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KEY=FINGERPRINTING - KELLEY JENNINGS

PLANT DNA FINGERPRINTING AND BARCODING

METHODS AND PROTOCOLS

Humana Press Molecular cloning and DNA-based analysis have become part of every molecular life science laboratory. The rapid adoption of DNA-based techniques has been facilitated by the introduction of the polymerase chain reaction (PCR), which has made cloning and characterization of DNA quick and relatively simple. PCR is virtually part of every variation of the plethora of approaches used for DNA fingerprinting today. Plant DNA Fingerprinting: Methods and Protocols aims to bring together the different currently available genome-based techniques into one repository. This volume contains detailed protocols for the preparation of plant genomic DNA, fingerprinting of plants for the detection of intra-species variations, the use of DNA barcoding, as well as methods for the bioinformatic analysis of data. Also included are several discussions on the broader issues of genome-based approaches in order to provide a sound understanding of the principles of these methods. Written in the successful Methods in Molecular Biology™ series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible protocols, and notes on troubleshooting and avoiding known pitfalls. Authoritative and easily accessible, Plant DNA Fingerprinting: Methods and Protocols is tailored principally for those who seek to augment their current methods of plant analysis and quality control using genome-based approaches as well as for scientists and researchers in different plant sciences.

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DNA BARCODING AND BIOCHEMICAL PROFILING OF MEDICAL PLANTS OF NORTHERN AND DESERT AREAS OF PAKISTAN TO IMPROVE RURAL LIVING STANDARD

Intl Food Policy Res Inst Pakistan is a country with a varied climate and hosts a large number of medicinal plant species. Most of the medicinal plants are collected in the wild by local communities. These plants are an important source of livelihood for rural economies. However, no systematic documentation has been undertaken to assist in proving ownership of the plant resources. This project focused on the conservation of natural plant resources by using modern molecular techniques and creating awareness for determining the active ingredients of the plants through biochemical profiling. Further objectives of the study were to identify marketing channels for medicinal plants, costs and margins of stakeholders involved in the marketing of medicinal plants, and factors responsible for the poor trade and decreasing population of these plants in the two study areas of Swat Valley and Cholistan Desert.

BIOLOGY EDUCATION AND RESEARCH IN A CHANGING PLANET

SELECTED PAPERS FROM THE 25TH BIENNIAL ASIAN ASSOCIATION FOR BIOLOGY EDUCATION CONFERENCE

Springer This book presents selected conference proceedings from the 25th Biennial Asian Association for Biology Education Conference. It clarifies the differences between the structure of biology education for educators and researchers. It solves open problems by creating a bridge between biological research and its application in education and the sustainable development of communities. The book's first topic is Biology Education in an X, Y, Z World, which provides ideas for how biology can be taught in innovative ways. The second topic, The Endangered Planet – How can Biology Education Help? discusses how humans depend on other species for survival and how they have the power to cause or to prevent extinctions. The third and final topic, Research in Biology, encompasses the growing wealth of biological information resulting from scientific research, especially in universities. Educators can use these findings to enhance their teaching.

DNA BARCODING AND MOLECULAR PHYLOGENY

Springer Nature This book presents a comprehensive overview of DNA barcoding and molecular phylogeny, along with a number of case studies. It discusses a number of areas where DNA barcoding can be applied, such as clinical microbiology, especially in relation to infection management; DNA database management; and plant-animal interactions, and also presents valuable information on the DNA barcoding and molecular phylogeny of microbes, algae, elasmobranchs, fishes, birds and ruminant mammals. Furthermore it features unique case studies describing DNA barcoding of reptiles dwelling in Saudi Arabian deserts, genetic variation studies in both wild and hatchery populations of *Anabas testudineus*, DNA barcoding and molecular phylogeny of Ichthyoplankton and juvenile fishes of Kuantan River in Malaysia, and barcoding and molecular phylogenetic analysis of indigenous bacteria from fishes dwelling in a tropical tidal river. Moreover, since prompt identification and management of invasive species is vital to prevent economic and ecological loss, the book includes a chapter on DNA barcoding of invasive species. Given its scope, this book will appeal not only to researchers, teachers and students around the globe, but also to general readers.

