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

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

introductory text for students of genetics is general and the students of agronomy as the book gives numerous agronomic applications

an exploration of the relationship between plants and people from early agriculture to modern day applications of biotechnology in crop production plants and people origin and development of human plant science relationships covers the development of agricultural sciences from roman times through the development of agricultural experiment station

this practical laboratory manual has been designed to familiarise students with protocols on plant tissue culture and recombinant dna technology it deals with the basic aspects on introduction laboratory organization sterilization techniques nutrition medium and the choice of explant it also has exercises on plant tissue culture seed culture embryo culture meristem culture node culture axillary bud proliferation etc a part of the manual also deals with recombinant dna technology

during the past 15 years cellular and molecular approaches have emerged as valuable adjuncts to supplement and complement conventional breeding methods for a wide variety of crop plants biotechnology increasingly plays a role in the creation conservation characterization and utilization of genetic variability for germplasm enhancement for instance anther microspore culture somaclonal variation embryo culture and somatic hybridization are being exploited for obtaining incremental improvement in the existing cultivars in addition genes that confer insect and disease resistance abiotic stress tolerance herbicide tolerance and quality traits have been isolated and re introduced into otherwise sensitive or susceptible species by a variety of transgenic techniques together these transformative methodologies grant access to a greater repertoire of genetic diversity as the gene s may come from viruses bacteria fungi insects animals human beings unrelated plants or even be artificially derived remarkable achievements have been made in the production characterization field evaluation and commercialization of transgenic crop varieties worldwide likewise significant advances have been made towards increasing crop yields improving nutritional quality enabling crops to be raised under adverse conditions and developing resistance to pests and diseases for sustaining global food and nutritional security the overarching purpose of this 3 volume work is to summarize the history of crop improvement from a technological perspective but to do so with a forward outlook on further advancement and adaptability to a changing world our carefully chosen case studies of important plant crops intend to serve a diverse spectrum of audience looking for the right tools to tackle complicated local and global issues

this volume contains papers which indicate how biodiversity can be used in a sustainable and equitable manner various uses of biotechnology including bioremediation and genetic engineering are dealt with by various authors

today it is generally accepted that one of the key areas of biotechnology for the next century will be in plant based biotechnology biotechnology has created new opportunities for plant scientists with important applications to agriculture and forestry this reference text is divided into five sections for ease of presentation the first section focuses on the structure composition and functionality of plant cells and genes with particular emphasis on the cellular and molecular biology of plants and cultured cells section two is concerned with the direct exploitation of cell cultures for the production of useful substances the third section deals with regeneration and propagation systems the fourth section considers the increasingly central area of genetic manipulation of plant cell systems the last section is on specific applications in plant biotechnology this reference work is a survey of these various facets of plant biotechnology the individual chapters and the follow up literature cited allow an easy

access to the various subject areas and will hopefully stimulate interest in these rapidly moving and exciting fields of research

monthly classified listing of references to worldwide articles dealing with all aspects of biotechnology also includes books and conferences each entry gives bibliographic information institutional address of author s and abstract author and subject index

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