

Introduction To Plant Tissue Culture By M K Razdan

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EILEEN THOMAS

Plant Cell and Tissue Culture Garland Science

Cell culture methodologies have become standard procedures in most plant laboratories. Currently, facilities for in vitro cell cultures are found in practically every plant biology laboratory, serving different purposes since tissue culture has turned into a basic asset for modern biotechnology, from the fundamental biochemical aspects to the massive propagation of selected individuals. "Plant Cell Culture Protocols, Third Edition is divided into five convenient sections that cover topics from general methodologies, such as culture induction, growth and viability evaluation, statistical analysis and contamination control, to highly specialized techniques, such as clonal propagation, haploid production, somatic embryogenesis, organelle transformation. The volume concludes with a section on the laborious process of measuring the epigenetics changes in tissue cultures." 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 Cell Culture Protocols, Third Edition seeks to serve both professionals and novices with its guide to the most common and applicable techniques and methods for plant tissue and cell culture.

Plant Cell Culture Springer Science & Business Media

Plant tissue culture (PTC) is basic to all plant biotechnologies and is an exciting area of basic and applied sciences with considerable scope for further research. PTC is also the best approach to demonstrate the totipotency of plant cells, and to exploit it for numerous practical applications. It offers technologies for crop improvement (Haploid and Triploid production, In Vitro Fertilization, Hybrid Embryo Rescue, Variant Selection), clonal propagation (Micropropagation), virus elimination (Shoot Tip Culture), germplasm conservation, production of industrial phytochemicals, and regeneration of plants from genetically manipulated cells by recombinant DNA technology (Genetic Engineering) or cell fusion (Somatic Hybridization and Cybridization). Considerable work is being done to understand the physiology and genetics of in vitro embryogenesis and organogenesis using model systems, especially Arabidopsis and carrot, which is likely to enhance the efficiency of in vitro regeneration protocols. All these aspects are covered extensively in the present book.

Since the first book on Plant Tissue Culture by Prof. P.R. White in 1943, several volumes describing different aspects of PTC have been published. Most of these are compilation of invited articles by different experts or proceedings of conferences. More recently, a number of books describing the Methods and Protocols for one or more techniques of PTC have been published which should serve as useful laboratory manuals. The impetus for writing this book was to make available a complete and up-to-date text covering all basic and applied aspects of PTC for the students and early-career researchers of plant sciences and plant / agricultural biotechnology. The book comprises of nineteen chapters profusely illustrated with self-explanatory illustrations. Most of the chapters include well-tested protocols and relevant media compositions that should be helpful in conducting laboratory experiments. For those interested in further details, Suggested Further Reading is given at the end of each chapter, and a Subject and Plant Index is provided at the end of the book.

Introduction to Plant Biotechnology BoD – Books on Demand

Acclaimed as the most practical guide to plant tissue culture, the book is now even better and introduces new developments in biotechnology, such as genetic engineering and cell culture.

Plant Tissue Culture CRC Press

Plant Tissue Culture In One Form Or Another Has Become One Of The Most Promising Branches Of Plant Science. Arising From The Totipotency Of Plant Cells, It Now Occupies A Key Position In Plant Breeding, Plant Propagation And Plant Biotechnology. Plant Tissue Culture - Basic And Applied

Brings To The Student Accessible, Up-To-Date Information On This Subject. Basic Knowledge Of Tissue Culture Methods Such As Isolation Of Suitable Tissues From The Mother Plant, Maintenance Of The Tissues Under In Vitro Condition In An Undifferentiated Or De-Differentiated Stage, Methods Of Genetic Engineering And Gene Transfer, Chromosomal Studies And The Handling Of In Vitro Micro Plants Are Described In Detail In This Book. Similarly, Application Aspects Of Micropropagation, Haploid Cell Culture, Protoplast Culture, Embryo Culture, Somatic Embryogenesis And Artificial Seeds Are Also Discussed.