DNA FINGERPRINTING IN PLANTS

PRINCIPLES, METHODS, AND APPLICATIONS, SECOND EDITION

CRC Press Given the explosive development of new molecular marker techniques over the last decade, newcomers and experts alike in the field of DNA fingerprinting will find an easy-to-follow guide to the multitude of techniques available in DNA Fingerprinting in Plants: Principles, Methods, and Applications, Second Edition. Along with step-by-step annotated p

FINGERPRINTING TECHNIQUES IN FOOD AUTHENTICATION AND TRACEABILITY

CRC Press There is an increasing interest by consumers for high-quality food products with a clear geographical origin. With these products in demand, suitable analytical techniques are needed for the quality control. Current analytical approaches are mass spectrometry techniques, spectroscopic techniques, separation techniques, and others. Fingerprinting Techniques in Food Authentication and Traceability discusses the principles of the techniques together with their advantages and drawbacks, and reported applications concerning geographical authenticity. A combination of methods analyzing different types of food compounds seems to be the most promising approach to establish the geographical origin. The abundant acquired data are analyzed by chemometrics. Producing safe and high-quality food is a prerequisite to ensure consumer health and successful domestic and international trade, and is critical to the sustainable development of national agricultural resources. Systems to trace food or feed products through specified stages of production, processing, and distribution play a key role in assuring food safety. Analytical techniques that enable the provenance of food to be determined provide an independent means of verifying traceability systems and also help to prove product authenticity, to combat fraudulent practices and to control adulteration, which are important issues for economic, religious, or cultural reasons. Proof of provenance has become an important topic in the context of food safety, food quality, and consumer protection in accordance with national legislation and international standards and guidelines.

WINE TRACEABILITY

MDPI Wine traceability is a central theme in the current world market where consumers are increasingly demanding the quality and origin of food and drink. The wine production chain and wine composition are generally controlled by different laws (International Organization of Vine and Wine (OIV), European Union (EU), and national governments) and need specific documentation. Nevertheless, wine production is subject to fraud. Consequently, the improvement of the methods applied to verify the origin and quality of wines is very important to protect wine consumers and producers. In this book, eight different papers—six research papers and two reviews—address the topic from different points of view.

ANIMAL CELL CULTURE

ESSENTIAL METHODS

John Wiley & Sons This is a comprehensive research guide that describes both the key new techniques and more established methods. Every chapter discusses the merits and limitations of the various approaches and then provides selected tried-and-tested protocols, as well as a plethora of good practical advice, for immediate use at the bench. It presents the most accessible and comprehensive introduction available to the culture and experimental manipulation of animal cells. Detailed protocols for a wide variety of methods provide the core of each chapter, making new methodology easily accessible. This book is an essential laboratory manual for all undergraduates and graduates about to embark on a cell culture project. It is a book which both experienced researchers and those new to the field will find invaluable.

ENDOPHYTES: BIOLOGY AND BIOTECHNOLOGY

VOLUME 1

Springer 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.

FUNGAL PLANT PATHOGENS

CABI Fungal plant pathogens can threaten food security, economic prosperity and the natural environment. Changing factors such as pesticide usage, climate change and increasing trade globalization can bring new opportunities to plant pathogens, and new challenges to those attempting to control their spread. Covering the key techniques used when working with fungal plant pathogens, this practical manual deals with the recognition of disease symptoms, detection and identification of fungi and methods to characterize them, as well as curation, quarantine and quality assurance. It is unique in its practical focus, providing an overview of both traditional and emerging methods and their applications, and detailed protocols on techniques such as microscopy, antibody detection using ELISA methods and lateral flow devices, molecular methods using PCR and fingerprinting and preservation techniques including freeze drying. For postgraduate and advanced undergraduate students of mycology and plant pathology Fungal Plant Pathogens provides an invaluable guide to investigating fungal plant diseases and interpreting laboratory findings. It is also a useful tool for extension plant pathologists, consultants and advisers in agriculture, horticulture and the food supply chain

FUNGAL PLANT PATHOGENS

CABI This book (12 chapters) provides detailed information on diagnostic systems for plant pathogenic fungi, discussing morphological determinations, culturing, serological methods, nucleic acid protocols from PCR to barcoding and DNA fingerprinting techniques. Chapters on diagnostic systems for fungi from seeds, guidelines on working with fungi to maintain bio-containment and prevent the release of a pathogen outside of the laboratory, and concepts and practices of quality assurance and quality systems for diagnostic laboratories are also included. The combination of information in the narrative portions of chapters and actual protocols makes this a well-balanced book that readers will find informative and useful.

