



Review of ethnobotany: application of medicinal plants

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Book Review

A review of Marínez, J.L., Muñoz-Acevedo, A., and Rai, M. (Eds.). 2019. *Ethnobotany: Application of Medicinal Plants*. Routledge, London, U.K.

A comprehensive exploration of the utilization of medicinal plants in the lives of communities from an ethnobotanical perspective is the main discussion in *Ethnobotany: Application of Medicinal Plants* edited by José L. Martínez, Amner Muñoz-Acevedo, and Mahendra Rai (2019). The primary goal of this book is to offer a thorough overview of the traditional healing practices across various cultures that utilize medicinal plants, and to explore the integration of these traditional uses into modern medicine. It bridges the gap between ethnobotany, pharmacology, and the conservation of medicinal plant species.

The discussion of medicinal plants is divided into several main sections, each focusing on a different aspect of medicinal plant research and application including the traditional use of medicinal plants, the bioactive compounds in medicinal plants, and the potential for developing modern medicines through bioprospecting. Some sections specifically address the practices of using medicinal plants within Indigenous communities, while others emphasize the importance of preserving the knowledge of local communities regarding medicinal plant use, particularly in the context of biodiversity conservation and the sustainable use of natural resources. Main topics covered in key chapters include introduction to ethnobotany and medicinal plants, biochemical properties of medicinal plants, cultural practices and traditional knowledge, modern applications of ethnobotany, and ethical considerations in ethnobotanical research.

The first section of this book begins with a discussion on medicinal plants and plant extracts that exhibit anticancer properties. The authors highlight specific plants such as *Viscum album* and *Withania somnifera* by examining their ethnobotanical uses and the scientific validation of their biological activity as anticancer agents. Additionally, this section also explores the role of traditional knowledge, economic implications, increasing number of plant patents, and emphasizes the importance of further research to explore the therapeutic potential related to the efficacy of plants in cancer treatment.

Chapter 2 explores medicinal plants traditionally used by local communities in Zimbabwe for the treatment of schistosomiasis, a disease caused by parasitic worms that is common in sub-Saharan Africa. The authors explain the effectiveness of plant species such as *Piliostigma thonningii* and *Ximenia caffra* against parasites causing schistosomiasis, which still require further research on their pharmacological effects. This section also emphasizes that, although modern drugs like praziquantel (PZQ) are effective for control, drug resistance and limited access to drugs lead to the use of herbal medicine as an alternative treatment. 35 plant species used in traditional medicine were identified, most of which showed anthelmintic activity and could reduce *Schistosoma* egg hatching, larval motility, and metabolism.

Chapter 3 discusses the use of medicinal plants in traditional medicine to treat hypertension, focusing on the active compounds in these plants and their mechanisms of action. Some plants highlighted in the discussion include celery, oats, barberry, mulberry, hawthorn, passion fruit, and ginger. The authors emphasize the importance of further scientific validation regarding the effectiveness of medicinal plants.

Chapter 4 reviews the potential and effectiveness of 358 plant species used for treating Central Nervous System (CNS) disorders by Indigenous communities in Brazil and categorizes their uses and bioactive compounds. This section emphasizes the importance of understanding the cultural context of Brazil's Indigenous communities, particularly the Krahô tribe, in relation to the use of medicinal plants, as Brazil has a high endemic plant species diversity and numerous ethnic groups. Therefore, an interdisciplinary approach is needed in ethnopharmacological studies to bridge traditional and academic knowledge, where it is noted that more than half of the identified plant species have not been studied for their medicinal properties, offering opportunities for research and new drug development.

Chapter 5 discusses **genipap** (*Genipa americana*), a plant native to northern South America that is used for food, medicine, and dye, with commonly used parts including the fruit, bark, and leaves. This section emphasizes the importance of sustainable utilization, as most genipap is harvested from wild populations, raising concerns about biodiversity loss. Therefore, ethnobotanical surveys are crucial in areas where the species grows, especially in regions highly dependent on it. The authors also highlight the unique reproductive mechanisms and genetic diversity of genipap, necessitating further research on conservation, genetic potential, and its safety, particularly concerning its cytotoxic effects. Moreover, several products derived from parts of the genipap plant have been patented, making it essential to implement methodologies for large-scale propagation and cultivation of *Genipa americana* for sustainable use, as current efforts have only involved maintaining a few individuals in grasslands and home gardens.

Chapter 6 discusses medicinal plants used by the indigenous communities of Patagonia. The authors emphasize the importance of commercializing plant species, such as *Adesmia boronioides* Hook. f., or *Paramela*, which has long been used by Indigenous peoples as medicine and is renowned for its fragrant aroma due to its high essential oil content. This makes it a potential candidate for development into commercial products such as modern medicines, perfumes, and aromatic ingredients for alcoholic beverages. Additionally, the authors highlight the bioactive compounds of the plant and its biological activities, which could be applied in modern medicine. They stress the importance of domesticating native plants to ensure high-quality genetic material and products, as well as the need for biodiversity conservation through sustainable practices.

Chapter 7 explores medicinal plants distributed in tropical and subtropical regions, including Central and South America. This section highlights the *Vismia* genus from the Hypericaceae family, which consists of 55 species widely used in traditional medicine to treat ailments such as ulcers, fungal infections, herpes, and fever. It details the biosynthetic pathways in these plants that produce around 161 types of secondary metabolites, such as anthraquinones, xanthenes, flavonoids, and terpenoids, along with their biological activities, including antimicrobial, antioxidant, anticancer, antiviral, and cytotoxic properties. Additionally, the author emphasizes *Vismia*'s significant potential in modern medical applications and the importance of sustainable practices to prevent overexploitation.

