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Numbering 92 species worldwide, members of the order Lagomorpha are familiar to people throughout the world, and yet their remarkable diversity and ecological importance are often underappreciated. In this book, Andrew T. Smith and his colleagues bring together the world's lagomorph experts to produce the most comprehensive reference on the order ever published, featuring detailed species accounts, stunning color photos, and up-to-date range maps. Contributors highlight the key ecological roles that lagomorphs play and explain in depth how scientists around the globe are working to save vulnerable populations. Thematic introductory chapters cover a broad spectrum of information about pikas, rabbits, and hares, from evolution and systematics to diseases and conservation. Each animal account begins with the complete scientific and common names for the species, followed by a detailed description of appearance and unique morphological characteristics, including a range of standard measurements of adult specimens. Subsequent sections discuss known paleontological data concerning the species, the current state of its taxonomy, and geographic variation. Each account also includes dedicated sections on habitat and diet, reproduction and development, ecology, behavior, and management. The definitive work on lagomorphs, this book is an invaluable reference for naturalists, professional biologists, and students. It will also be beneficial for those conducting biodiversity surveys and conservation throughout the world.

Metagenomics: Perspectives, Methods, and Applications provides thorough coverage of the growing field of metagenomics. A diverse range of chapters from international experts offer an introduction to the field and examine methods for metagenomic analysis of microbiota, metagenomic computational tools, and recent metagenomic studies in various environments. The emphasis on application makes this text particularly useful for applied researchers, practitioners, clinicians and students seeking to employ metagenomic approaches to advance knowledge in the biomedical and life sciences. Case-study based application chapters examine topics ranging from viral metagenome profiling, metagenomics in oral disease and health, metagenomic insights into the human gut microbiome and metabolic syndromes, and more. Additionally, perspectives on future potential at the end of each chapter provoke new thought and motivations for continued study in this exciting and fruitful research area. Provides thorough coverage of the rapidly growing field of metagenomics, with an emphasis on applications of relevance to translational researchers, practitioners, clinicians and students Features a diverse range of chapters from international experts that offer an introduction to the field and examine methods for metagenomic analysis of microbiota, metagenomic computational tools and research pipelines Highlights perspectives on future potential at the end of each chapter to provoke new thought and motivations for continued study in this exciting and fruitful research area

This book is the out come from the personnel's who have their foot in microbiology science last two decades. It's a collection of almost a dozen of sister concerned disciplines in microbiology. It includes more than 6900 terms related to microbiology. This book will become and essential book to all who have some bearing with microbiology and fields like mycology, bacteriology, virology,

microbe-biotechnology, parasitology etc.

Extremophiles are organisms that are able to live in extreme conditions due to their unique physiological and genetic adaptations. Extremophiles are harnessed for their extremozymes that have wide applications in biotechnology, pharmaceuticals, and industry. Recent developments in genomics and proteomics have helped unravel the mechanism of survival, physiological adaptation, and genomics structure of extremophiles. *Physiology, Genomics, and Biotechnological Applications of Extremophiles* covers innovative developments in understanding the physiology and biochemistry of extremophiles using the -omics perspective, focuses on the advancement in mechanisms of the extremophiles that makes them able to survive under extreme conditions, and discusses the applications of extremophiles in astrobiology. Covering topics such as genomics and the history and identification of extremophiles, it is ideal for students, professors, researchers, academicians, microbiologists, agricultural scientists, and biotechnologists.

This book, first of this new two-volume set, provides an informative tour of the basics of biotechnology to recent advances in biotechnology. Knowledge of new and fresh approaches is a prerequisite to solving plant biological problems, and to this end, the editors have brought together a group of contributors who address the most recent techniques and their applications in plant biotechnology. The chapters discuss some recent techniques such as TILLING (Targeting Induced Local Lesions In Genomes), advances in molecular techniques to study diversity, protein purification, and methods and analysis in protein-protein interaction detection. The volume also covers molecular markers and QTL mapping, including four chapters that deal with different molecular markers, development of mapping populations, and association mapping for dissecting the genetic basis of complex traits in plants in sufficient detail. The knowledge of biotechnology techniques and their applications will be valuable for researchers and scientists as well as for the many students engaged in plant biotechnology studies.

