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Antimicrobial Activity of Endophytic Fungi Isolated from Swietenia Macrophylla Leaves Endophytic Fungi: Biodiversity, Antimicrobial Activity and Ecological Implications Endophytic Microbes: Isolation, Identification, and Bioactive Potentials Natural Products and Molecular Genetics Underlying the Antifungal Activity of Endophytic Microbes Neotropical Endophytic Fungi *Microbial Endophytes* Antifungal Activity of Endophytic Fungus Isolated from Orthosiphon Stamineus Benth (misai Kucing) Leaves Fungal Endophytes in Plants *IDENTIFICATION AND ANTIMICROBIAL ACTIVITY OF ENDOPHYTIC ACTINOMYCETES ISOLATED FROM MEDICINAL PLANTS IN THAILAND* **Endophytes** Endophytic Fungi Hosted by Medicinal Plants May Potentially Exhibit Antimicrobial Activity **Endophytes: Biology and Biotechnology Endophytic Association: What, Why and How Endophyte Biology** Bacterial Endophytes of Oil Palm **Endophytic Fungus - a Source of Antimicrobial Nanoparticles Isolation, Characterisation and Antimicrobial Activity of Endophytic Actinobacteria from South Australian Seaweed** Endophytes: Crop Productivity and Protection **Seed Endophytes** *Molecular Identification of Fungi* **Endophytes of Forest Trees Antimicrobial Activity of Two Endophytic Fungi, Phomopsis Sp. Ed2 and Penicillium Minioluteum Ed24 Isolated from Orthosiphon Stamineus Benth and Their Potential Antimicrobial Compounds** *Bioactive Compounds from Endophytic Fungi Isolated from Kaempferia Parviflora* **Biocontrol Mechanisms of Endophytic Microorganisms Endophytes: Mineral Nutrient Management, Volume 3 Identification and Screening of Putative Endophytic Bacteria for Plant Growth-promoting Activity Dual Sources of Antimicrobial Activity of Anemopsis Californica** Endophytic Fungi from Medicinal Plants in Korea **Activity of Endophytic Actinomycetes Against Meloidogyne Javanica Biotechnology of Endophytic Fungi of Grasses** *Endophytic Fungi* **Endophytes of Forest Trees Microbial Endophytes Endophytes for a Growing World** Bacterial Endophytes for Sustainable Agriculture and Environmental Management **Endophytic Fungi in Grasses and Woody Plants The Systemic Activity of Mutualistic Endophytic Fungi in Solanaceae and Cucurbitaceae Plants on the Behaviour of the Phloem-feeding Insects Trialeurodes Vaporariorum, Aphis Gossypii and Myzus Persicae Antibacterial Activity of Aspergillus Sp. 7(13), an Endophytic Fungus Isolated from the Leaves of Orthosiphon Stamineus (misai Kucing) Against Food Borne Bacteria Genetic Characterization of Antimicrobial Activities of Endophytic Bacteria Burkholderia Strains MS455 and MS389 Antimicrobial Compounds from Endophytic Fungi of Goldenseal (Hydrastis Canadensis)**

Endophytic Association: What, Why, and How focuses on the endophytic association of plants, how they have originated inside the host, their importance, and how they are beneficial for the environment, as well as humans. The book discusses how using endophytic microbes in agricultural fields can be enriched without impacting environment negatively, and how they can be utilized for pharmaceutical purposes, including bioremediation. It includes advanced and up-to-date information, as well as future directions for young researchers and scientists who are working in the field of agriculture, pharmaceuticals, bio nanotechnology and bioremediation of environmental contaminants for environmental protection and sustainable development. Details the underlying mechanisms of endophyte-host association and their signaling mechanisms Describes numerous, successful field studies on the different applications of nanoparticles produced by endophytes (bio-nanotechnology) for sustainable development Presents recent advances and challenges in endophyte-associated bio-remediation research and applications for human health Provides information on bioactive compounds produced by endophytes for pharmaceutical purposes "Anemopsis californica is a plant native to the southwestern United States and northern Mexico that has been used by many Native American tribes to alleviate pain and inflammation and to treat infection. Limited research has examined the chemical composition of A. californica responsible for its purported therapeutic properties. Goal 1 of this study was to identify pathogenic bacteria against which the plant extract was active, and isolate the compounds responsible for this activity. Goal 2 was to identify bioactive compounds from endophytic fungi isolated from the plant./DISS_para The A. californica root extract was tested against a panel of bacteria and exhibited the most activity against several Mycobacterium spp. Bioassay-guided fractionation was conducted on a sample of A. californica roots was undertaken to isolate the bioactive compounds. These compounds were identified as the furofuran lignans sesamin (1) and asarinin (2), which were shown to have minimum inhibitory concentrations (MICs) ranging from 23 to 395 µM against five different species of environmental nontuberculous mycobacteria. These findings are