BIOTECHNOLOGY AND BIOLOGY OF TRICHODERMA

Newnes Biotechnology and Biology of Trichoderma serves as a comprehensive reference on the chemistry and biochemistry of one of the most important microbial agents, Trichoderma, and its use in an increased number of industrial bioprocesses for the synthesis of many biochemicals such as pharmaceuticals and biofuels. This book provides individuals working in the field of Trichoderma, especially biochemical engineers, biochemists and biotechnologists, important information on how these valuable fungi can contribute to the production of a wide range of products of commercial and ecological interest. Provides a detailed and comprehensive coverage of the chemistry, biochemistry and biotechnology of Trichoderma, fungi present in soil and plants Includes most important current and potential applications of Trichoderma in bioengineering, bioprocess technology including bioenergy & biofuels, biopharmaceuticals, secondary metabolites and protein engineering Includes the most recent research advancements made on Trichoderma applications in plant biotechnology and ecology and environment

PHYTOMYCOLOGY AND MOLECULAR BIOLOGY OF PLANT PATHOGEN INTERACTIONS

CRC Press Plants are exposed to highly diverse microbiota forming complex interactions in natural environments. Phytomycology and Molecular Biology of Plant Pathogen Interactions presents information on defense mechanisms of the plants, as various microbes can have positive effects on their plant hosts. Key Features Delineates the journey from Koch's postulate to molecular systems biology. Provides comprehensive information on fungal biology, pathogenicity genes, and their expression while interacting with host plants. Highlights the techniques and approaches involved in phytofungi identification and detection. Describes multi-omics approaches and metabolic engineering in plant fungi. This book is beneficial to readers including plant scientists and researchers, particularly plant pathologists, molecular biologists, and mycologists.

ENDOPHYTES FOR A GROWING WORLD

Cambridge University Press Discusses the role of endophytes in food security, forestry and health. It outlines their general biology, spanning theory to practice.

ENDOPHYTE BIOLOGY

RECENT FINDINGS FROM THE KASHMIR HIMALAYAS

CRC Press 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.

LABORATORY PROTOCOLS IN APPLIED LIFE SCIENCES

CRC Press As applied life science progresses, becoming fully integrated into the biological, chemical, and engineering sciences, there is a growing need for expanding life sciences research techniques. Anticipating the demands of various life science disciplines, *Laboratory Protocols in Applied Life Sciences* explores this development. This book covers a wide spectrum of areas in the interdisciplinary fields of life sciences, pharmacy, medical and paramedical sciences, and biotechnology. It examines the principles, concepts, and every aspect of applicable techniques in these areas. Covering elementary concepts to advanced research techniques, the text analyzes data through experimentation and explains the theory behind each exercise. It presents each experiment with an introduction to the topic, concise objectives, and a list of necessary materials and reagents, and introduces step-by-step, readily feasible laboratory protocols. Focusing on the chemical characteristics of enzymes, metabolic processes, product and raw materials, and on the basic mechanisms and analytical techniques involved in life science technological transformations, this text provides information on the biological characteristics of living cells of different origin and the development of new life forms by genetic engineering techniques. It also examines product development using biological systems, including pharmaceutical, food, and beverage industries. *Laboratory Protocols in Applied Life Sciences* presents a nonmathematical account of the underlying principles of a variety of experimental techniques in disciplines, including: Biotechnology Analytical biochemistry Clinical biochemistry Biophysics Molecular biology Genetic engineering Bioprocess technology Industrial processes Animal Plant Microbial biology Computational biology Biosensors Each chapter is self-contained and written in a style that helps students progress from basic to advanced techniques, and eventually design and execute their own experiments in a given field of biology.