An Introduction to Plant Tissue Culture Academic Press

Document from the year 2012 in the subject Agrarian Studies, , course: Carrier Oriented Program, language: English, abstract: Plant tissue culture is a collection of techniques used to maintain or grow plant cells, tissues or organs under sterile conditions on a nutrient culture medium of known composition. Different techniques in plant tissue culture may offer certain advantages over traditional methods of propagation. This practical manual has been prepared in response to the necessities of the graduate students as an introduction to the in vitro tissue culture techniques and some molecular aspects.

Introduction to Plant Tissue Culture Science Publishers

This book presents latest work in the field of plant biotechnology regarding high-efficiency micropropagation for commercial exploitation at low labor and equipment costs. The book consists of 18 chapters on establishing advanced culture systems, techniques as well as latest modification protocols on a variety of crops. It also discusses new methods such as nylon film culture system, light-emitting diode and wireless light-emitting diode system, stem elongation, wounding manipulation and shoot tip removal, in vitro hydroponic and microponic culture system, thin cell layer culture system etc. Plant cell tissue has been developed more than fifty years ago. Since then applications of in vitro plant propagation expanded rapidly all around the world and played as an important role in agricultural and horticultural systems. This book will be of interest to teachers, researchers, scientists, capacity builders and policymakers. Also the book serves as additional reading material for undergraduate and graduate students of agriculture, forestry, ecology, soil science, and environmental sciences.

Modern Applications of Plant Biotechnology in Pharmaceutical Sciences Saskatoon :

National Research Council of Canada, Prairie Regional Laboratory

Advances in Plant Tissue Culture: Current Developments and Future Trends provides a complete and up-to-date text on all basic and applied aspects of plant tissue cultures and their latest application implications. It will be beneficial for students and early-career researchers of plant sciences and plant/agricultural biotechnology. Plant tissue culture has emerged as a sustainable way to meet the requirements of fresh produces, horticultural crops, medicinal or ornamental plants. Nowadays, plant tissue culture is an emerging field applied in various aspects, including sustainable agriculture, plant breeding, horticulture and forestry. This book covers the latest technology, broadly applied for crop improvement, clonal propagation, Somatic hybridization Embryo rescue, Germplasm conservation, genetic conservation, or for the preservation of endangered species. However, these technologies also play a vital role in breaking seed dormancy over conventional methods of conservation. Focuses on plant tissue culture as an emerging field applied in various aspects, including sustainable agriculture, plant breeding, horticulture and forestry Includes current studies and innovations in biotechnology Covers commercialization and current perspectives in the field of plant tissue culture techniques

Introduction to in Vitro Propagation John Wiley & Sons

The techniques of plant organ, tissue, and cell culture concentrated on reproducibility, simplicity and accuracy are now established in many research laboratories racy with sufficient illustration to make all mani throughout the world and are being used in numerous pulations clear. areas of plant science. Methods have been developed The drawings of items used in the bench layout to

propagate plants and free them from viruses using diagrams are symbolic and are 'keyed in' by number to shoot tip culture. The regeneration of plants from callus the list of materials and equipment. A line around an culture has also proved useful commercially. Elegant item indicates that is sterile. techniques have been used to synthesise somatic The adoption of an integrated text in which diagrams hybrids by the fusion of protoplasts and to transform are related spatially to the methods will, we hope, help cells. These and many other techniques have been the student to grasp the techniques quickly and effect and can be used to investigate a variety of botanical tively. This is first and foremost a manual which has its phenomena as well as to improve crop plants and now place on the laboratory bench open in front of the provide an important part of the basic experimental student, a book to be used! skills required by a majority of experimental botanists. *Plants from Test Tubes* S. Chand Publishing

The first volume of this Plant Tissue Culture (PTC) bibliography, published in 1986, covered the literature from 1900 to 1985. This supplement to the PTC bibliography covers the papers and books published in the period 1986-1989, with some references of 1985 and before which were not available when the original volume was compiled. The detailed Introduction to this volume includes a table with a graphic presentation of the trend of research in the field of PTC during this 5-year period. It is interesting to note that during the past five years alone about 6000 papers have been published, which is almost half of the literature published from 1900 to 1985. Another table lists the periodicals and their respective volumes surveyed for this book. Appended is an Index to Plant Names, which facilitates the search of the literature either subject-wise or species/crop-wise.