significant given that these bacteria can cause skin, pulmonary, and lymphatic infections. With the use of liquid chromatography - mass spectrometry (LC-MS), it was determined that sesamin and asarinin were extracted at relatively high levels from A. californica roots (1.7-3.1g/kg and 1.1-1.7 g/kg, respectively), but lower levels from leaves (0.13 g/kg for both compounds). Our findings suggest that the majority of activity of crude A. californica root extracts against nontuberculous mycobacteria can be attributed to the presence of sesamin and asarinin. This is the first reported isolation of these compounds from a member of the Saururaceae family, and the first description of their activity against nontuberculous mycobacteria. DISS_para Goal 2 of this project was to identify bioactive compounds from the fungal endophytes of A. californica (fungi living asymptomatically within the plant tissues). The fungal endophytes were extracted from the plant and cultured on a solid media. Twelve different fungi were identified. Crude extracts of these fungi were prepared and partitioned with liquid-liquid chromatography. Several antimicrobial compounds were isolated or identified from these fungi, including a new antimicrobial compound chaetocuprum A from the fungus Chaetomium cupreum. An additional nineteen compounds were also identified, of which six have been shown in literature or with our investigations to possess antimicrobial activity. In addition, a crude extract of the A. californica root was prepared from the same batch of roots from which fungi were isolated, to ascertain whether any of these antimicrobial compounds were present in the plant. None of the antimicrobial compounds isolated from the endophytes were detected in the extract, but a series of other fungal compounds were present. Finally, at least eighteen ions were detected as being present in both the botanical and fungal extracts. The structures of these "overlapping compounds" have not yet been solved, but their presence does suggest a potential role for fungi in the chemical composition of botanical extracts."--Abstract from author supplied metadata. This book describes the various therapeutic and commercial applications of compounds produced by endophytes. Endophytes are microorganisms that reside in the living internal tissues of plants without showing any apparent symptom of their presence. During their life cycle, they establish a symbiotic or parasitic relationship with the host plant. The book discusses different kinds of compounds that these endophytes produce, and their potential properties such as antimicrobial, anti-oxidative, anti-inflammatory, anticancer, neutraceutical, immunomodulatory etc. Other prospects of entophytic biology such as fungi of wild and domesticated crop plants and their applications in sustainable agriculture have also been included. The book also provides details about various techniques used in endophyte research, metabolite detection and bioactivity-based assays to explore endophytes. Endophytes with phytohormones-producing potential and their role in plant —microbial interactions under stress are also discussed. The book also highlights novel strategies to tap into the hidden potential of endophytic fungi for the production of novel biomolecules using an integrated approach. These microorganisms have attracted a lot of scientific attention worldwide because of their huge potential for novel phytochemicals, pharmaceuticals and lead compounds. Hundreds of new novel endophytic fungi have been isolated, identified and systematically studied in last decade. However, this is the first of its kind, systematic compilation of potential biotechnological applications of endophytic compounds. Chapter contributions from groups across the globe make this book very up-to-date and informative. This book is very useful and interesting for students and researchers in the field of microbiology, plant sciences, mycology and pharmacology. It is also helpful for industry experts working on developing novel compounds. Microbes are robust and promiscuous machines for the biosynthesis of antimicrobial compounds which combat serious crop and human pathogens. A special subset of microbes that inhabit internal plant tissues without causing disease are

referred to as endophytes. Endophytes can protect their hosts against pathogens. I hypothesized that plants which grow without synthetic pesticides, including the wild and ancient relatives of modern crops, and the marginalized crops grown by subsistence farmers, host endophytes that have co-evolved to combat host-specific pathogens. To test this hypothesis, I explored endophytes within the ancient Afro-Indian crop finger millet, and diverse maize/teosinte genotypes from the Americas, for anti-fungal activity against Fusarium graminearum. F. graminearum leads to devastating diseases in cereals including maize and wheat and is associated with accumulation of mycotoxins including deoxynivalenol (DON). I have identified fungal and bacterial endophytes, their secreted