Introduction To Plant Biotechnology Hs Chawla

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this book has been written to meet the needs of students for biotechnology courses at various levels of undergraduate and graduate studies this book covers all the important aspects of plant tissue culture viz nutrition media micropropagation organ culture cell suspension culture haploid culture protoplast isolation and fusion secondary metabolite production somaclonal variation and cryopreservation for good understanding of recombinant dna technology chapters on genetic material organization of dna in the genome and basic techniques involved in recombinant dna technology have been added different aspects on rdna technology covered gene cloning isolation of plant genes transposons and gene tagging in vitro mutagenesis pcr molecular markers and marker assisted selection gene transfer methods chloroplast and mitochondrion dna transformation genomics and bioinformatics genomics covers functional and structural genomics proteomics metabolomics sequencing status of different organisms and dna chip technology application of biotechnology has been discussed as transgenics in crop improvement and impact of recombinant dna technology mainly in relation to biotech crops

plant biotechnology has created unprecedented opportunities for the manipulation of biological systems of plants to understand biotechnology it is essential to know the basic aspects of genes and their organization in the genome of plant cells this text on the subject is aimed at students

basics laboratory organization sterilization techniques nutrition medium choice of the explant plant tissue culture seed culture micropropagation meristem culture micropropagation axillary bud proliferation micropropagation adventitious regeneration micropropagation organogenesis micropropagation embryogenesis cell suspension secondary metabolite production in a cell suspension culture anther culture protoplast isolation and fusion biotechnology sds page electrophoresis of proteins isolation of dna from plant tissues isolation an purification of plasmid dna restriction enzyme digestion of dna agarose gel electrophoresis preparation of competent cells transformation of e coil with plasmid dna and ligation of insert dna to a vector agrobacterium mediated gene transfer biolistic method of transformation in plants in vitro amplification of dna by pcr detection of transgenes rapd analysis microsatellite marker analysis southerm biotting southerm hybridization

covering the latest advances in the use of plants to produce medicinal drugs and vaccines examines topics including plant tissue culture secondary metabolite production metabolomics and metabolic engineering bioinformatics molecular farming and future biotechnological directions

plant tissue culture techniques help in understanding basic life processes which is essential to improving crop productivity furthermore recently molecular biology has assumed great importance with respect to plant biotechnology this book combines all three aspects into one with a focus on practical applications of various techniques it discusses micropropagation studies on several crop plants the molecular basis of understanding various life processes including the molecular basis of somatic embryogenesis and other physiological and biochemical processes having significant biotechnological applications it also covers in vitro studies of certain important plants like aloe vera simmondsia chinensis anacyclus pyrethrum and crataeva nurvala arachis hypogaea l phoenix dactylifera dendrocalamus asper asparagus adescendens roxb natural products of plant origin with their therapeutic potential and biotechnological production as well as genome analysis of crop plants with future applications in biotechnology

the book advances in biotechnology is about recent advances in some of the important fields that are ongoing in certain biotechnological applications biotechnology has been quite helpful in keeping pace with the demands of every increasing human population and in improving the quality of human life major biotechnological achievements associated with human welfare have been from the fields like genetic engineering transgenic plants and animals genomics proteomics monoclonal antibodies for the diagnosis of disease gene therapy etc fourteen authoritative chapters written by experts having experience in academics and research on current developments and future trends in biotechnology have been empathized the book provides a detailed account of various methodologies used in biotechnology i e high capacity vectors dna sequencing dealing with next generation sequencing molecular markers dna microarray technology as well as proteomics that have revolutionized biotechnology with a wide array of applications the book not only presents a well founded explanation of the topics but also aims to present up to date reviews of current research efforts some thoughtful discussions on the potential benefits and risks involved in producing biotechnological products and the challenges of bringing such products to market it will prove to be an excellent reference work for both academicians and researchers indicating new starting points to young researchers for new projects in the field the book is intended for biotechnologist biologist researchers teachers and students of biosciences and biotechnology

natural compounds obtained from plants represent a tremendous global market due to their use as food additives cosmetics in agriculture and in pharmaceuticals this book provides up to date information on various strategies

and methods for producing compounds of interest leading researchers discuss the latest advances in environmentally friendly natural compound production from plants making the book a valuable resource for biotechnologists pharmacists food technologists and researchers working in the medical and healthcare industries

since ancient times plants have been used as a prime natural source of alternative medicines and have played an important role in our lives the old tradition of medicinal plant application has turned into a highly profitable business in the global market resulting in the release of a large number of herbal products people have tried to find different sources of medicines to alleviate pain and cure different illnesses due to severe constraints of synthetic drugs and the increasing contraindications of their usage there is a growing interest world over in the usage of natural products based on medicinal herbs hence there is an ever expanding market of herbs and herbal based medicinal preparations all over the world this has culminated into an exponential increase in number of research groups in different geographical locations and generation of volume of research data in the field in a short span of time the path breaking advancement in research methods and interdisciplinary approaches is giving birth to newer perspectives therefore it becomes imperative to keep pace with the advancement in research and development in the field of medicinal herbs there are a large number of researchers in different parts of the world working on various aspects of medicinal plants and herbal medicines the idea is to bring their recent research work into light in the form of a book the proposed book contains chapters by the eminent researchers in different countries and working with different disciplines of medicinal plants articles pertain to different disciplines such as 1 resources and conservation of medicinal plants 2 biosynthesis and metabolic engineering of medicinal plants 3 tissue culture propagation and bioreactor technology of medicinal plants 4 phytochemical research on medicinal plants 5 herbal medicines and plant derived agents in cancer prevention and therapy 6 herbal medicines and plant derived agents in metabolic syndrome management 7 herbal medicines and plant derived agents in modulation of immune related disorders 8 herbal medicines and hepatotoxicity the book will prove itself an asset for the researchers professionals and also students in the area of medicinal plants and mechanism of their action

contributed articles

reviews several recent developments that relate to improving crop productivity and product diversification considers the genetic manipulation of major

products such as carbohydrates fatty acids sesquiterpenes and floriculture crops and discusses aspects of the biosafety environmental release and commercial exploitation of transgenics other topics include developing pest resistant transgenic plants producing human therapeutics in plants using molecular biology techniques in plant breeding to protect intellectual property rights and biosystematics annotation copyrighted by book news inc portland or

the title of this volume plant biotechnology nell products and applications may look a little out of place among previous vol umes of current topics in microbiology and immunology that have focused mostly on issues related to human health and ani mal biology however plant biology has always been of immense and has enjoyed an intimate relationship practical importance with medicine and other biological sciences for centuries in creasing scientific specialization and the dramatic advances in the medical and chemical sciences during this century have left many persons with the impression that plant biology and plant bio technology is important only in relation to the agricultural sci ences this is no longer true within the past year a genetically engineered plant virus has been used to vaccinate and protect against an animal disease see the chapter by lomonossoff and hamilton the first human trials of a potential transgenic plant based oral vaccine against cholera have been conducted see the chapter by richter and kipp and the first human trial of an injectable transgenic plant derived therapeutic protein is under way discussed in the chapter by russell et al today plant biotechnology is being used in new and creative ways to produce therapeutic products for medicine and plastics for industry as well as new disease and stress resistant crops for agriculture

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Introduction

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