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Biostimulants in Alleviation of Metal Toxicity in PlantsNew and Future Developments in Microbial Biotechnology and BioengineeringBioprocessing Technology in Food and Health: Potential Applications and Emerging ScopeA Manual for Dryland Afforestation and ManagementSubsoil Constraints for Crop ProductionDiversity and Biotechnology of Extremophilic Microorganisms from IndiaMicrobial Diversity and Biotechnology in Food SecurityTrichoderma And Gliocladium. Volume 1Dispersal of Trichoderma Harzianum in Container MediaMechanism of Action of Trichoderma Harzianum in Soilless CultureStudies on the Ecology of Trichoderma Harzianum in Natural SoilTrichoderma And Gliocladium, Volume 2Morphology and Molecular Descriptions of Trichoderma HarzianumTrichoderma and GliocladiumTrichoderma And GliocladiumChitinolytic System in Trichoderma HarzianumEfficacy of Trichoderma Harzianum as a Biocontrol for Sclerotium RolfsiiTrichoderma Harzianum Strain T-22Biological Studies of Trichoderma Harzianum and Its in Vitro Antagonicity Against 3 Root PathogensImage Analysis of Green Fluorescent Protein Tagged Trichoderma Harzianum in Soil and a Molecular Comparison of Conserved Genes in T. Harzianum and Fusarium Oxysporum Sarvajeet Singh Gill Ram Prasad Deepak Kumar Verma G. Singh Teogenes Senna de Oliveira Pradnya Pralhad Kanekar R.N. Kharwar Gary E. Harman GyeSoon Jeong Kim Walid Nosir Darin Matthew Eastburn Gary E. Harman Shafiquzzaman Siddiquee Christian P. Kubicek Gary E. Harman Cirano Jose Ulhoa Homer Douglas Wells Kasturi Ratana Singaram Kati Orr

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biostimulants in alleviation of metal toxicity in plants emerging trends and opportunities focuses on the role of substances or micro organisms whose presence can address issues of metal contamination in soils seeds and plants including a range of biostimulant tools the book highlights both endogenous and exogenous application written and edited by a global team of experts this book presents an overview on biostimulants in determining metal toxicity as plants encounter a wide range of environmental challenges during their lifecycle among which metal toxicity is a common form of abiotic stress this book thoroughly covers important topics on the subject matter once inside a plant system toxic metals may initiate a variety of physiological alterations in plants including adversely impacted seed germination root and shoot growth chloroplasts ultrastructure and photosynthesis nutrients assimilation carbohydrates metabolism and plant hormonal status which collectively results in reduced plants yields in addition to several naturally occurring physiological and metabolic re programing responses plants may also modify their root and shoot systems in order to dilute entered amount of toxic metals as an additional tool biostimulants have emerged as one of the important plant protectors under adverse conditions includes endogenous and exogenous application of biostimulants focuses on use based on specific metal contamination presents forward looking prospects for the use of biostimulants in plant health protection

crop improvement through microbial biotechnology explains how certain techniques can be used to manipulate plant growth and development focusing on the cross kingdom transfer of genes to incorporate novel phenotypes in plants including the utilization of microbes at every step from cloning and characterization to the production of a genetically engineered plant this book covers microbial biotechnology in sustainable agriculture aiming to improve crop productivity under stress conditions it includes sections on genes encoding avirulence factors of bacteria and fungi viral coat proteins of plant viruses chitinase from fungi virulence factors from nematodes and mycoplasma insecticidal toxins from bacillus thuringiensis and herbicide tolerance enzymes from bacteria introduces the principles of microbial biotechnology and its application in crop improvement lists various new developments in enhancing plant productivity and efficiency explains the mechanisms of plant microbial interactions and the beneficial use of these interactions in crop improvement explores various bacteria classes and their beneficial effects in plant growth and efficiency

the functional foods market represents one of the fastest growing and most fascinating areas of investigation and innovation in the food sector this new volume focuses on recent findings new research trends and emerging technologies in bioprocessing making use of microorganisms in the production of food with health and nutritional benefits the volume is divided into three main parts part i discusses functional food production and human health looking at some newly emerged

bioprocessing technological advances in the functional foods chocolates whey beverages in conjunction their prospective health benefits part ii on emerging applications of microorganism in safe food production covers recent breakthroughs in food safety in microbial bioprocessing chapters discuss spoilage issues harmful pathogenic microorganisms genetically modified microorganisms stability and functionality and potential of food grade microbes for biodegradation of toxic compounds such as mycotoxins pesticides and polycyclic hydrocarbons chapters in part iii on emerging scope and potential application in the dairy and food industry explore and investigate the current shortcomings and challenges of the microbially mediated processes at the industrial level the editors have brought together a group of outstanding international contributors at the forefront of bioprocessing technology to produce a valuable resource for researchers faculty students food nutrition and health practitioners and all those working in the dairy food and nutraceutical industries especially in the development of functional foods

community oriented conservation of natural resources and promotion and protection of trees in drylands are examples to deal with climatic adversities this book provides knowledge on climatic ecological social and economic condition of dry areas and lay out approaches and strategies to restore degraded lands there are 15 chapters and first five deals with physiography of rajasthan drylands ecology problems of land degradation its economic evaluation and the approaches and strategies of restoration and rehabilitation next two chapters describe the problems of sand drift salinity water logging and effluent inflicted areas and strategies to control them chapters 8 10 deal with seed production quality planting materials genetic improvement propagation and planting techniques chapters 11 12 describe methods of rain water harvesting and irrigation and resources conservation for seed sowing and favouring regeneration and successions effective management of pests diseases in nurseries and plantation growth and yield prediction equations and models and people s perception and participation in managing forest resources have been described in last 3 chapters purpose of this publication is to strengthen the forest functionaries and readers with wide ranging knowledge on land degradation desertification and eco biology of drylands and methods to restore and rehabilitate degrading forest lands to increase forest cover enhance resilience and people livelihoods and improve environmental conditions academician researchers forest managers non government organizations extension agents and environmentalists can use it in developing conserving and managing drylands ecosystems for its long lasting beneficial effects this book is also useful to policy makers in effective planning of restoring protecting and conserving dryland s ecological and socioeconomic services