natural products and/or genes with anti-Fusarium activity from both maize and finger millet. I have shown that some of these endophytes can efficiently suppress F. graminearum in planta and dramatically reduce DON during seed storage when introduced into modern maize and wheat. The most exciting discovery of my research is that an endophytic bacterium (strain M6, Enterobacter sp.), isolated from the roots of finger millet, builds a remarkable physical barrier consisting of bacterial micro-colonies that protect the host against pathogen invasion. M6 creates an unusual root hair-endophyte stacking (RHESt) formation that prevents entry and/or traps the pathogen which is then killed. Tn5 mutant analysis demonstrated that the endophyte kills the fungal pathogen by using a c-di-GMP-dependent signaling network and diverse fungicides including phenazine. The endophyte has evolved an epistatic regulatory interaction to suppress an antibiotic released by Fusarium which would otherwise inhibit phenazine release into the RHESt. The end-result of this remarkable physico-chemical barrier is a reduction in levels of the mycotoxin DON, thus potentially protecting millions of subsistence farmers and their livestock. To the best of my knowledge, RHESt represents a novel plant defence mechanism and suggests the value of exploring the microbiomes of the world's ancient, orphan crops as source of endophytes with antimicrobial activity. This book discusses the latest developments in our understanding of microbial endophytes, their ecology, diversity and potential biotechnological applications. It covers all the latest advances concerning the endophytic interaction of microorganisms in a wide array of plants, reported on by experts from the entire globe. The diverse microbial community, which consists of archaeal, bacterial, fungal and protistic taxa, can be found in all plants. The endophytic lifecycle reveals how microorganisms play essential roles in plant growth, fitness and diversification. Diversity is an integral component of ecology. In soil ecology, below-ground interactions of plant and microorganisms are accomplished by endophytes, which reside in the plant’s internal tissues. The microbial world in general and endophytes in particular reflect a unique degree of genetic and functional (metabolic) diversity. Currently, significant attention is being paid to endophytic microorganisms, as their repertoire of cells and metabolites hold immense potential with regard to biotechnological applications for sustainable development. The diversity of bacterial endophytes guarantees that there are endophytes capable of forming compatible associations with all agronomically important plants, including monocots and dicots. The study of endophytes’ diverse nature in connection with biodiesel, medicinal and agriculturally important crop can lead to a better understanding of applicable facets. The topics in this dynamic field of study are so diverse and vast. This volume will benefit all botanists, microbiologists, ecologists, plant pathologists, physiologists, agronomists, molecular biologists, environmentalists, policymakers, conservationists and NGOs working to protect species and prevent the loss of biologically significant genetic material. Fungi enjoy great popularity in pharmaceutical, agricultural, and biotechnological applications. Recent advances in the decipherment of whole fungal genomes promise an acceleration of these trends. This timely book links scientists from different parts of the world who are interested in the molecular identification of fungi combined with the exploration of the fungal biodiversity in different ecosystems. It provides a compendium for scientists who rely on a rapid and reliable detection of fungal specimens in environmental as well as clinical resources in order to ensure the benefit of industrial and clinical applications. Chapters focus on the opportunities and limits of the molecular marker-mediated identification of fungi. Various methods, procedures and strategies are outlined. Furthermore, the book offers an update of the current progress in the development of fungal molecular techniques, and draws attention to potential and associated problems, as well as integrating theory and practice. Discusses the role of endophytes in food security, forestry and health. It outlines their general biology, spanning theory to practice. Found in every plant species, the diversity of endophytic micro-organisms can be extremely high within different plant organs and tissue types. In trees, their ecological roles with respect to host tree can vary from latent pathogens or saprophytes to neutral commensalists and mutualists. Given their high diversity, and their bio-active nature, endophytes are currently being associated with a role in tree health against insect herbivores and fungal pathogens, as well as improving tree properties in phytoremediation. Meanwhile there is increasing interest in the potential of some tree endophytes as new sources of drug compounds. The first book on