Marine bioprospecting is a highly topical subject - in both applied and basic research - but, as yet, the marine ecosystem is a relatively unexplored source of natural bioactive substances with potential therapeutic activity. This book addresses the use of marine enzymes in biocatalysis through a series of chapters from leading scientists within academic and industrial fields.

Biocatalytic processes can take advantage of the habitat-related properties of marine enzymes, such as salt tolerance, hyperthermostability, barophilicity, cold adaptivity, and so on, whilst also taking into consideration substrate specificity and affinity. These evolved properties are linked to the metabolic functions of the enzymes and to the ecological aspects of the natural source. New properties can also be discovered at the molecular level of catalysis, particularly concerning the stereochemical characteristics of products. *Marine enzymes for biocatalysis* initially examines the nature and level of interest in marine biological diversity, and outlines the fundamentals of biocatalysis. It goes on to detail sources of marine enzymes, and to analyse examples from both chemical and stereochemical viewpoints of catalysis, including microbial enzymes and animal or plant sources. The book goes on to explore the future potential of marine bioprospecting in biocatalysis. Compiles studies from leading scientists in a direct and accessible format. Includes practical descriptions of results, adding further details not often covered in formal articles

Takes a molecular view which fully explains the enzymatic aspects of reactions, particularly regarding biocatalytic characteristics and descriptions of bioprocesses Selects examples of chemical and stereochemical aspects of enzymatic action with respect to known terrestrial counterparts

Highly recommended by CHOICE, Oct 2018 Extremophiles are nature's ultimate survivors, thriving in environments ranging from the frozen Antarctic to abyssal hot hydrothermal vents. Their lifeforms span bacteria to fishes, and are categorized as halophiles from hypersaline environments, acidophiles from acidic waters, psychrophiles from cold habitats, and thermophiles from warm waters. Extremophiles: From Biology to Biotechnology comprehensively covers the basic biology, physiology, habitats, secondary metabolites for bioprospecting, and biotechnology of these extreme survivors. The chapters focus on the novel genetic and biochemical traits that lend these organisms to biotechnological applications. Couples studies of marine extremophile biology/genomics and extremophile culture for biotechnological applications with the latest advances in bio-prospecting and bio-product development Includes practical experiments that a laboratory can use to replicate extreme habitats for research purposes Presents latest advances in extremophile genomics to give the reader a better understanding of the regulatory mechanisms of extremophiles Offers insights into the production of commercially important extremozymes, carotenoids, bioactive compounds and secondary metabolites of medicinal value. This unique guide serves as a resource for biotechnologists who wish to explore extremophiles for their commercial potential, as well as a valuable reference for teaching undergraduate, graduate and postgraduate students.

The new volume takes an interdisciplinary look at current technical challenges and recent developmental trends in microbial biotechnology. It covers an avalanche of new information available through research by focusing on a broad spectrum of issues on different microorganisms and their recent applications and implications in agriculture, soil science and forestry, industry, and public health and medicine. Microbes present in our immediate environment have a direct or indirect influence leading to either a harmful or beneficial effect. Microbial Biotechnology: Technological Challenges and Developmental Trends is divided into four major sections that focus on Part I: Antimicrobial Agents: Role and Applications in Medicine and Health Care Part II: Role of Microorganisms in Agriculture and Plant Biotechnology Part III: Microbial Enzymes and Their Potential Industrial Applications Part IV: Microorganisms in Environment: Role and Industrial Applications Topic include organic chemistry, biomass conversion, optimal production processes for different microbes, screening methods, and application of omics approaches such as (meta) genomics, proteomics, and metabolomics, or other biotechnology tools, to provide a deeper understanding of the microbial-based new and emerging products, trends, processes, and technologies. The chapters present unbiased original research results on microbes by incorporating case studies wherever appropriate. Providing research findings applicable to the development of new methodologies, applications, and technologies, the book will be a valuable resource for people working in various fields of microbiology.