INTRODUCTION TO PLANT CELL TISSUE AND ORGAN CULTURE Elsevier

This work deals with basic plant physiology and cytology, and addresses the practical exploitation of plants, both as crops and as sources of useful compounds produced as secondary metabolites. Covers problems of commercial exploitation, socio-legal aspects of genetic engineering of crop plants, and of the difficulties of marketing natural compounds produced by cells under artificial conditions.

Plant Tissue Culture: An Introductory Text Daya Books

Under the vast umbrella of Plant Sciences resides a plethora of highly specialized fields. Botanists, agronomists, horticulturists, geneticists, and physiologists each employ a different approach to the study of plants and each for a different end goal. Yet all will find themselves in the laboratory engaging in what can broadly be termed biotechnol

Plant Cell and Tissue Culture - A Tool in Biotechnology Elsevier Publishing Company

A comprehensive state-of-the-art collection of the most frequently used techniques for plant cell and tissue culture. Readily reproducible and extensively annotated, the methods range from general methodologies, such as culture induction, growth and viability evaluation, and contamination control, to such highly specialized techniques as chloroplast transformation involving the laborious process of protoplast isolation and culture. Most of the protocols are currently used in the research programs of the authors or represent important parts of business projects aimed at the generation of improved plant materials. Two new appendices explain the principles for formulating culture media and the composition of the eight most commonly used media formulations, and list more than 100 very useful internet sites.

Applications of Plant Cell and Tissue Culture Springer Science & Business Media

Modern Applications of Plant Biotechnology in Pharmaceutical Sciences explores advanced techniques in plant biotechnology, their applications to pharmaceutical sciences, and how these methods can lead to more effective, safe, and affordable drugs. The book covers modern approaches in a practical, step-by-step manner, and includes illustrations, examples, and case studies to enhance understanding. Key topics include plant-made pharmaceuticals, classical and non-classical techniques for secondary metabolite production in plant cell culture and their relevance to pharmaceutical science, edible vaccines, novel delivery systems for plant-based

products, international industry regulatory guidelines, and more. Readers will find the book to be a comprehensive and valuable resource for the study of modern plant biotechnology approaches and their pharmaceutical applications. Builds upon the basic concepts of cell and plant tissue culture and recombinant DNA technology to better illustrate the modern and potential applications of plant biotechnology to the pharmaceutical sciences Provides detailed yet practical coverage of complex techniques, such as micropropagation, gene transfer, and biosynthesis Examines critical issues of international importance and offers real-life examples and potential solutions

Introduction to Plant Biotechnology (3/e) Springer Science & Business Media

It is a pleasure to contribute the foreword to *Introduction to Cell and Tissue Culture: The Ory and Techniques* by Mather and Roberts. Despite the occasional appearance of thoughtful works devoted to elementary or advanced cell culture methodology, a place remains for a comprehensive and definitive volume that can be used to advantage by both the novice and the expert in the field. In this book, Mather and Roberts present the relevant methodology within a conceptual framework of cell biology, genetics, nutrition, endocrinology, and physiology that renders technical cell culture information in a comprehensive, logical format. This allows topics to be presented with an emphasis on troubleshooting problems from a basis of understanding the underlying theory. The material is presented in a way that is adaptable to student use in formal courses; it also should be functional when used on a daily basis by professional cell culturists in academia and industry. The volume includes references to relevant Internet sites and other useful sources of information. In addition to the fundamentals, attention is also given to modern applications and approaches to cell culture derivation, medium formulation, culture scale-up, and biotechnology, presented by scientists who are pioneers in these areas. With this volume, it should be possible to establish and maintain a cell culture laboratory devoted to any of the many disciplines to which cell culture methodology is applicable.