tree endophytes in several years, and containing contributions from leading authors in the field, this book provides an important reference text for professional researchers and advanced students. Microbial Endophytes: Prospects for Sustainable Agriculture discusses the practical and theoretical aspects regarding the use of endophytic microorganisms in agriculture, providing insights on the biotechnological applications associated with long-term crop production. Chapters deal with the various aspects of endophytic microorganisms, including isolation, enumeration, characterization procedures, diversity analysis, and their role as biofertilizer, biocontrol agent and microbial inoculants. Framed to discuss the present and future potential of microbial endophytes in biotic and abiotic stress management, bioremediation, bioactive compounds production, and in nanotechnology, this book provides a single-volume resource that will be valuable to academics and researchers interested in microbiology, agricultural sciences and biotechnology. Explores aspects of sustainable agriculture by using endophytic microorganism such as bacteria, fungi and actinobacteria Presents insights into the use of endophytes as biofertilizer and biocontrol agents in sustainable agriculture Relates endophyte organisms and nano-technology Strains MS455 and MS389, endophytic bacteria, were isolated from healthy soybean plant growing adjacent to a patch of plants affected by charcoal rot disease, caused by the fungal pathogen Macrophomina phaseolina. The complete genomes of both strains were sequenced and identified as Burkholderia species Strain MS455 exhibits broad-spectrum antifungal activities against economically important pathogens, including Aspergillus flavus. Random and site-specific mutations were employed in discovery of the genes that share high homology to the ocf gene cluster of Burkholderia contaminans strain MS14, which is responsible for production of the antifungal compound occidiofungin. RNA-seq analysis demonstrated ORF1, a homolog to the ambR1 LuxR-type regulatory gene, not only regulates occidiofungin biosynthesis in MS455, but also involved in expression of multiple genes, especially those involved in ornibactin biosynthesis. Plate and corn kernel assays showed that growth of A. flavus and aflatoxin production were reduced significantly by MS455 as compared with buffer control and the ORF1 mutant. Strain MS389 shows significant antifungal and antibacterial activities as well. Mutagenesis study identified that the TatC gene, an important unit of twin-arginine translocase (Tat) secretion system, and the LysR-type transcriptional regulatory gene were essential for the antifungal activity of strain MS389. RNA-seq analysis implied that the pyrrolnitrin biosynthesis gene cluster and an uncharacterized NRPS / PKS gene cluster were involved in antifungal activity. By comparing several endophytic bacteria of Burkholderia, including MS455 and MS389, to pathogenic Burkholderia species, endophytic bacteria were observed to harbor multiple antimicrobial biosynthesis genes but lack certain pathogenic or virulence genes. The potential endophytic behavior related genes and characteristics related to antibiotic resistance, secretion system, and CRISPR-Cas profiles were well established. The research findings on strains MS455 and MS389 have provided important genetic clues for understanding their molecular mechanism of antimicrobial activities and exhibited their potential possibility as biocontrol agents. This volume provides basic insight and protocols relating to endophytic microbes. Chapter are divided into five major sections detailing basic isolation, bioactive metabolites production. endophytism, isolation and identification of endophytes, bioactive potentials, and screening of metabolites. Authoritative and cutting-edge, Endophytic Microbes: Isolation, Identification, and Bioactive Potentials aims to provide comprehensive and accessible methods to undergraduate, graduate, and established scientist. This book is a printed edition of the Special Issue "Fungal Endophytes in Plants" that was published in JoF Forty-seven actinomycetes were isolated from leaves, stems and roots of seven medicinal plants, Catharanthus roseus, Stemona sp., Phyllanthus amarus, Pseuderanthemum graciliflorum, Phyllanthuspulcher, Vernoniacinerea and Ophiorrhiza sp. by using starch-casein, humic acid-vitamin and water agar. They were identified as Streptomyces (14 isolates), Amycolatopsis (1 isolate), Nocardia (5 isolates), Micromonospora (6 isolates), Microbispora (15 isolates) and Nonomuraea (6 isolates) based on phenotypic and genotypic characteristics. On the basis of 16S rRNA gene sequences analysis, Streptomyces (2 isolates), PA1-07 was similar to Streptomyces curacoi JCM 4219T (98.75%) while VC1-01 was similar to S. coelurescens JCM 4360T (99.04%). Amycolatopsis (1 isolate), ST1-08 was similar to Amycolatopsis pretoriensis JCM 12673T (99.17%). Nocardia (1 isolate), ST1-06 was similar to Nocardia araoensis JCM 12118T (99.03%).

