

Preface

Presently, the prime focus of biotechnology research is to ameliorate the health benefits and basic nutrition values from the original source. With the recent advances in nanobiotechnology, enzyme biotechnology and purification technology, it is feasible to harness the natural extracts having bioactive compounds from the original source with the desired purity and yield. Human society is becoming health and calorie conscious, therefore preference for consumption for bioactive compounds has increased immensely in last two decades. For example, according to World Health Organization around 1.6 million people worldwide died due to diabetes in 2016 and number will rise to 629 million diabetics globally by 2045.

Natural extracts from plants, metabolites from microorganisms or marine based sources are a rich source of bioactive compounds and are reported to have healthier effects on prevention of cardiovascular diseases, mental disorders, inflammation, obesity and several other health issues.

Recently, researchers have employed novel methods for the purification and extraction of bioactive compounds with desired purity and recovery. Now extraction methodologies for bioactives production with improved efficiency has revamped with the advancement in nanobiotechnology and analytical molecular chemistry based techniques. At the outset of new nano-biotechnology applications, there is a pressing need to explore this area and thus seeks special attention to publish the advancement in this area at this high time. The present book is an attempt to bring together leading scientists to contribute review articles that cover the focal theme of all aspects of Bioactive compounds production and extraction, Enzyme technology, and Nano-technological interventions of bioactive compounds production and recovery.

The first chapter summarizes various techniques and their applications in the extraction and production of bioactive compounds from natural sources. The second chapter emphasis on the recovery and utilization of bioactives from food processing waste. The third chapter discusses the physical and chemical methods employed for flavonoid extraction and various applications in the biotechnology sector. The fourth chapter highlights the bioactive peptides, their sources, production techniques, major uses and biotechnological applications. The fifth chapter is focused on the recent progress made in the field of enhancing the production of stevioside through biotechnological interventions. The sixth chapter addresses the biotechnological applications of health promising bioactive molecules present in vegetable crops and medicinal herbs/plants. The seventh chapter summarizes the various recent studies employed to enhance the yield and productivity of two high valued algal compounds including astaxanthin and lutein under various growth conditions. The eighth chapter provides an overview of the biologically active compounds, extraction of algal biomass and their potential role for the human welfare, in a structured way. The ninth chapter presents the classification of sweeteners, microbial production of sweeteners, commercial outlook and demand, health effects and

regulations for consumption. The 10th chapter discusses the recent advances made in the bioprocessing of oleaginous microalgae to omega-3 fatty acid production. The 11th chapter describes the potential of filamentous fungi, yeast and bacteria for the production of biopigments, and their potential applications. The 12th chapter highlights the mechanism(s) of cytotoxicity of RNases toward the cancerous cells, which make(s) RNases prominent chemotherapeutic or anticancer agents. The thirteen chapter discusses the nanoparticles synthesized using greener methods that significantly enhances the pharmacological properties of biomolecules. The 14th chapter presents the significance of nanotechnology in bioactive compounds. The chapter focuses on the health benefits of bioactive compounds, their bio-accessibility and bioavailability. The last 15th chapter describes the procedure of enhancement of bioactivity of compound by using nanotechnology.

The editors sincerely thank all the authors for their outstanding efforts to provide state of-the-art information on the subject matter of their respective chapters. We thank several reviewers who evaluated the manuscripts and provided critical suggestions to improve these further. We hope that this book will provide information about the latest research and advances, especially the innovations in biotechnological production of bioactive compounds. We wish to thank everyone involved in making possible publication of the book in a timely manner, especially Dr. Kostas Marinakis, Senior Book Acquisition Editor, Devlin Person, Editorial Project Manager and Vignesh Tamil, Project Manager, Reference Content Production, Elsevier Inc. It is our hope that this book will be useful to the students and researchers from both academia and industry.

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