this book will address the major subsoil physical and chemical constraints and their implications to crop production plant growth is often restricted by adverse physical and chemical properties of subsoils yet these limitations are not revealed by testing surface soils and hence their significance in crop management is often overlooked the major constraints can be physical or chemical physical limitations such as poor

nil subsoil structure sandy subsoils that do not provide adequate water or gravelly subsoils and etc on the other hand chemical constraints include acidity alkalinity high extractable al or mn low nutrient availability salts boron toxicity and pyritic subsoils some of these constraints are inherent properties of the soil profile while others are induced by crop and soil management practices this aim of this book is to define the constraints and discuss amelioration practices and benefits for crop production this book will be of interest to readers involved with agriculture and soil sciences in laboratory applied or classroom settings

this authored book collates information on extremophilic microorganisms from around the world with special emphasis on india the main focus of this book is to describe extreme environments as the habitats of these microorganisms mechanisms of the extremophiles to cope up with the surrounding environment new taxa created their physiological properties their biotechnological potential in the production of different biomolecules and biomaterials and their role in sustainability the concept of the book is to have comprehensive information on the diversity of microorganisms in one place the purpose of the present book is to make aware young researchers of the attempts made so far to isolate these different microbes inspire them to revisit the extreme environments investigate their biodiversity using advanced molecular techniques and explore further their biotechnological potential this book is of interest to post graduate students young researchers of india as well as other countries it is useful reading material for researchers involved in environmental microbiology microbial diversity microbial systematics microbial culture collections molecular taxonomy and microbial biotechnology

the roles of microbes in agriculture industry and environment have been the point of interest since long time for their potential exploitation although only a fraction of microbial diversity was accessed by microbiologists earlier for harnessing them owing to limited techniques available the molecular techniques have opened new vistas to access the wide field of the unexplored microbes and their exploitation for useful genes and novel metabolites sincere efforts have been made in biotechnology using microbes leading to improve our life with respect to agriculture and people health this comprehensive volume covers different aspects of microbial biotechnology and its management in sustainable agriculture for food security and improved human health the book comprises four sections endophytes and mycorrhizae microbial diversity and plant protection microbial functions and biotechnology and microbes and the environment which contain 53 chapters the book examines the aspects on endophytes and mycorrhizae bioactive compounds growth promoting microorganisms disease management with emphasis on biocontrol genetics of disease resistance microbial enzymes advances in potential of microbes and their industrial as well as pharmaceutical applications in addition the use of botanicals and the etiology and management of medicinal and aromatic plants in the post harvest management have been reviewed in greater depth for the benefit of teaching and research community the biotechnological developments using microbe potential have enabled us combat the environment and human health

problems worldwide in ecofriendly manner we are sure that this volume will be highly useful to all those concerned with fungi bacteria viruses and their biology including environmental and public health officers and professionals in the field of interest the volume is an exhaustive coverage of almost all the aspects of microbial biology andbiotechnology

this volume gives an account of the morphology and taxonomy of trichoderma and gliocladium before disscusing their ecology and basic biology

fungal species belonging to the genus trichoderma are worldwide in occurrence and easily isolated from soil and other forms of plant organic matter rapid growth rate in culture and the production of numerous spores conidia also trichoderma are a rich source of secondary metabolites this has culminated in the commercial production of several trichoderma species for the protection and growth enhancement of a number of crops in soil or soilless culture one of the most interesting aspects of the science of biological control is the study of the mechanisms employed by biocontrol agents to affect disease control and enhance plant growth past research indicates that the mechanisms are many and varied even within the genus trichoderma in order to make the most effective use of biocontrol agents for the control of plant disease

fungi belonging to the genera trichoderma and gliocladium are soil bourne saprophytes which have been used for industrial and agricultural applications for decades some strains produce enzymes and antibiotics while others are useful as biological agents for the protection of plants against pathogens

the fungus trichoderma harzianum hypocrea ascomycota hypocreales hypocreaceae is an ubiquitous species in the worldwide with some strains e g strains t32 fa30 commercially exploited for the biological control of plant pathogenic fungi t harzianum is asexual anamorphic its sexual stage teleomorph has described as hypocrea lixii the comprehensive treaties of t harzianum was described various multidisciplinary approaches using physiological and biochemical techniques molecular characteristics including phenotype and genotype and determination of volatile compounds by gas chromatography mass spectrometry gc ms together with classic morphological criteria to disclose the authentic species of t harzianum this book inside unique study tools have widely helped such as researchers professionals and students gain sundry knowledge of t harzianum through its enzymes volatile metabolites molecular biology and biological activities

fungi belonging to the genera trichoderma and gliocladium are soil bourne saprophytes which have been used for industrial and agricultural applications for decades some strains produce enzymes and antibiotics while others are useful as biological agents for the protection of plants against pathogens this second volume of two describes the commercial uses of trichoderma and gliocladium beginning with an in depth discussion of the degradation of polysaccharides and macromolecules by

fungal enzymes the application of the fungi in biocontrol for agricultural purposes is then examined the final section of this volume deals with protein production and the utilisation of trichoderma enzymes by various industries

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