Microbispora (7 isolates), CR1-01, CR1-04, CR1-07, CR1-08 and CR1-11 were similar to Microbispora rosea subsp. rosea JCM 3006T (98.83-99.17%) while CR1-09 was similar to M. hainanensis JCM 19666T (98.98-99.93%) and OH1-01 was similar to M. corallina JCM 10267T (98.96%). Nonomuraea (1 isolate), PA1-10 was similar to Nonomuraea candida JCM 15928T (98.31%). The ethyl acetate extract of these isolates were screened for antimicrobial activity based on disc diffusion method. The crude extract of CR1-01 and CR1-08 showed antibacterial activity against Staphylococcus aureus ATCC 6538. The crude extract of CR1-01 and CR1-05 showed against Kocuria rhizophila ATCC 9341. Whereas, the crude extract of ST1-02 and ST1-05 exhibited against Candida albicans ATCC 10231. This book reviews the latest developments in our understanding of microbial endophytes and their potential applications in enhancing productivity and disease protection. It covers all the latest discoveries regarding endophytes, their interactions with plants and application in agricultural productivity and protection. Our understanding of endophytes has increased exponentially in recent decades. These microbes, such as fungi, bacteria, and actinobacteria, establish a symbiotic or parasitic association with plants. A better understanding of endophytic microorganisms may help to elucidate their functions and potential role in developing sustainable systems of crop production and improved protection against biotic stresses. Endophytes play a vital role in plant growth and health promotion. Endophytic bacteria are of agrobiological interest because they create host-endophyte relationships, which can open exciting prospects for newer biotechnological applications. Endophytes have also proven to be a beneficial and sustainable alternative to agrochemicals due to their role in the biocontrol of pests and diseases. Further, endophytes are essential to the production of several secondary metabolites in grasses, in the process of gummosis in trees, and the production of useful metabolites such as alkaloids, pestaloside, cryptocandin, enfumafungin, subglutinols, etc. for the host plant. They are also involved in the production of enzymes, biosurfactants, biocontrol agents and plant growth promoters. As such, it is imperative that we explore these products' industrial applications in the fields of biotechnology, pharmacy and agriculture. This volume will offers a valuable guidance for botanists, microbiologists, biotechnologists, molecular biologists, environmentalists, policymakers, conservationists, and those working for the protection of plant species of agricultural and medicinal importance. Endophytes are a group of microorganisms that do not cause obvious disease symptoms to the host plants and include endophytic bacteria, endophytic fungi and endophytic actinomycetes. Among them, endophytic fungi belong to ascomycetes and are widely distributed in mosses, ferns, shrubs, algae, herbs, angiosperms and gymnosperms. Endophytic fungi establish a good mutualistic relationship with their hosts, which is reflected in accelerating plant growth, promoting nutrient uptake, and enhancing resistance to stress. On the other hand, many endophytic fungi produce some secondary metabolites such as alkaloids, terpenoids, polysaccharides, phenols, etc., and thus have some pharmacological interventions and therapeutic effects with significant efficacy. The present book revolves around the introduction and potential functions of endophytic fungi in the field. The book presents four important sections, including (i) the introduction of endophytic fungi, (ii) diversity and antimicrobial activity of endophytic fungi from mangrove forests, (iii) positive effects of arbuscular mycorrhizal fungi on ornamental plants, and (iv) potential application and assessment of arbuscular mycorrhizal fungi on fruit trees, vegetable crops, and ornamental crops.This book can provide important support for graduate students and researchers in the study of endophytic fungi. On the other hand, the book also summarizes some new advances, especially in pharmacological interventions of endophytic fungi. Endophytes are commonly known as microorganisms, mainly bacteria and fungi, which live inside plant tissues without inducing symptoms. Considering the long-lived trees, endophytes have a fundamental role in preparing their hosts to face extreme weather conditions, drought, heat, cold, and pathogen and herbivore attacks. The current knowledge clearly demonstrates the importance of endophytes in shaping the plant diversity in a forest. Endophytes have an important capacity for biocontrol of forest diseases. Considering endophyte diversity and the range of various compounds and enzymes they can produce, endophytes can be used for various biotechnological applications. This book is a comprehensive account of recent advances in the endophytic research. It covers recent perspective of endophytic research, molecular diversity, bioprospecting