Secondary Metabolism In Microorganisms Plants And Animals

Endophytes and Secondary Metabolites
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Secondary Metabolites
Secondary Metabolism in Microorganisms, Plants and Animals
From Secondary Metabolites to Molecular Farming

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Endophytes and Secondary Metabolites
BoD – Books on Demand
Role of Plant Growth Promoting Microorganisms in Sustainable Agriculture and Nanotechnology explores PGPMs (actinomycetes, bacteria, fungi and cyanobacteria) and their multidimensional roles in agriculture, including their increasing applications in sustainable agriculture. In addition to their traditional understanding and applications in agriculture, PGPMs are increasingly known as a source of nano-particles production that are gaining significant interest in their ability to provide more economically, environmentally friendly and safe technologies to crop growers. The book considers new concepts and current developments in plant growth, thus promoting microorganisms research and evaluating its implications for sustainable productivity. Users will find this to be an invaluable resource for researchers in applied microbial biotechnology, soil science, nano-technology of microbial strains, and industry personnel in these areas. Presents basic and applied aspects of sustainable agriculture, including nano-technology in sustainable agriculture Identifies molecular tools/omics approaches for enhancing plant growth promoting microorganisms Discusses plant growth promoting microorganisms in bioactive compounds production, and as a

source of nano-particles

Secondary Metabolism in Microorganisms, Plants, and Animals CRC Press

Plant Metabolites and Regulation Under Environmental Stress presents the latest research on both primary and secondary metabolites. The book sheds light on the metabolic pathways of primary and secondary metabolites, the role of these metabolites in plants, and the environmental impact on the regulation of these metabolites. Users will find a comprehensive, practical reference that aids researchers in their understanding of the role of plant metabolites in stress tolerance. Highlights new advances in the understanding of plant metabolism Features 17 protocols and methods for analysis of important plant secondary metabolites Includes sections on environmental adaptations and plant metabolites, plant metabolites and breeding, plant microbiome and metabolites, and plant metabolism under non-stress conditions

Fungal Pigments Springer

Phytochemicals provides original research work and reviews on the sources of phytochemicals, and their roles in disease prevention, supplementation, and accumulation in fruits and vegetables. The roles of anthocyanin, flavonoids, carotenoids, and taxol are presented in separate chapters. Antioxidative and free radicle scavenging activity of phytochemicals is also discussed. The medicinal properties of Opuntia, soybean, sea buckthorn, and gooseberry are presented in a number of chapters. Supplementation of plant extract with phytochemical properties in broiler meals is discussed in one chapter. The final two chapters include the impact of agricultural practices and novel processing technologies on the accumulation of phytochemicals in fruits and vegetables. This book mainly focuses on medicinal plants and the disease-preventing properties of phytochemicals, which will be a useful resource to the reader.

Microbial Cell Factories Engineering for Production of Biomolecules Springer Science & Business Media

1. Secondary Metabolism and Differentiation In addition to the primary metabolic reactions, which are similar in all living beings (formation and breakdown of nucleic acids and proteins as well as of their precursors, of most carbohy drates, of some carboxylic acids, etc.), a vast number of metab olic pathways lead to the formation of compounds peculiar to a few species or even to a single chemical race only. These reac tions, in accord with CZAPEK (1921) and PAECH (1950), are summed up under the term "secondary metabolism", and their products are called "secondary metabolites. " The wide variety of secondary products formed in nature includes such well-known groups as alkaloids, antibiotics, cardiac glyco sides, tannins, saponins, volatile oils, and others. A consider able number of them are of economic importance in therapeutics or technology. Although secondary products are produced by micro organisms, higher plants, and animals (cf. LUCKNER, 1972), most of the substances are found in the plant kingdom. The lack of mechanisms for true excretion in higher plants may result in this unequal distribution, the "waste products" of metabolism in plants instead being accumulated in the vacuoles, the cell walls, or in special excretory cells or spaces of the organism ("metabolic excretion," cf. FREY-WYSSLING, 1935,

1970; MOTHES, 1966a, b, 1972; LUCKNER et al. , 1976. Many secondary substances have, however, a direct biologic func tion. They can be regulatory effectors, e. g.