HERBAL DRUGS AND FINGERPRINTS

EVIDENCE BASED HERBAL DRUGS

Springer Science & Business Media Evidence based herbal drugs are on hi-acceptance day by day due to health friendly nature compared to synthetic drugs. The active ingredients in herbal drugs are different chemical classes, e.g. alkaloids, coumarins, flavonoids, glycosides, phenols, steroids, terpenes etc., are identified at molecular level using current analytical practices, which are unique characteristic, as finger, so known as fingerprints. The fingerprints are used for assessment of quality consistency and stability by visible observation and comparison of the standardized fingerprint pattern, have scientific potential to decipher the claims made on these drugs for authenticity and reliability of chemical constituents, with total traceability, which starts from the proper identification, season and area of collection, storage, their processing, stability during processing, and rationalizing the combinational in case of polyherbal drugs. These quality oriented documents have ample scientific logics so well accepted globally by regulatory authorities and industries, to determine intentional/ unintentional contamination, adulteration, pollutants, stability, quality, etc. parameters. Based on geo-climatic factors, a same plant species has different pharmacological properties due to different ingredients; such regional and morphological variations are identified by fingerprints, at the time of collection of the medicinal herb. The chromatographic (TLC, HPTLC, HPLC, GC,) and spectral (UV-Vis., FTIR, MNR, MS, LC-MS, GC-MS etc.) techniques have world-wide strong scientific approval as validated methods to generate the fingerprints of different chemical classes of active ingredients of herbal drugs. Presently there is a need for a book having all the fingerprinting techniques for herbal drugs at a place with theory, case studies and art to discover patentable forms. The present book is a mile stone in the subject, to be utilized by Scientists, Medical Doctors, Technicians, Industrialists, Researchers, and Students both in PG and UG levels.

FINGERPRINTING TECHNIQUES IN FOOD AUTHENTICATION AND TRACEABILITY

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EXAMINATION OF THE POTENTIAL HUMAN HEALTH, WATER QUALITY AND OTHER IMPACTS OF THE CONFINED ANIMAL FEEDING OPERATION INDUSTRY

HEARING BEFORE THE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS, UNITED STATES SENATE, ONE HUNDRED TENTH CONGRESS, FIRST SESSION, SEPTEMBER 6, 2007

DIETARY SUPPLEMENTS, BOTANICALS AND HERBS AT THE INTERFACE OF FOOD AND MEDICINE

Frontiers Media SA

DNA BARCODES

METHODS AND PROTOCOLS

Humana Press A DNA barcode in its simplest definition is one or more short gene sequences taken from a standardized portion of the genome that is used to identify species through reference to DNA sequence libraries or databases. In *DNA Barcodes: Methods and Protocols* expert researchers in the field detail many of the methods which are now commonly used with DNA barcodes. These methods include the latest information on techniques for generating, applying, and analyzing DNA barcodes across the Tree of Life including animals, fungi, protists, algae, and plants. Written in the highly successful *Methods in Molecular Biology*™ series format, the chapters include the kind of detailed description and implementation advice that is crucial for getting optimal results in the laboratory. Thorough and intuitive, *DNA Barcodes: Methods and Protocols* aids scientists in continuing to study methods from wet-lab protocols, statistical, and ecological analyses along with guides to future, large-scale collections campaigns.

MEDICINAL PLANTS

DOMESTICATION, BIOTECHNOLOGY AND REGIONAL IMPORTANCE

Springer Nature Medicinal plant research is an evergreen subject. There is a tremendous increase in popularity of herbal medicine in traditional medicine, ethnomedicine, modern medicine and as over the counter food supplements. Even after this increased demand, supply is neither uniform nor assured as most of these plants are collected from wild. In developing countries of tropical and subtropical regions where majority of herbal drugs are produced, this is not organised sector making it vulnerable to several malpractices, hence standardization of all aspects required. This has also negative

impact on biodiversity and conservation of plants as well as supply of uniform material. This book is aimed to provide up to date information about sustainable use of selected medicinal plants, their active ingredients and efforts made to domesticate them to ensured uniform supply. Development of agrotechnology, biotechnology and cultivation practices using conventional and non-conventional methods are presented. Where these efforts will lead the medicinal plant research and future perspective are discussed. The chapters are written by well recognised group leaders in working in the field. The book contains topics on general biology of medicinal plants, their sustainable use and, cultivation and domestication efforts. A uniform chapter structure has been designed to keep consistency. The book will be useful for academicians, agriculturists, biotechnologists and researcher, and industries involved in manufacturing herbal drugs and supplementary products.