The world of halophiles is quite diverse and their representatives in three domains of life i.e. archaea, bacteria and eukarya. They

are found all over the small subunit rRNA based tree of life and these micro-organisms are adapted to salt concentration up to saturation hence able to grow at >300g/l NaCl concentration. Their metabolic diversity is high as well encompassing oxygenic and anoxygenic phototrophs, aerobic heterotrophs, denitrifiers, sulphate reducers, fermenters and methanogens. The proteins of halophiles are magnificently engineered to function in a milieu containing 2-5M salt that encodes genes represent a valuable repository and resource for reconstruction and visualizing processes of habitat selection and adaptive evolution. Search for new enzymes endowed with novel activities and enhanced stability continues to be desirable purpose for important commercial production of biotechnological significance. These poly extremophiles proved excellent source of enzymes and metabolites possessing inherent ability to function in extreme conditions of high salt, alkaline pH and facilitating catalysis for industrial application in food processing, industrial bioconversion, bioremediation etc. In fact, it has just begun to realize the great potential and true extent of diversity and suitable applications if explored them judiciously. This book highlights current applications and research on halophiles to provide a timely overview. Chapters are written by expert authors from around the world and include topics of varied importance which include their role to play in enzyme production, restoration of soil fertility and plant growth , antimicrobial and biocatalytic potential, biomolecules in nanotechnology and aspects of quorum sensing. The book is divided into three sections, dealing with biodiversity, biotechnology and sustainable exploitation of halophiles. This major new work represents a valuable source of information to all those scientists interested in microorganisms in general and extremophiles in particular with respect to their innovative products and applications.

This review of recent developments in our understanding of the role of microbes in sustainable agriculture and biotechnology covers a research area with enormous untapped potential. Chemical fertilizers, pesticides, herbicides and other agricultural inputs derived from fossil fuels have increased agricultural production, yet growing awareness and concern over their adverse effects on soil productivity and environmental quality cannot be ignored. The high cost of these products, the difficulties of meeting demand for them, and their harmful environmental legacy have encouraged scientists to develop alternative strategies to raise productivity, with microbes playing a central role in these efforts. One application is the use of soil microbes as bioinoculants for supplying nutrients and/or stimulating plant growth. Some rhizospheric microbes are known to synthesize plant growth-promoters, siderophores and antibiotics, as well as aiding phosphorous uptake. The last 40 years have seen rapid strides made in our appreciation of the diversity of environmental microbes and their possible benefits to sustainable agriculture and production. The advent of powerful new methodologies in microbial genetics, molecular biology and biotechnology has only quickened the pace of developments. The vital part played by microbes in sustaining our planet's ecosystems only adds urgency to this enquiry. Culture-dependent microbes already contribute much to human life, yet the latent potential of vast numbers of uncultured—and thus untouched—microbes, is enormous. Culture-independent metagenomic approaches employed in a variety of natural habitats have alerted us to the sheer diversity of these microbes, and resulted in the characterization of novel genes and gene products. Several new antibiotics and biocatalysts have been discovered among environmental genomes and some products have already been

commercialized. Meanwhile, dozens of industrial products currently formulated in large quantities from petrochemicals, such as ethanol, butanol, organic acids, and amino acids, are equally obtainable through microbial fermentation. Edited by a trio of recognized authorities on the subject, this survey of a fast-moving field—with so many benefits within reach—will be required reading for all those investigating ways to harness the power of microorganisms in making both agriculture and biotechnology more sustainable.

This book offers up-to-date information on different microbiomes, their community composition and interactive functions with the host, bringing together information from diverse research reports to provide an overview of the rapid developments in meta-omics technologies. It is a valuable resource for scientists, researchers, postgraduate and graduate students interested in understanding the impact and importance of next generation sequencing technologies on different hosts and their microbiomes.

This volume addresses in detail both livestock's role in climate change and the impacts of climate change on livestock production and reproduction. Apart from these cardinal principles of climate change and livestock production, this volume also examines the various strategies used to mitigate livestock-related GHG emissions, and those which can reduce the impacts of climate change on livestock production and reproduction. Presenting information and case studies collected and analyzed by professionals working in diversified ecological zones, the book explores the influence of climate change on livestock production across the globe. The most significant feature of this book is that it addresses in detail the different adaptation strategies and identifies targets for different stakeholders in connection with climate change and livestock production. Further, it puts forward development plans that will allow the livestock industries to cope with current climate changes and strategies that will mitigate the effects by 2025. Lastly, it provides researchers and policymakers several researchable priorities to help develop economically viable solutions for livestock production with less GHG emissions, promoting a cleaner environment in which human beings and livestock can live in harmony without adverse effects on productivity. Given that livestock production systems are sensitive to climate change and at the same are themselves a contributor to the phenomenon, climate change has the potential to pose an increasingly formidable challenge to the development of the livestock sector. However, there is a dearth of scientific information on adapting livestock production to the changing climate; as such, well-founded reference material on sustaining livestock production systems under the changing climate scenarios in different agro-ecological zones of the world is essential. By methodically and extensively addressing all aspects of climate change and livestock production, this volume offers a valuable tool for understanding the hidden intricacies of climatic stress and its influence on livestock production.