Biocontrol Mechanisms of Endophytic Microorganisms Academic Press

This book consists of an introductory overview of secondary metabolites, which are classified into four main sections: microbial secondary metabolites, plant secondary metabolites, secondary metabolites through tissue culture technique, and regulation of secondary metabolite production. This book provides a comprehensive account on the secondary metabolites of microorganisms, plants, and the production of secondary metabolites through biotechnological approach like the plant tissue culture method. The regulatory mechanisms of secondary metabolite production in plants and the pharmaceutical and other applications of various secondary metabolites are also highlighted. This book is considered as necessary reading for microbiologists, biotechnologists, biochemists, pharmacologists, and botanists who are doing research in secondary metabolites. It should also be useful to MSc students, MPhil and PhD scholars, scientists, and faculty members of various science disciplines.

Diversity, Bioprospecting and Biotechnological Applications Frontiers Media SA

The Biochemistry of Plants: A Comprehensive Treatise, Volume 7: Secondary Plant Products focuses on the biochemistry of secondary compounds, including tissue culture and differentiation, complexes, and plant systematics. The selection first elaborates on the physiological roles of secondary natural products, tissue culture and the study of secondary natural products, and turnover and degradation of secondary natural products. Discussions focus on degradative reactions of nitrogenous and phenolic compounds, concept of turnover of secondary products, and plant-vertebrate interactions. The text then elaborates on secondary plant products and cell and tissue differentiation; compartmentation in natural product biosynthesis by multienzyme complexes; and secondary metabolites and plant systematics. The manuscript examines the stereochemical aspects of natural products biosynthesis, nonprotein amino acids, and amines. Topics include tryptamines, phenethylamines, and histamine, nonprotein amino acids as analogues and antimetabolites, chemistry and biogenesis, and nonprotein amino acids as indexes for chemotaxonomy. The book also tackles glycosylation and glycosidases; transmethylation and demethylation reactions in the metabolism of secondary plant products; and oxygenases and the metabolism of plant products. The selection is a vital reference for researchers interested in the biochemistry of secondary compounds.

Fungal Primary and Secondary Metabolism and its Importance for Virulence and Biomedical Applications Springer

This third book in the three-volume Plant Secondary Metabolites examines the relationship between environmental stress and the physiology of plants, leading to stimulation of secondary metabolites. Various stressors are discussed, including plant and soil interfaces, changing climate elements, essential plant nutrients, pest insects, plant pathogens and microrganisms, and more. The chapters, written by experienced experts, also

address the diverse utilization of plant-originated secondary metabolites and more.

Volatiles and Metabolites of Microbes Springer

The first source to unite secondary fungal metabolism and morphogenesis in one volume, Secondary Metabolism and Differentiation in Fungi treats biological systems as parts of a whole rather than as a series of individual elements, highlighting research in genetics, molecular biology, and ecology. Featuring the expertise of 19 international authorities, each chapter is a rich source of experimentation ideas. The book facilitates the application of novel techniques to existing problems in molecular mycology and explores potentials for major new research. This indispensable guide to a key scientific field benefits biologists, chemists, and other scientists.

Their Roles in Stress Eco-physiology Academic Press

Plants require essential nutrients (macronutrients and micronutrients) for normal functioning. Sufficiency range is the levels of nutrients necessary to meet the plant's needs for optimal growth. This range depends on individual plant species and the particular nutrient. Nutrient levels outside of a plant's sufficiency range cause overall crop growth and health to decline, due either to deficiency or toxicity from over-accumulation. Apart from micronutrients (B, Cl, Mn, Fe, Zn, Cu and Mo), Aluminum (Al), cerium (Ce), cobalt (Co), iodine (I), lanthanum (La), sodium (Na), selenium (Se), silicon (Si), titanium (Ti), and vanadium (V) are emerging as novel biostimulants that may enhance crop productivity and nutritional quality. These beneficial elements are not "essential" but when supplied at low dosages, they augment plant growth, development, and yield by stimulating specific molecular, biochemical, and physiological pathways in responses to challenging environments. The book is the first reference volume that approaches plant micronutrient management with the latest biotechnological and omics tools. Expertly curated chapters highlight working solutions as well as open problems and future challenges in plant micronutrient deficiency or toxicity. We believe this book will introduce readers to state-of-the-art developments and research trends in this field.