DNA TECHNIQUES TO VERIFY FOOD AUTHENTICITY

APPLICATIONS IN FOOD FRAUD

Royal Society of Chemistry The food supply chain needs to reassure consumers and businesses about the safety and standards of food. Global estimates of the cost of food fraud to economies run into billions of dollars hence a huge surge in interest in food authenticity and means of detecting and preventing food fraud and food crime. Approaches targeting DNA markers have assumed a pre-eminence. This book is the most comprehensive and timely collection of material from those working at the forefront of DNA techniques applied to food authenticity. Addressing the new field of analytical molecular biology as it combines the quality assurance rigour of analytical chemistry with DNA techniques, it introduces the science behind DNA as a target analyte, its extraction, amplification, detection and quantitation as applied to the detection of food fraud and food crime. Making the link with traditional forensic DNA profiling and describing emerging and cutting-edge techniques such as next generation sequencing, this book presents real-world case studies from a wide perspective including from analytical service providers, industry, enforcement agencies and academics. It will appeal to food testing laboratories worldwide, who are just starting to use these techniques and students of molecular biology, food science and food integrity. Food policy professionals and regulatory organisations who will be using these techniques to back up legislation and regulation will find the text invaluable. Those in the food industry in regulatory and technical roles will want to have this book on their desks.

MOLECULAR MARKERS IN PLANTS

John Wiley & Sons Molecular Markers in Plants surveys an array of technologies used in the molecular analysis of plants. The role molecular markers play in plant improvement has grown significantly as DNA sequencing and high-throughput technologies have matured. This timely review of technologies and techniques will provide readers with a useful resource on the latest molecular technologies. Molecular Markers in Plants not only reviews past achievements, but also catalogs recent advances and looks forward towards the future application of molecular technologies in plant improvement. Opening chapters look at the development of molecular technologies. Subsequent chapters look at a wide range of applications for the use of these advances in fields as diverse as plant breeding, production, biosecurity, and conservation. The final chapters look forward toward future developments in the field. Looking broadly at the field of molecular technologies, Molecular Markers in Plants will be an essential addition to the library of every researcher, institution, and company working in the field of plant improvement.

THE SCIENCE OF FORENSIC ENTOMOLOGY

John Wiley & Sons The Science of Forensic Entomology builds a foundation of biological and entomological knowledge that equips the student to be able to understand and resolve questions concerning the presence of specific insects at a crime scene, in which the answers require deductive reasoning, seasoned observation, reconstruction and experimentation—features required of all disciplines that have hypothesis testing at its core. Each chapter addresses topics that delve into the underlying biological principles and concepts relevant to the insect biology that forms the bases for using insects in matters of legal importance. The book is more than an introduction to forensic entomology as it offers in depth coverage of non-traditional topics, including the biology of maggot masses, temperature tolerances of necrophagous insects; chemical attraction and communication; reproductive strategies of necrophagous flies; archaeoentomology, and use of insects in modern warfare (terrorism). As such it will enable advanced undergraduate and postgraduate students the opportunity to gain a sound knowledge of the principles, concepts and methodologies necessary to use insects and other arthropods in a wide range of legal matters.

DNA BANKS

PROVIDING NOVEL OPTIONS FOR GENE BANKS?

Bioversity International Introduction and overview; State of the art of DNA storage: results of a world wide survey; DNA storage as a complementary conservation strategy; Platforms for DNA banking; The role of bioinformatics in coordinating conservations efforts; DNA banks: a primary resource for conservation research; Tissue collections as a means of storing DNA: a contribution to the conservation of Colombian biodiversity; Opportunities, limitations and needs for DNA banks; A model for DNA banking to enhance the management, distribution and use of ex situ stored PGR.

