

Plants have always been a source of nourishment and healing for living things. Their dual task of producing nutrients and medicines has played a key role in the evolution of herbivore and omnivore organisms. The so-called secondary metabolites are molecules with well-defined functional roles. These compounds are produced to defend plants from abiotic and biotic stresses. The complexity of the molecular structures produced by plants is only equal to their versatility and chemical diversity, while the harmonic intertwining of biosynthetic and metabolic pathways offers a perfect picture of the adaptive plasticity of plants to changing environmental conditions.

This book is divided into three parts designed to provide the reader with a general overview, a biochemical and a biotechnological approach to plant bioactive molecules.

The first part analyses the concepts of chemical diversity, sustainability and functional role of bioactive molecules, by exploring the sites of synthesis and accumulation, the plant defence strategies and the use of bioactive molecules as food supplements and as a source for natural products to fight diseases. The first part ends with the study of chemotaxonomy.

The second part is dedicated to plant biochemistry, with the detailed description of the main biosynthetic pathways leading to the synthesis of phenols and flavonoids, terpenes, oxylipins and nitrogen-containing substances.

The third and final part describes plant biotechnology and production of bioactive molecules with industrial processes, both *in vivo* and *in vitro*. Special attention is paid to cell and tissue cultures, roots and shoots cultures, technological aspects describing bioreactors, biofermenters and photobioreactors. The book concludes with a chapter describing the genetic engineering strategies for the production of plant bioactive molecules, facing with ethical problems, risks and benefits of using recombinant DNA in genetically modified organisms (GMOs) and the use of molecular pharming, with a general discussion on food safety.

Massimo Maffei graduated in Plant Biology from the University of Turin, Italy, where he is currently a Professor of Plant Physiology in the Department of Life Sciences and Systems Biology. His current research interest is the study of the biochemistry and molecular biology of plant bioactive molecules. He also studies the early signals in plant-plant and plant-insect interaction. He has published more than 150 scientific papers in international journals and is the Editor-in-Chief of the Open Access JCR *Journal of Plant Interactions*.

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