

Preface

Fungi as cell factories

Fungi display an extraordinary level of structural and functional diversity with an estimated 1.5–5.1 million extant species. About 100,000 fungal species have so far been described. The number of species identified continues to increase particularly with the development and application of postgenomic methodologies to disentangle species aggregates and identify cryptic species. Fungi are one of the most important groups of eukaryotic organisms that are exploited for metabolites of potential therapeutic value as well as applications in diverse industries such as food and textile.

Fungi offer a rich and diverse source of biomolecules that continue to be explored for food, health and environmental applications through research and development of both public and private sectors. And the key to harnessing this fantastic natural resource is to maximize more collaborative efforts across these sectors. With this backdrop, this volume presents an exciting collection of chapters by active researchers across the globe covering a range of applications of fungi and their biomolecules, presented under various thematic sections.

Sections 1 and 2 present recent research on fungi as cell factories in the production of enzymes and various metabolites and their use as biocatalysts and biofilms. The topics include discovery of fungal enzymes and pathways, applications in food and textile industries, peptides and peptaibols and recent advances in the role and analysis of volatile compounds.

Sections 3 and 4 explore fungal secondary metabolism and regulation of synthesis with an array of research developments covered including metabolic

diversity, antimicrobial and antitumour agents, biosynthesis of nanoparticles, mycotoxins, the influence of nutrients, fungal secretome, the role of secretory proteins in pathogenesis and regulatory genes.

Section 5 focuses on molecular approaches to the identification of fungal species that were hitherto difficult to distinguish reliably based on their phenotype. Furthermore, parallel developments in genetic methodologies that are continuing to emerge to improve the performance of fungal strains for industrial application are also presented.

Section 6 covers various recent methodological and conceptual advances in understanding and exploiting fungal diversity and their interactions including bioinformatic approaches for the detection of fungal species and their biomolecules. Further chapters provide insights into key molecules and their implications, plant growth promotion and sustainable environmental management including recent advances and emerging areas.

This volume provides a comprehensive coverage of exemplars of the diverse roles and applications of fungal biomolecules in food, health and the environment. Furthermore, with the collection of chapters providing a wider perspective from fungal metabolic diversity to the impact on ecosystem management, this volume would serve as an excellent reference for early career and experienced academics and researchers from both public and private sectors.

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