In this era of climate change and food/water/natural resource crises, it is important that current advancements in technology are made taking into consideration the impact on humanity and the environment. This new volume, *Food Technology: Applied Research and Production Techniques*, in the *Innovations in Agricultural and Biological Engineering* book series, looks at recent developments and innovations in food technology and sustainable technologies. Advanced topics in the volume include food processing, preservation, nutritional analysis, quality control and maintenance as well as good manufacturing practices in the food

industries. The chapters are highly focused reports to help direct the development of current food- and agriculture-based knowledge into promising technologies. Features: provides information on relevant technology makes suggestions for equipment and devices looks at standardization in food technology explores new and innovative packaging technology studies antimicrobial activities in food considers active constituents of foods and provides information about isolation, validation and characterization of major bioactive constituents discusses the effect of laws and regulatory guidelines on infrastructure to transform technology into highly value-added products Food Technology: Applied Research and Production Techniques will be a very useful reference book for food technologists, practicing food engineers, researchers, professors, students of these fields and professionals working in food technology, food science, food processing, and nutrition.

This book reviews the evidence supporting the influence of plant fibers on our daily life by either having impacts on our nutrition or improving processed foods for human and animal feeding. By bringing new information and updating existing scientific data, this book will also be a consistent source of information for both professional and non-professionals that are involved in food science and technology, nutrition, and even medical sciences related to human health and well-being.

With a roster of international contributors, this volume offers an abundance of solutions to address agricultural water management challenges in today's water-scarce areas of the world. The authors present studies on farmer-friendly irrigation scheduling methods, model-based analysis of crop water requirements, ways to optimize surface irrigation systems, and hydraulic design and management of surface water systems. The book goes on to highlight ways to improve soil properties by taking into account spatial, temporal, and spectral variability in soil properties. The volume also covers various innovative research studies on soil and water productivity of vegetable cultivation under water-stressed areas, application of coir geotextiles, and the role of biofertilizers in controlling soil degradation and maintaining fertile topsoil. Crop management strategies to enhance the efficient use of marginal and saline lands for nonconventional crops are also discussed. The book is divided into four sections, covering: engineering interventions in irrigation management technological interventions in management of soil properties technological inventions for soil and water conservation crop management for non-conventional use This volume will serve as an invaluable resource for academicians, researchers, engineers, agronomists, extension officers, students, and farmers in the broad discipline of agricultural and biological engineering.

Fighting Multidrug Resistance with Herbal Extracts, Essential Oils and their Components offers scientists a single source aimed at fighting specific multidrug-resistant (MDR) microorganisms such as bacteria, protozoans, viruses and fungi using natural products. This essential reference discusses herbal extracts and essential oils used or under investigation to treat MDR infections, as well as those containing antimicrobial activity that could be of potential interest in future studies against MDR microorganisms. The need to combat multidrug-resistant microorganisms is an urgent one and this book provides important coverage of mechanism of action, the advantages and disadvantages of using herbal extracts,

essential oils and their components and more to aid researchers in effective antimicrobial drug discovery Addresses the need to develop safe and effective approaches to coping with resistance to all classes of antimicrobial drugs Provides readers with current evidence-based content aimed at using herbal extracts and essential oils in antimicrobial drug development Includes chapters devoted to the activity of herbal products against herpes, AIDS, tuberculosis, drug-resistant cancer cells and more

This document is exclusively dedicated to DNA. It explains the secret of DNA from all corners Presented in a simple, lucid manner; it will be useful to all involved in bioscience. In all it consists of 12 chapters, figures, photos and a wholesome glossary of the terms related to DNA.