of novel genes using high throughput molecular techniques, and most importantly application of endophytes in practicing sustainable agriculture. Endophytic micro-organisms are mysterious living component associated mutually with plant roots and soil microbes. Various endophytic bacteria have attracted considerable attention for their ability to promote plant growth through direct mechanisms or by acting as biocontrol agents. Endophytes also find use in biocontrol, medicine, agriculture and food industry. This is a useful reading for the student of agriculture, environmental microbiology and biotechnology. The challenges to meet the food requirement of the burgeoning population and stabilized productivity of agriculture lands can only be met by a second green revolution. After steadily declining for over a decade hunger is on the rise again, affecting million people of the global population. Therefore, crop yields must be increased substantially over the coming decades to keep pace with global food demand. The plant rhizosphere is a multidimensional and dynamic ecological environment of complicated microbe–plant interactions for harnessing essential macro and micronutrients from a limited nutrient pool. This book will showcase naturally-occurring endophyte which can be explored for nutrient mineralization and mobilization for sustainable agriculture. This will cover recent trends, prospects, critical commentaries and advancement in the research area focusing on naturally-occurring beneficial endophytic microbes. Thus, it is proposed to bring out new scientific insights and frontiers of research that have exploration of endophyte for mineral nutrient management in soil and crops. The chapters are contributed by leading scientists across the globe. The book will be useful to agronomists, microbiologists, ecologists, plant pathologists, molecular biologists, environmentalists, policy makers, conservationists, and NGOs working for the crop production and productivity development and consequently over all agricultural significance. Endophytic fungus inhabits such as biotopes. Many endophytic fungi and their metabolites have been reported to have insecticidal and fungicidal activity. Biological approach using an endophytic fungus is a novel way towards the development of safe, environmental friendly, viable and green method for the synthesis of silver nanoparticles in the field of nanotechnology. Several species of endophytes are able to synthesize nanoparticles with potential antimicrobial activity. In the present work, a single step environmental friendly approach is employed to synthesize silver nanoparticles. We have investigated biosynthesis of silver nanoparticles using endophytic fungus Aspergillus fumigatus isolated from the leaves of Cannabis sativa and have achieved rapid formation of silver nanoparticles in a short duration.Furthermore, the antimicrobial potential of AgNPs was systematically evaluated. The synthesized AgNPs could efficiently inhibit various clinically isolated pathogens like E. coli, S. albus, Klebsiella pneumoniae and Enterococcus sp. The current research opens a new avenue for the green synthesis of nano-materials. This pioneering book focuses on Neotropical endophytic fungi, providing a comprehensive overview of their diversity, ecology, and biotechnological applications in medicine, agriculture, and industry. Despite their rich diversity, the endophytic fungi associated with plants of Central and South American biomes remain largely unknown. The book addresses that knowledge gap by offering insights into Neotropic endophytic fungal community. This book describes about endophytic fungi and their antagonistic and plant growth promoting activity. Fungal endophytes can colonize internal plant tissues without causing apparent harm to their host plant. In modern agriculture, pesticide application is still an invaluable and effective method to control plant diseases. Use of agrochemicals is falling into disfavor because of environmental pollution and detrimental effects on a variety of non target organisms; potential use of microbes based biocontrol agents as replacement or supplements for agrochemicals has been addressed in many recent reports. In that context, we isolated and identified fungal endophytes from living symptomless tissues of eight different medicinal plants in Korea, investigated antifungal activity against seven plant pathogenic fungi in vitro and evaluated in vivo the selected twelve plant growth promoting fungi for growth enhancement of cucumber, tomato and pepper in the green house condition. Biocontrol Mechanisms of Endophytic Microorganisms introduces endophytic microorganisms, colonization, diversity and distribution, describes the isolation and identification of endophytic microorganisms by traditional cultivation and by next generation sequencing technologies, and covers biocontrol mechanisms, bacterial priming, endophytic based methods, the significance on fungi, and