Discovery and Applications Academic Press

Volatiles and Metabolites of Microbes compiles the latest research and advancement in the field of volatiles, metabolites synthesized from the microbial strains such as actinomycetes, bacteria, cyanobacteria, and fungal species and their potential applications in the field of healthcare issue and sustainable agriculture. There is an urgent need to explore new and advanced biological methods for health industries and sustainable agriculture and to protect the environment from environmental pollution or contaminates, global warming, and also control the health of human beings from the side effects of various pharmaceuticals products. Focusing all these factors, Volatiles and Metabolites of Microbes explores new aspects of microorganism in terms of volatiles, enzymes, bioactive compounds synthesized from the microbes and their potential applications in the field of sustainable agriculture and health-related issues Provides a broad aspect about

volatiles, bioactive compounds, and secondary metabolites of microbes compiled in one cover Gives the latest research and advancement in the field of volatiles, secondary metabolites, and bioactive compounds synthesized from the different microbial strains Responds to new developments in the detection of the complex compound structures of volatiles Offers insight to a very broad audience in Biotechnology, Applied Microbiology, Agronomy, and Pathology

Secondary Metabolites in Soil Ecology BoD – Books on Demand

Recent changes in the pattern of agricultural practices from use of hazardous pesticides to natural (organic) cultivation has brought into focus the use of agriculturally important microorganisms for carrying out analogous functions. The reputation of plant growth promoting rhizomicroorganisms (PGPRs) is due to their antagonistic mechanisms against most of the fungal and bacterial phytopathogens. The biocontrol potential of agriculturally important microorganisms is mostly attributed to their bioactive secondary metabolites. However, low shelf life of many potential agriculturally important microorganisms impairs their use in agriculture and adoption by farmers. The focal theme of this book is to highlight the potential of employing biosynthesized secondary metabolites (SMs) from agriculturally important microorganisms for management of notorious phytopathogens, as a substitute of the currently available whole organism formulations and also as alternatives to hazardous synthetic pesticides. Accordingly, we have incorporated a comprehensive rundown of sections which particularly examine the SMs synthesized, secreted and induced by various agriculturally important microorganisms and their applications in agriculture. Section 1 includes discussion on biosynthesized antimicrobial secondary metabolites from fungal biocontrol agents. This section will cover the various issues such as development of formulation of secondary metabolites, genomic basis of metabolic diversity, metabolomic profiling of fungal biocontrol agents, novel classes of antimicrobial peptides. The section 1 will also cover the role of these secondary metabolites in antagonist-host interaction and application of biosynthesized antimicrobial secondary metabolites for management of plant diseases. Section 2 will discuss the biosynthesized secondary metabolites from bacterial PGPRs, strain dependent effects on plant metabolome profile, bio-prospecting various isolates of bacterial PGPRs for potential secondary metabolites and non-target effects of PGPR on microbial community structure and functions. Section 3 encompasses synthesis of antimicrobial secondary metabolites from beneficial endophytes, bio-prospecting medicinal and aromatic hosts and effect of endophytic SMs on plants under biotic and biotic stress conditions.

Metabolic Engineering of Plant Secondary Metabolism Springer Nature

This book is a printed edition of the Special Issue "Fungal Pigments" that was published in JoF

Functions of Plant Secondary Metabolites and Their Exploitation in Biotechnology Elsevier

Biocontrol and Secondary Metabolites: Applications and Immunization for Plant Growth and Protection covers established and updated research on emerging trends in plant defense signaling in, and during,

stress phases. Other topics cover growth at interface as a sustainable way of life and the context of human welfare and conservation of fungi as a group of organisms. Further, the book explores induced systemic resistance using biocontrol agents and/or secondary metabolites as a milestone for sustainable agricultural production, thus providing opportunities for the minimization or elimination of the use of fungicides. Presents an overview on mechanisms by which plants protect themselves against herbivory and pathogenic microbes Identifies the use of immunization as a popular and effective alternative to chemical pesticides Explores how these fungi help crop plants in better uptake of soil nutrients, increase soil fertility, produce growth promoting substances, and secrete metabolites that act as bio-pesticides

A Comprehensive Treatise Springer

Applied Plant Biotechnology for Improvement of Resistance to Biotic Stress applies biotechnology insights that seek to improve plant genomes, thus helping them achieve higher resistance and optimal hormone signaling to increase crop yield. The book provides an analysis of the current state-of-the-art in plant biotechnology as applied to improving resistance to biotic stress. In recent years, significant progress has been made towards understanding the interplay between plants and their hosts, particularly the role of plant immunity in regulating, attenuating or neutralizing invading pathogens. As a result, there is a great need to integrate these insights with methods from biotechnology. Applies biotechnology insights towards improving plant genomes, achieving higher resistance and optimizing hormone signaling to increase crop yield Presents the most modern techniques, investigations, diagnostic tools and assays to monitor and detect contaminating agents in crops, such as grape, tomato, coffee and stone fruit Provides encyclopedic coverage of genes, proteins, interaction networks and mechanisms by which plants and hosts seek survival Discusses the methods available to make crops resistant and tolerant to disease without decreased yield or food production Provides insights for policymakers into the difficulties faced by scientific researchers in the use of biotechnology intervention, transgenes and genetically modified sequences