Industrial Biotechnology Academic Press

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 Pathology Avery Publishing Group

Callus and cell culture. Isolation and culture of plant protoplasts. A method for fusion of plant protoplasts with polyethylene glycol. Introduction of genetic information into plant protoplasts. Isolation of 5-bromodeoxyuridine-resistant cells from soybean protoplasts. Meristem culture. Organogenesis and embryogenesis. Histological methods.

Liquid Culture Systems for in vitro Plant Propagation Humana Press

Designed primarily as a text for undergraduate and postgraduate students of Botany and Plant Biotechnology, the book discusses the theoretical aspects and modern applications of plant cell, tissue and organ culture. Written with the aim of providing up-to-date information on the subject, and focused on the concept of commercialization of plant cell culture, the contents have been presented with clarity. The book not only discusses the theoretical aspects of plant tissue culture but also emphasizes the art of its practice. It also provides a systematic explanation of asepsis and methods of sterilization, plant tissue culture techniques, culture of reproductive structures, plant tissue culture in germplasm conservation, its applications in the industry and plant pathology and operation and management of greenhouse hardening unit. In addition, it discusses in vitro propagation of plants (micropropagation) with a series of case studies pertaining to tree species and horticultural crops. Besides students, the book will also prove to be useful for researchers, scholars and teachers.

Plant Cell Culture John Wiley & Sons

Introduction and techniques; Introductory history; Laboratory organisation; Media; Aseptic manipulation; Basic aspects; Cell culture; Cellular totipotency; Somatic embryogenesis; Applications to plant breeding; Haploid production; Triploid production; In vitro pollination and fertilization; Zygotic embryo culture; Somatic hybridisation and cybridisation; Genetic transformation; Somaclonal and gametoclonal variant selection; Application to horticulture and

forestry; Production of disease-free plants; clonal propagation; General applications; Industrial applications: secondary metabolite production; Germplasm conservation.

Practical Book of Biotechnology & Plant Tissue Culture CRC Press

Plant Tissue Culture Techniques and Experiments is a manual that contains laboratory exercises about the demonstration of the methods and different plant materials used in plant tissue culture. It provides an overview on the plant cell culture techniques and plant material options in selecting the explant source. This book starts by discussing the proper setup of a tissue culture laboratory and the selection of the culture medium. It then explains the determination of an explant which is the ultimate goal of the cell culture project. The explant is a piece of plant tissue that is used in tissue culture. Furthermore, the book discusses topics about callus induction, regeneration and morphogenesis process, and haploid plants from anther and pollen culture. The meristem culture for virus-free plants and in vitro propagation for commercial propagation of ornamentals are also explained in this manual. The book also provides topics and exercises on the protoplast isolation and fusion and agrobacterium-mediated transformation of plants. This manual is intended for college students, both graduate and undergraduate, who study chemistry, plant anatomy, and plant physiology.

Plant Tissue Culture: New Techniques and Application in Horticultural Species of Tropical Region Bios Scientific Pub Limited

Automation in plant tissue culture; General introduction and overview; Economic analysis of automated micropropagation; Economic aspects of somatic embryogenesis; Systems analysis and engineering; Engineering aspects of plant propagation in bioreactors; Mechanical engineering approaches to plant biotechnology; Image analysis for plant cell culture and micropropagation; Image analysis for embryogenesis; Automation of the bioreactor process for mass propagation and secondary metabolism; Delivery system for tissue culture by encapsulation; A delivery system for naked somatic embryos for interior spruce; Automated systems for organogenesis; Commercialisation of tissue culture and automated systems; Environmental control in plant tissue culture; General introduction; Physical microenvironmental and its effects; Vessels, gels, liquid media, and support systems; The chemical microenvironment; Carbon nutrition in vitro; Regulation and manipulation of carbon assimilation in micropropagated systems; Ethylene; In vitro acclimatization; Low temperature storage of plant tissue cultures; Environmental measurement and control systems.