metabolite based formulations. The book concludes with chapters on biofilms, microbiota and safety issues of microorganisms. The intensive use of chemicals to control these plant pathogens has resulted in negative consequences such as the release of toxic chemicals in the environment, reduced soil fertility and human health problems. Therefore, environmentally-friendly and sustainable replacement of chemical fertilizers or pesticides is highly challenging. Contains exclusive information about research on immunogenetics going on all over the world Includes all the minute and recent details that will be the prerequisite requirement for any researcher who wants to work on immunogenetics and its applications Comes fully-equipped with pictures, illustrations and tables, delivering the information in a meticulous

manner that makes it more attractive to readers This volume, Endophyte Biology: Recent Findings from the Kashmir Himalayas, is a unique compilation of the original, latest, and updated information on endophyte biology of the Kashmir Himalayas. The book presents an introduction to and definition of endophytes, the endophytic diversity of some important plants of the Kashmir Himalayas, bioprospection of endophytes for various drug metabolites, sustainable agriculture, and more. This book discusses the applications of endophytes in the agriculture, aroma, and pharmaceutical industries. Endophyte biology, the study of microorganisms, often fungi and bacteria, which live within living plant tissues, is an emerging discipline of science with a multitude of applications in ecology, agriculture, and industry. Despite having huge diversity of plants, the information about the endophyte biology is still in its infancy in this part of the world, and this book is an attempt to bridge the information gap on endophyte biology pertaining to the Kashmir Himalayas. This book will serve as a manual for research scholars as it presents the methodologies and techniques involved in endophyte biology research that can be applied in other regions of the world. Supplemented with illustrations, figures, and tables, the volume is a valuable reference for teachers and students at graduate and undergraduate level in colleges and universities as well as for scientists, researchers, and others. The purpose of this research was to isolate bioactive compounds from endophytic fungi isolated from Kaemperia parviflora leaves were collected from 3 provinces in Thailand. The endophytic fungi were isolated using surface-sterillization technique and obtained 36 isolates. All isolates were examined antimicrobial activity using dual culture agar diffusion technique. Endophytic fungus isolate KPCH007 cultured on malt extract agar had the best antimicrobial activity because it can inhibited the growth of test gram positive Bacillus subtilis, Staphylococcus aureus and negative bacteria Pseudomonas aeruginosa. Based on morphology and nucleotide sequencing analysis of ITS regions of rDNA, endophytic fungus isolate KPCH007 was identified as Alternaria tenuissima. Isolation of culture broth EtOAc crude extract of endophytic fungus isolate KPCH007 cultivated in malt extract broth gave compound 1, compound 2 and compound 3. Isolation of mycelia EtOAc crude extract gave mixture 4, mixture 5 and compound 6. The structure elucidation of these compounds was achieved by analysis of spectroscopic data and physical properties. Compound 1 was identified as 1-methyl-2-pyrrolidone. Compound 2 was identified as dehydroaltenusin. Compound 3 was identified as 1,6-dihydroxy-3-methoxy-8-methyl-9H-xanthen-9-one. From the mycelia ; Mixture 4 was obtained as yellow liquid and it was identified as a mixture of triglycerides. Mixture 5 was a mixture of macrosporin and alternariol-9-methyl ether and Compound 6 was identified as alternariol-9-methyl ether. Antimicrobial activities and cytotoxicity of the pure compound were tested. For antimicrobial activities, Compound 1 was found to exhibit activity against B. subtilis , S. aureus, P. aeruginosa and E. coli. with the MIC value of 31.25, 31.25, 62.50 and 62.50 microgram/ml. Mixture 5 was found to exhibit activity against all four bacteria with the MIC value of 125, 250, 250, and 250 microgram/ml. Compound 6 was found to exhibit activity against all four bacteria with the MIC value of 62.50, 62.50, 125, 125 microgram/ml and inhibited C. albicans at 250 microgram/ml., respectively. In addition, compound 1 can exhibited cytotoxic activities against SW620 (colon), BT474 (breast), KATO-3 (gastric), HEP-G2 (hepatoma) and CHAGO (lung) cell line with IC[subscript 50] >10, >10, >10, >10, 8.4 microgram/ml, Compound 3 with IC[subscript 50] >10, 7.4, >10, >10, >10 microgram/ml, Mixture 5 with IC[subscript 50] >10, 6.4, >10, 10, >10 microgram/ml and Compound 6 with IC[subscript 50] 10, 6.4, 8.8, 7.9 and 10 microgram/ml, respectively. This book considered the biological, ecological, toxicology, and chemical aspects of research topics as they