Deficiency and Toxicity Management

Springer Science & Business Media

This reference work presents an authoritative review of endophytes and their applications to human welfare. Endophytes have become a class of interesting and curious microorganisms due to their intimate intra- and intercellular association with plants for competence, survival and reproduction. They can be bacteria or fungi, and they are usually non-pathogenic to their host. Endophytes have important applications in agriculture and industry, namely, they can help with plant growth, act as biocontrol agents and biosurfactant and secondary metabolite producers, and they are also rich sources of bioactive natural products. Novel and beneficial effects of endophytes are constantly emerging, and this book, divided into four sections, provides readers with the latest developments in this fast expanding field. In the first section, readers will discover the biology of the major groups of endophytes, followed by a summary of conventional

and molecular tools for endophytes' identification in Section II. The production of high-value metabolites by endophytes will be explored in the third section of this book, and in the final section, readers will find several case studies, examples and prospects for endophytes' application in agriculture and industry. Written by leading international authors, this reference work will appeal to a wide readership, from students and researchers in the field of botany, biotechnology and agriculture to professionals interested in the production and applications of endophytic metabolites.

Secondary Metabolism and Cell Differentiation Academic Press

In this book emphasis will be put in the relevance of Plant Biotechnology for producing compounds of pharmaceutical and industrial relevance specifically the contribution of in vitro plant cell cultures for producing recombinant proteins (molecular farming) and compounds produced by plants useful for human and animal health (secondary metabolites) will be discussed. Also the description of some process held by whole plants will be included. The aim will be to provide relevant theoretical frameworks and the latest empirical research findings for professionals and researchers working in the field of Plant Biotechnology, molecular farming and biochemical engineering.

Plant Secondary Metabolites, Volume Three Secondary Metabolism in Microorganisms, Plants and Animals

Vol. 1 is the Proceedings of the 6th annual symposium of the Plant Phenolics Group of North America, 1966; vols. 2-5 are the Proceedings of the annual symposium of the Phytochemical Society of North America, 1967-70

Secondary Metabolites Springer Nature

This Reference Work is devoted to plant secondary metabolites and their evolutionary adaptation to different hosts and pests. Secondary metabolites play an important biological role in plants' defence against herbivores, abiotic stresses and pathogens, and they also attract beneficial organisms such as pollinators. In this work, readers will find a comprehensive review of the phytochemical diversity, modification and adaptation of secondary metabolites, and the consequences of their co-evolution with plant parasites, pollinators, and herbivores. Chapters from expert contributors are organised into twelve sections that collate the current knowledge in intra-/inter-specific diversity in plant secondary metabolites, changes in secondary metabolites during plants' adaptation to different environmental conditions, and co-evolution of host-parasite metabolites. Among the twelve themed parts, readers will also discover expert analysis on the genetics and chemical ecology evolution of secondary metabolites, and particular attention is also given to allelochemicals, bioactive molecules in plant defence and the evolution of sensory perception in vertebrates. This reference work will appeal to students, researchers and professionals interested in the field of plant pathology, plant breeding, biotechnology, agriculture and phytochemistry.

Their Function and Evolution Academic Press

This Methods in Molecular Biology volume provides key methodologies for accessing and exploiting natural product information provided by the genomes of filamentous fungi. Includes materials and reagents lists, step-by-step protocols and

troubleshooting tips."
Microbial Secondary Metabolites: Recent Developments and Technological Challenges Springer Science & Business Media
This new volume of Methods in Enzymology continues the legacy of this premier serial by containing quality chapters authored by leaders in the field. The first of 3 volumes covering Natural product biosynthesis by microorganisms and plants, it has chapters on such topics as Kinetics of plant sesquiterpene synthases, Terpenoid biosynthesis in fungi, and plant Type III polyketide synthases. Contains quality chapters authored by leaders in the field The first of 3 volumes Has chapters on such topics as kinetics of plant sesquiterpene synthases, terpenoid biosynthesis in fungi, and plant Type III polyketide synthases