with the livelihood and healthcare practices of local communities. The findings clearly indicate that rural inhabitants continue to rely heavily on plant-based resources for primary healthcare, food, and other daily needs. Traditional knowledge related to the identification, preparation, and utilization of medicinal plants remains an important cultural asset, particularly among

elderly members of the community. However, the gradual erosion of indigenous knowledge, coupled with increasing anthropogenic pressures and habitat disturbances, poses a serious threat to both plant diversity and ethnobotanical traditions. The oral mode of knowledge transmission further increases the risk of its loss in future generations.

Therefore, there is a pressing need for systematic documentation, conservation, and sustainable management of plant resources in the region. Efforts should also be made to promote awareness, encourage community participation, and integrate traditional knowledge with modern scientific research. Such approaches can contribute not only to biodiversity conservation but also to the development of sustainable livelihood options and plant-based healthcare systems.

CONCLUSION

These species are used for curing various common diseases in the Kangra district, Himachal Pradesh. The inhabitants believe in efficacy of these herbs along with some divine power, but the knowledge is restricted to very few elderly folks and new generation does not show interest. The knowledge about these medicinal plants is vanishing. Therefore, this information needs to be systematically collected, documented and preserved for the generations to come vis-à-vis conserving the precious plants resources of high economic utility. This is very essential to intensify your traditional knowledge and to come back to nature.

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