PLANT BIOLOGY AND BIOTECHNOLOGY

VOLUME II: PLANT GENOMICS AND BIOTECHNOLOGY

Springer Plant genomics and biotechnology have recently made enormous strides, and hold the potential to benefit agriculture, the environment and various other dimensions of the human endeavor. It is no exaggeration to claim that the twenty-first century belongs to biotechnology. Knowledge generation in this field is growing at a frenetic pace, and keeping abreast of the latest advances and calls on us to double our efforts. Volume II of this two-part series addresses cutting-edge aspects of plant genomics and biotechnology. It includes 37 chapters contributed by over 70 researchers, each of which is an expert in his/her own field of research. Biotechnology has helped to solve many conundrums of plant life that had long remained a mystery to mankind. This volume opens with an exhaustive chapter on the role played by thale cress, *Arabidopsis thaliana*, which is believed to be the *Drosophila* of the plant kingdom and an invaluable model plant for understanding basic concepts in plant biology. This is followed by chapters on bioremediation, biofuels and biofertilizers through microalgal manipulation, making it a commercializable prospect; discerning finer details of biotic stress with plant-fungal interactions; and the dynamics of abiotic and biotic stresses, which also figure elsewhere in the book. Breeding crop plants for desirable traits has long been an endeavor of biotechnologists. The significance of molecular markers, marker assisted selection and techniques are covered in a dedicated chapter, as are comprehensive reviews on plant molecular biology, DNA fingerprinting techniques, genomic structure and functional genomics. A chapter dedicated to organellar genomes provides extensive information on this important aspect. Elsewhere in the book, the newly emerging area of epigenetics is presented as seen through the lens of biotechnology, showcasing the pivotal role of DNA methylation in effecting permanent and transient changes to the genome. Exclusive chapters deal with bioinformatics and systems biology. Handy tools for practical applications such as somatic embryogenesis and micropropagation are included to provide frontline information to entrepreneurs, as is a chapter on somaclonal variation. Overcoming barriers to sexual incompatibility has also long been a focus of biotechnology, and is addressed in chapters on wide hybridization and hybrid embryo rescue. Another area of accomplishing triploids through endosperm culture is included as a non-conventional breeding strategy. Secondary metabolite production through tissue cultures, which is of importance to industrial scientists, is also covered. Worldwide exchange of plant genetic material is currently an essential topic, as is conserving natural resources in situ. Chapters on in vitro conservation of extant, threatened and other valuable germplasm, gene banking and related issues are included, along with an extensive account of the biotechnology of spices – the low-volume, high-value crops. Metabolic engineering is another emerging field that provides commercial opportunities. As is well known, there is widespread concern over genetically modified crops among the public. GM crops are covered, as are genetic engineering strategies for combating biotic and abiotic stresses where no other solutions are in sight. RNAi- and micro RNA- based strategies for crop improvement have proved to offer novel alternatives to the existing non-conventional techniques, and detailed information on these aspects is also included. The book's last five chapters are devoted to presenting the various aspects of environmental, marine, desert and rural biotechnology. The state-of-the-art coverage on a wide range of plant genomics and biotechnology topics will be of great interest to post-graduate students and researchers, including the employees of seed and biotechnology companies, and to instructors in the fields of plant genetics, breeding and biotechnology.

MOLECULAR METHODS IN PLANT DISEASE DIAGNOSTICS

PRINCIPLES AND PROTOCOLS

CABI Using molecular methods for plant disease diagnosis provides diagnosticians with a number of advantages over more traditional methods. They can allow the identification of morphologically similar species, for example, or the detection of infection prior to symptom formation. Not only can molecular tools help by increasing the efficacy, accuracy and speed of diagnosis; their common technological basis provides further benefits, especially where resources are limited and traditional skills are hard to sustain. This book provides protocols for nucleic acid-based methods currently applied to plant pathogen detection and identification. It takes the practitioner through the full range of molecular diagnostic and detection methods and, as these generic techniques are appropriate for use on any target with minimal modification, also provides a useful resource for students of plant pathology

and plant pathologists. Beginning with the background and future directions of the science, it then addresses DNA barcoding, microarrays, polymerase chain reactions (PCR), quality assurance and more, forming a complete reference on the subject.

ANIMAL CELL BIOTECHNOLOGY

METHODS AND PROTOCOLS

Springer Science & Business Media The second edition of this book constitutes a comprehensive manual of new techniques for setting up mammalian cell lines for production of biopharmaceuticals, and for optimizing critical parameters for cell culture considering the whole cascade from lab to final production. The chapters are written by world-renowned experts and the volume's five parts reflect the processes required for different stages of production. This book is a compendium of techniques for scientists in both industrial and research laboratories that use mammalian cells for biotechnology purposes.

GUIDELINES FOR THE RE-INTRODUCTION OF GALLIFORMES FOR CONSERVATION PURPOSES

IUCN

NATURAL MEDICINES

CLINICAL EFFICACY, SAFETY AND QUALITY

CRC Press Globally, natural medicine has been considered as an important alternative to modern allopathic medicine. Although natural medicines are popular in society, only limited medicinal herbs have been scientifically evaluated for their potential in medical treatment. This book connects various aspects of the complex journey from traditional medicine to modern medicine. It provides information on topics including global regulations and regulatory hurdles, diverse nutritional challenges and potential health benefits, novel food innovations especially seed-to-clinic approaches, and future trends.