Introductory Practical Biochemistry, designed to cater to the requirements of students of biochemistry, microbiology, molecular biology, cellular biology etc. covers modern techniques employed for qualitative and quantitative analysis of biomolecules. The techniques for genetic transformation etc., have been included to give preliminary information to the beginners in the field of genetic engineering. Radioisotopic and immunological techniques also find a place in the book. Each chapter starts with introductory details of the techniques followed by simple laboratory exercises. The book provides concise information on theoretical and practical aspects of the techniques employed in biochemical studies for the Undergraduate and Postgraduate students, Instructors and Research workers.

Thousands of secondary metabolites are produced by plants to withstand unfavourable environmental conditions and are important molecules for nutraceutical, agro, cosmetic and pharmaceutical industries, etc. Harvesting of plants for the extraction of these important metabolites can threaten the plant germplasm, and various medicinally important plants are at the verge of extinction. Based on need, various methods and strategies were developed and followed by researchers from time to time to save the plant germplasm and produce important secondary metabolites efficiently to meet their growing demands. Biotechnological Approaches to Enhance Plant Secondary Metabolites: Recent Trends and Future Prospects provides a comprehensive introduction and review of state-of-the-art biotechnological tools in this field of research at global level. The methodologies are highlighted by real data examples in both in vitro and in vivo level studies. The book:

- Highlights and provides overviews of the synthesis, classification, biological function and medicinal applications of the recent advancements for the enhanced production of novel secondary metabolites in plants
- Provides an overview of the role of induced mutation, salinity stress and brassinosteroids impact to increase the secondary metabolic contents in plants and suggests an increase in enzymatic activity in plants could be due to various point mutations, which in turn could play a role at transcriptome levels
- Discusses the significant role of endophytes to enhance the contents of plant secondary metabolites
- Alternatively, suggests the urgent need to set up the standard

operating procedures using hydroponics system of cultivation for significant enhancement of secondary metabolite contents • Enlists various in vitro techniques to enhance plant secondary metabolites contents using plant tissue culture approaches • Provides a systematic overview of state-of-the-art biotechnological tools CRISPER Cas9 and RNAi to enhance the plant secondary metabolite contents • Recommends CRISPER Cas9 technology over RNAi, ZFNs and TALENs because of its relatively simple and high precision method with an easily programmable tool This serves as a reference book for the researchers working in the field of plant secondary metabolites and pharmaceutical industries at global level.

Sustainable Biological Systems for Agriculture: Emerging Issues in Nanotechnology, Biofertilizers, Wastewater, and Farm Machines explores and introduces the use of nanotechnology, biofertilizers, and design of farm machines in agriculture. The contributions are from India, Africa and the USA; the chapters emphasize sustainable solutions for the enhancement of agriculture processes. The volume provides a wealth of information on new and emerging issues in this interdisciplinary field. The book is divided into several sections: Potential Applications of Nanotechnology in Biological Systems Emerging Issues, Challenges and Specific Examples of Nanotechnology for Sustainable Biological Systems Potential of Nano- and Bio- fertilizers in Sustainable Agriculture Emerging Focus Areas in Biological Systems Performance of Farm Machines for Sustainable Agriculture The information provided here will be valuable to government agricultural professionals, scientists, researchers, farmers, and faculty and students all over the world.

The existence of life at high temperatures is quite fascinating. At elevated temperatures, only microorganisms are capable of growth and survival. Many thermophilic microbial genera have been isolated from man-made (washing machines, factory effluents, waste streams and acid mine effluents) and natural (volcanic areas, geothermal areas, terrestrial hot springs, submarine hydrothermal vents, geothermally heated oil reserves and oil wells, sun-heated litter and soils/sediments) thermal habitats throughout the world. Both culture-dependent and culture-independent approaches have been employed for understanding the diversity of microbes in hot environments. Interest in their diversity, ecology, and physiology has increased enormously during the past few decades as indicated by the deliberations in international conferences on extremophiles and thermophiles held every alternate year and papers published in journals such as Extremophiles. Thermophilic moulds and bacteria have been extensively studied in plant biomass bioconversion processes as sources of industrial enzymes and as gene donors. In the development of third generation biofuels such as bioethanol, thermophilic fungal and bacterial enzymes are of particular interest. The book is aimed at bringing together scattered up-to-date information on various aspects of thermophiles such as the diversity of thermophiles and viruses of thermophiles, their potential roles in pollution control and bioremediation, and composting.

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