relate to endophytes of grasses. Several chapters reflect the very pragmatic applications of endophytes and endophyte-infected grasses. Other chapters offer future applications for endophytes and are therefore discussed from theoretical viewpoints. This book contains the collective writings of an international group of experts on fungal endophytes of grasses, all of whom are directed toward, understanding, creating, and exploiting the positive aspects of endophytes. With this book, we are attempting to stimulate and facilitate future explorations of the grass endophytes. This book focuses on the importance and roles of seed microbiomes in sustainable agriculture by exploring the diversity of microbes vectored on and within seeds of both cultivated and non-cultivated plants. It provides essential insights into how seeds can be adapted to enhance microbiome vectoring, how damaged seed microbiomes can be assembled again and how seed microbiomes can be conserved. Plant seeds carry not only embryos and nutrients to fuel early seedling growth, but also microbes that modulate development, soil nutrient acquisition, and defense against pathogens and other stressors. Many of these microbes (bacteria and fungi) become endophytic, entering into the tissues of plants, and typically exist within plants without inducing negative effects. Although they have been reported in all plants examined to date, the extent to which plants rely on seed vectored microbiomes to enhance seedling competitiveness and survival is largely unappreciated. How microbes function to increase the fitness of seedlings is also little understood. The book is a unique and important resource for researchers and students in microbial ecology and biotechnology. Further, it appeals to applied academic and industrial agriculturists interested in increasing crop health and yield. Microbial Endophytes: Functional Biology and Applications focuses on endophytic bacteria and fungi, including information on foundational endophytes and the latest advances in relevant genomics, proteomics and nanotechnological aspects. The book provides insights into the molecular aspects of plant endophytes and their interactions and applications, also exploring the potential commercialization of endophytic microorganisms and their use as bio fertilizers, in biocontrol, and as bioactive compounds for other sustainable applications. Coverage of important and emerging legal considerations relevant to those working to implement these important bacteria in production processes is also included. Presents discussion on entry, colonization and the distribution of endophytic microorganisms Explores the phyto immunological functions of endophytic microorganisms Provides genomic insights on plant endophyte interaction Identifies bio-commercial aspects of microbial endophytes for sustainable agriculture, including potential legal issues and IPR in microbial research "With this study, we explored the potential role of fungal endophytes in the antimicrobial activity of the medicinal plant goldenseal, Hydrastis canadensis L. (Ranunculaceae). A total of 23 fungal cultures were obtained from surface-sterilized samples of H. canadensis roots, leaves and seeds. Eleven secondary metabolites were isolated from these fungal endophytes, five of which had reported antimicrobial activity. Hydrastis canadensis plant material from the same harvest was analyzed for the presence of fungal metabolites using liquid chromatography coupled to high resolving power mass spectrometry. One fungal metabolite, the antimicrobial compound alternariol monomethyl ether, was detected both as a metabolite of the fungal endophyte Alternaria sp. isolated from H. canadensis seeds and as a component of an extract from the H. canadensis seed material. The concentration of this compound (991 ppm in dry seed material) was in a similar range that has previously been reported for metabolites of ecologically important fungal endophytes. The seed extracts themselves, however, possessed no significant antimicrobial activity."--Abstract from author supplied metadata. Endophytic fungi are important biotechnological tools because they produce many secondary metabolites. However, to access this important source of bioactive molecules, it is essential to explore the diversity of endophytic fungi and catalog their species richness in different ecosystems. This book reviews the diversity, characterisation and biocontrol of endophytic fungi. Latent infection vs. endophytic colonization by fungi; Isolation and analysis of endophytic fungal communities from woody plants; Fungal endophytes of living branch bases in several european tree species; Ecological and physiological aspects of host specificity in endophytic fungi; Coastal redwood leaf endophytes: their occurrence, interactions and response to host volatile terpenoids; Fungal endophytes of palms; Morphological and physiological adaptation of balansieae and trends in the evolution of grass endophytes.