

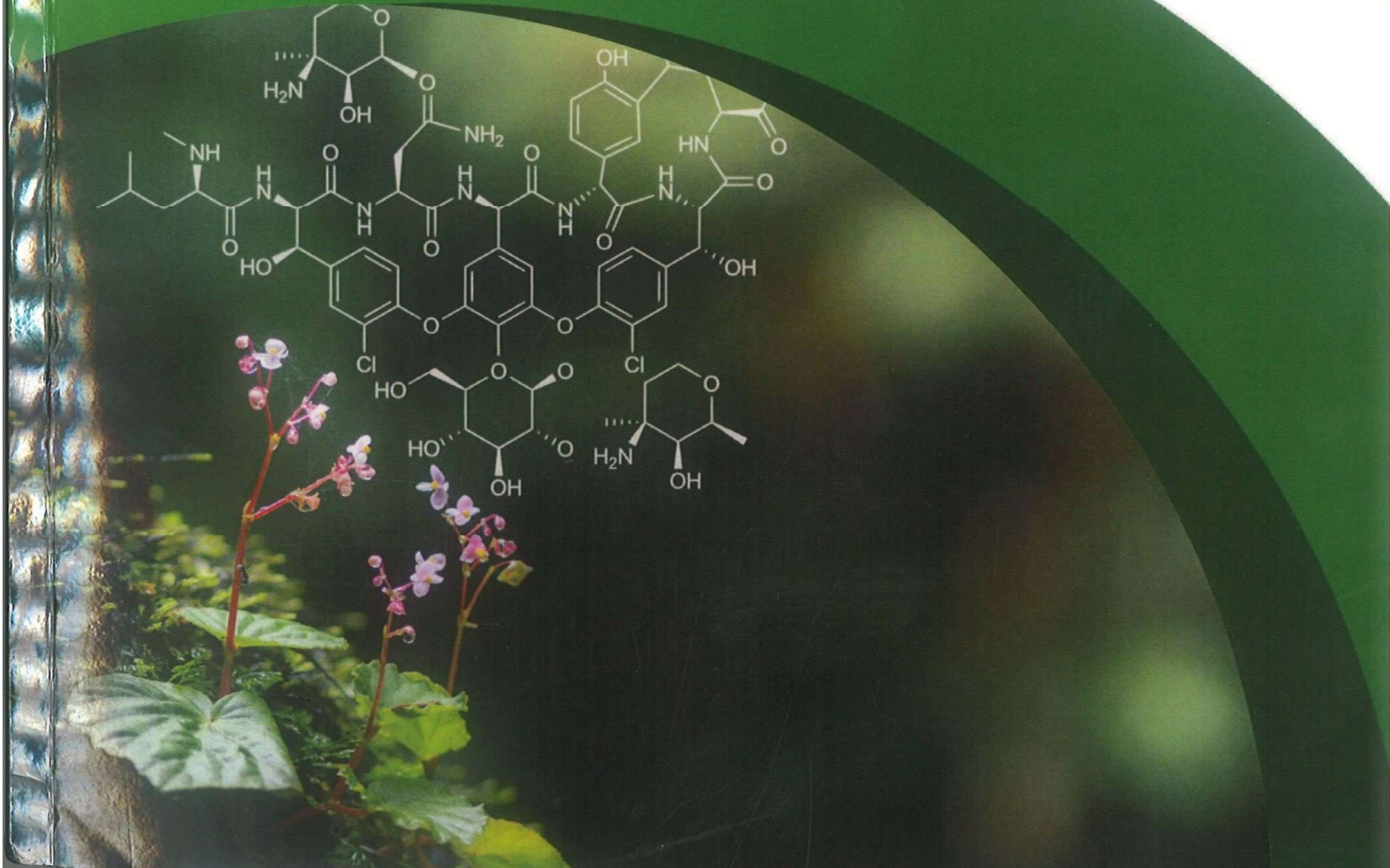
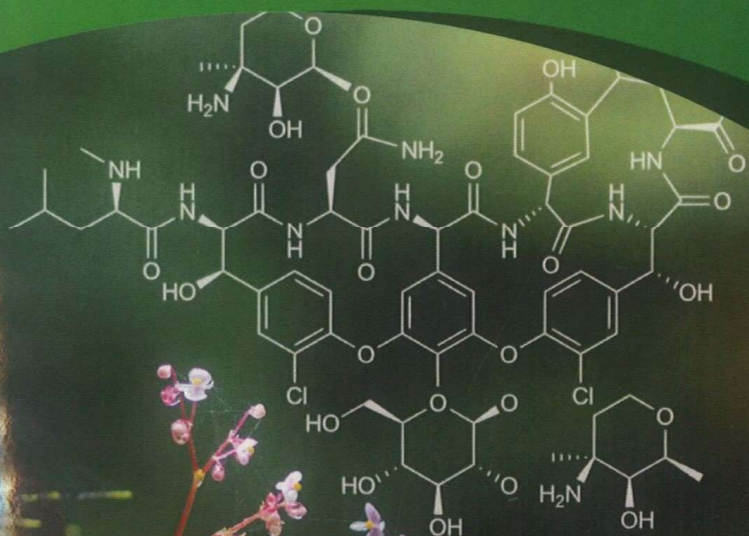
EXPLORING MEDICINAL PLANTS