FEATURES • Provides information on sustainable use of natural products in the development of new drugs and clinically validated herbal remedies • Discusses issues on evaluation and clinical aspects of herbal medicine, promotion and development, safety evaluation, metabolite profiling, biomarker analysis, formulation, and stability testing • Describes traditional uses of natural medicine through identification, isolation and structural characterization of their active components • Elucidates mechanisms of biological action, adverse effects and identification of their molecular targets of natural medicine • Multidisciplinary appeal including chemistry, pharmacology, pharmacognosy and cell and molecular biology, as well as integration with clinical medicine This book serves as an essential guide for individuals researching natural medicines, and industry employees in areas including drug development, pharmacology, natural products chemistry, clinical efficacy, ethnopharmacology, pharmacognosy, phytotherapy, phyto-technology and herbal science.

EVIDENCE-BASED RESEARCH METHODS FOR CHINESE MEDICINE

Springer This book is a practical guide to the evidence-based medicine (EBM) research methods that are applicable to Chinese medicine (CM). It includes 3 parts: clinical research, healthcare data research and laboratory research. In each chapter, it explains how to acquire, analyze and evaluate a specific kind of CM research result. Authors exemplify the most important methods with successful cases in transforming reliable data into new knowledge of CM. This book emphasizes the requirements for CM researchers to design and conduct CM studies by following the best available principles, standards and guidelines.

PLANT FOODS AND DIETARY SUPPLEMENTS: BUILDING SOLID FOUNDATIONS FOR CLINICAL TRIALS

Frontiers Media SA

PROTOCOLS FOR NUCLEIC ACID ANALYSIS BY NONRADIOACTIVE PROBES

Springer Science & Business Media Protocols for Nucleic Acid Analysis by Non-radioactive Probes, Second Edition provides a firm background on the basic preparative protocols required for the analysis of nucleic acids by nonradioactive methods. Presenting the methodologies using amazing new applications, this volume offers guide chapters on nucleic acid extractions, preparation of nucleic acid blots, and labeling of nucleic acids with nonradioactive haptens. New fluorescent techniques such as Real Time PCR and microarrays are also included, allowing users to get a nonradioactive protocol implemented in the laboratory with minimum adaptation required and fastest time to results. The protocols follow the successful Methods in Molecular Biology™ series format, each offering step-by-step laboratory instructions, an introduction outlining the principles behind the technique, lists of the necessary equipment and reagents, and tips on troubleshooting and avoiding known pitfalls.

MOLECULAR PHARMACOGNOSY

Springer Science & Business Media "Molecular Pharmacognosy" discusses the application of molecular biology in resource science and authentication of traditional Chinese medicine (TCM). This book reviews the latest developments in pharmacognosy, introduces a series of new views and insights, presents the hotspots and focus of the field of study on molecular pharmacognosy, and predicts a new direction of study on the resource science of TCM. Furthermore, the book also provides an open communications platform for the development of molecular pharmacognosy. This book is intended for biomedical scientists and researchers in the fields of molecular biology, traditional medicine and natural pharmaceuticals. Professor Lu-qi Huang is Director of the Collaborating Centre of the World Health Organization for Traditional Medicine (Chinese Materia Medica) and Vice-Chairman of the Australia Chinese Association for Biomedical Sciences Inc.

HANDBOOK OF DNA PROFILING

Springer This reference book comprehensively reviews the significance of DNA technology in forensic science. After presenting the theory, basic principles, tools and techniques that are used in forensic DNA typing, it summarizes various techniques, including autosomal STR, Y-STR, X-STR, mitochondrial DNA and NGS, used in solving both criminal as and civil cases, such as paternity disputes, identification of mutilated remains, and culprit identification in sexual assault and murder cases. It also provides an overview of DNA-based genetic diagnostics for various diseases, and discusses the role of DNA typing in drug reactions, as well as the application of non-human DNA profiling of animals and plants in forensic science investigations. Lastly, the book examines the role of internal quality control in maintaining the high quality of DNA profiling.

CONSERVATION BIOLOGY

EVOLUTION IN ACTION

Oxford University Press The main goal of this book is to encourage and formalize the infusion of evolutionary thinking into mainstream conservation biology. It reviews the evolutionary foundations of conservation issues, and unifies conceptual and empirical advances in evolutionary conservation biology. The book can be used either as a primary textbook or as a supplementary reading in an advanced undergraduate or graduate level course - likely to be called Conservation Biology or in some cases Evolutionary Ecology. The focus of chapters is on current concepts in evolution as they pertain to conservation, and the empirical study of these concepts. The balanced treatment avoids exhaustive reviews and overlapping duplication among the chapters. Little background in genetics is assumed of the reader.