Chapter 8 examines the link between traditional and modern medicine, where various bioactive compounds are isolated from plants traditionally used by local communities for application in modern medicine. The plant discussed in detail is turmeric (*Curcuma longa* L.) and its bioactive compound, curcumin, which possesses high pharmacological activity, such as antimicrobial, anti-inflammatory, anticancer, antioxidant, antiarthritis, antimalarial, chemopreventive, and chemotherapeutic properties. This gives it the potential to treat various infections and diseases, including skin conditions, lung diseases, digestive disorders, pain, wounds, sprains, liver disorders, Alzheimer's, Parkinson's, smallpox, and various types of cancer.

Chapter 9 discusses the medicinal plants used by the Indigenous Khyang people in Bandarban District, Bangladesh. It covers the local names of the plants, the types of diseases they treat, the plant parts used, preparation methods, and the phytochemical content of the plants utilized by the Indigenous communities. The authors emphasize the importance of the ethnobotanical knowledge of these communities regarding the use of plants as medicine and its relation to the phytochemical content of the plants, which offers various health benefits such as anticancer, anti-inflammatory, and antioxidant activities. Therefore, the authors highlight the importance of identifying various plant species with potential for application in modern medicine while also ensuring the preservation of traditional knowledge that is threatened by deforestation and globalization.

Chapter 10 provides an overview of cardiovascular diseases and highlights the potential of traditional medicines, specifically herbs and spices, in treating Cardiovascular Diseases (CVD) and related complications such as heart disease, ischemic heart disease, cerebrovascular disease, chronic rheumatic heart disease, hypertension, hyperlipidemia, vascular diseases, and other heart conditions. The authors also emphasize the importance of regulation and standardization in the use of traditional or herbal medicines for treating CVDs, as seen in Canada and Europe, given the increasing interest in medicinal plants as efficient and more economical alternatives to traditional treatments.

Chapter 11 analyzes the parameters that affect the safety and effectiveness of using medicinal plants in the treatment and prevention of various ailments. The authors highlight the increasing reliance on medicinal plants and the unsustainable. Therefore, it is crucial to implement proper harvesting, cultivation, and quality control processes to ensure the safety, efficacy, and sustainability of natural resources. This section also emphasizes the importance of bioprospecting and sustainable resource utilization, particularly in the context of biodiversity loss by integrating traditional medicine into modern healthcare systems while addressing the associated risks and conservation efforts, especially for vulnerable populations.

Chapter 12 explores the biodiversity in Arunachal Pradesh, India. This research focuses on the active compounds and secondary metabolites of medicinal plants and their traditional uses. The authors emphasize the importance of preserving medicinal plants in the region due to their potential bioactive compounds and to prevent habitat degradation from excessive exploitation. This section also covers the classification of secondary metabolites into phenolic compounds, alkaloids, and terpenoids, which have ecological functions and health benefits. To ensure the sustainability of natural resources for future generations, further research is needed on unexplored plants, as well as the use of advanced biotechnology methods for optimization in conservation.

Chapter 13 focuses on medicinal plants for anti-urolithiasis and emphasizes the importance of selecting the right plant materials for optimal extraction of bioactive compounds. This section highlights modern extraction methods that can enhance efficiency and reduce the degradation of bioactive compounds, as well as methods for purifying these compounds. Additionally, this section addresses the prevalence of urolithiasis and the potential of traditional herbal medicine as a cost-effective alternative to conventional treatments in India. Research continues to explore the mechanisms and effectiveness of herbal remedies in preventing the formation of urolithiasis.

Chapter 14 focuses on ethnopharmacology, specifically the use of natural bioactive products from plants for traditional medicine. The authors emphasize the importance of a multidisciplinary approach in determining the pharmacological activity of plants as reliable ethnopharmacological evidence and the differentiation between plant materials and biological models through *in vitro* experiments. Key aspects include experimental design, data analysis, and the use of statistical methods, with dose-response curves being crucial for analyzing biological responses to bioactive compounds. Additionally, this section also discusses the appropriate terminology for classifying agonists related to biological systems, as well as *in vivo* and *in vitro* studies.

Chapter 15 focuses on a comprehensive analysis of the chemical compounds found in *Citrus* species, including their structure, molecular formula, and biological activity or function in the body. The authors emphasize the health benefits of phytochemicals in these plant species, such as essential oils, flavonoids, and limonoids. These compounds exhibit antioxidant, antibacterial, antifungal, and even anticancer properties. Additionally, this section discusses the ethnopharmacological benefits of these compounds in traditional medicine, their applications in food and cosmetics, and the need for further research on minor flavonoids and hydroxycinnamates present in *Citrus* plants.

The final section of this book discusses the pharmacological potential of medicinal plants due to their bioactive compounds, making them suitable for use as traditional medicines, such as in *Platonia insignis* Mart. or Bacuri. This plant exhibits various pharmacological activities, including antioxidant effects, anti-inflammatory properties, and acetylcholinesterase inhibition. Therefore, further development is needed for the discovery of new drugs, particularly in the treatment of neurodegenerative diseases such as Alzheimer's.

Ethnobotany provides a comprehensive and insightful exploration of the intersection between traditional knowledge and modern science in the use of medicinal plants. The book successfully highlights the cultural, biochemical, and ecological dimensions of medicinal plants, while also addressing the challenges of conservation and the ethical considerations in ethnobotanical research. It serves as a valuable resource for researchers, practitioners, and students interested in

ethnobotany, pharmacology, and plant conservation, offering both theoretical insights and practical applications. Overall, it underscores the importance of preserving traditional knowledge and integrating it into modern healthcare and sustainability efforts.

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