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ETHNOBOTANY AND ETHNOPHARMACOLOGY OF MEDICINAL AND AROMATIC PLANTS

Steps Towards Drug Discovery

Edited by
Mohd Adnan
Mitesh Patel
Mejdi Snoussi



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12 Metabolomics of Medicinal and Aromatic Plants

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12.1 INTRODUCTION

Over the centuries, the plants were the sole source of all the medicaments and health care for humans and domestic animals (Porwal et al. 2020). Medicinal and aromatic plants (MAPs) were the source of various bioactive components, which have been used for treating countless diseases over a long period. Since ancient times, spices and MAPs have played crucial roles in human nutrition, conferring aroma, flavor, and color to foods (Sousa et al. 2019). Recently, an estimated increase has been found in synthetic substances in various sectors of the economy, including agriculture, food, and pharmaceuticals (Adel Mahmoodabad et al. 2014). In the pharmaceutical industry, secondary metabolites of medicinal plants are equally beneficial as lead compounds for the design and production of effective drugs. During this process, vast amounts of harmful solvents were often used to prepare desired drugs. The phytotherapeutic nature of medicinal plants is due to specific secondary metabolites and biologically active components formed during secondary metabolism. They provide many compounds exhibiting various therapeutic effects (Salmerón-Manzano, Garrido-Cardenas, and Manzano-Agugliaro 2020).

While aromatic plants produce aromatic substances exhibiting therapeutic properties like antimicrobial, anti-inflammatory, and antioxidant activities, generally used for culinary purposes, food, and liqueur industries (Jamshidi-Kia, Lorigooini, and Amini-Khoei 2018), the MAPs are the plant's raw materials, rich in secondary metabolites, and play various functions in the growth and nourishment of the body in pigmentation (Cadar et al. 2021). In a recent study, it has been proved that the antimicrobial substance found in herbal extracts can preserve food safety; based on these properties, plants can be used as natural antimicrobials. By using MAPs as raw material, a series of intermediate and final products can be obtained, including allopathic medicines, phytotherapeutic products, botanical supplements, cosmetics and personal care, paints, and others (Enioutina et al. 2020). This chapter envisions promoting and creating awareness about MAPs as a good diversification for small scale farmers.

The thermal decomposition of MAPs derivative under an oxygen-deficient environment called pyrolysis was used earlier for charcoal preparation and tar production for sealing boats (Rollag et al. 2022). The growth in pyrolysis could be considered an effective way of transforming biomass into bio-oils. Different methodologies, including thermo-chemical biological processes, have converted biomass into valuable products. Among them, pyrolysis is the most common, since it has many advantages, including storing and flexibility in adjuring for transportation through turbines, boilers, or engines (Demirbas 2005). The eventual objective of the pyrolysis is to provide high-yield energy products by gradually ousting non-renewable fossil fuels (Zaman et al. 2017). Typically, a pyrolysis system unit contains the equipment for pre-processing target residues, the reactor, and a unit for downstream processing.

12.2 VALUE OF MAPs AS RAW MATERIALS

The MAPs play an essential role in disease prevention and daily lifestyle-based health management. They are an integral part of the traditional medicine system and vital component of various local trade supply chains found in numerous local communities worldwide. The MAPs are comprised of a wide range of species that have different sources, uses, and characterization, where their activities can be valuable for livelihood as MAPs are one of the most convenient options for harvests trade, as it requires access to natural assets, volunteer labor, and primary species knowledge (Urquiza-Haas and Cloatre 2019). More than 70% of MAPs trade is being used in herbal products, and other plant-based products are harvested from the forest, and their demand increases daily. The Medicinal Plant Specialist Group of the World Conservation Union (IUCN-International Union for Conservation of Nature) predicts that nearly about 15,000 plant species used in the herbal product could be endangered due to unsustainable collection and unfair trade.