MICROBIAL LIFE ON FAÇADES

Springer Nature This book provides a detailed overview of the microorganisms that form the initial growth on the exterior facades of buildings. It deals with the ecophysiological properties that characterize the basic conditions under which these microorganisms can occur on facades. In addition to an identification key for the types and forms of microorganisms, this book provides a detailed description of the individual organisms, stating their ecological range. Furthermore, the various ecological parameters are discussed in short chapters. Measures to prevent and combat the colonization of facades

with microorganisms are also addressed. Specialists (architects, construction experts), builders, scientists and master students can find all the information they need on facade algae and fungi here. The authors Dr. Wolfgang Karl Hofbauer is chief scientist (taxonomy, ecophysiology and genetics) of the department Environment, Sensors and Hygiene at the Fraunhofer Institute for Building Physics. His professional research areas are taxonomy and ecophysiology of organisms on building surfaces, about which he did his doctorate in 2008, genetic barcoding of building relevant (micro)organisms and greening of building surfaces. Retired Prof. Dr. Dr.h.c Georg Gartner worked and researched at the University of Innsbruck on the cultivation and taxonomy of soil-and airborne, algae for many years. In 2012, Prof. Gartner was awarded an honorary doctorate by Sofia University for his services to the cooperation in algal studies between the botanical institutes of the University of Innsbruck and the University of Sofia.

FUNDAMENTALS OF PHARMACOGNOSY AND PHYTOTHERAPY E-BOOK

Elsevier Health Sciences 'A new classic' in a new edition! Fully revised and updated throughout New sections on antimicrobials From journal reviews of the previous edition: 'Drawing on their wealth of experience and knowledge in this field, the authors, who are without doubt among the finest minds in pharmacognosy today, provide useful and fascinating insights into the history, botany, chemistry, phytotherapy and importance of medicinal plants in some of today's health care systems. This is a landmark textbook, which carefully brings together relevant data from numerous sources and provides in an authoritative and exhaustive manner, cutting edge information that is relevant to pharmacists, pharmacognocists, complementary practitioners, doctors and nurses alike.' The Pharmaceutical Journal 'This is the first book that I have encountered which combines the compounds and plants found in standard pharmacognosy textbooks, i.e. those used in orthodox Western medicine, with the 'new phytopharmaceuticals' which have become established in Western culture over the last 20 years. The medical establishment in this environment is finally catching up with the practices of the general population and so this book is an excellent choice for those who wish to investigate which of the many plants available have some scientific credence. I shall be adding this book to the Essential Reading list for all of the undergraduate students on our pharmacy degree course and would encourage all those involved in teaching pharmacy students to do the same.' P.J. Houghton, Department of Pharmacy, King's College London, Journal of Ethnopharmacology 'Educated pharmacists no doubt equate Pharmacognosy with hours spent hunched over a microscope identifying vegetable drugs. Many probably consider it as a subject with little importance in a modern pharmacy curriculum. How wrong they are! ... This book is designed to give an overview at an easy-to-understand level of a broad subject area... For students of science and of the healthcare professions it is a useful text and the authors are to be commended for their work.' Irish Pharmacy Journal From customer reviews: 'A new classic. This is an excellent publication both for science students and the non scientific who have an interest in phytotherapy. The layout is logical and clearly set out. I love the chemical structural diagrams, and the explanations of even complex sequences are easy to understand with very little jargon. It is encouraging to see pharmacognosy being given a prominent place in a modern textbook, and interesting to see both hand drawings and chemical structures on the same page!' 'I can recommend this to anyone who is interested in the science behind herbal products and medicines; especially if you are interested in plants. It's quite simple to follow and very concise! Good for pharmacy students.' 'This is an ultimate textbook in this subject and a boon for students of M Pharmacy (Pharmacognosy) as well as undergraduates students of Pharmacy. Besides them, it is really suitable for every course comprising a study of plants and their medicinal use.' 'Excellent reference book. As an editor, I instantly found the answers to various questions I had regarding botanical descriptions. And it even answered questions that I hadn't gotten around to asking. Highly recommended!'