

Plant Cell and Tissue Culture—A Tool in Biotechnology: Basics and Application by Neumann, Karl-Hermann, Kumar, Ashwani, and Imani, Jafargholi

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An elegant production from Springer this year from their well-known and very well-received series *Principles and Practices* came in the form of a handy book on plant tissue culture by Neumann et al. (2009). This volume is unique in the production series as this is not an edited volume as is mostly expected by the title and the publisher which makes it more interesting reading and attractive since there is less chances of repetitions of some basic aspects as is commonly observed in several multiauthored volumes. The three authors, all of them being well respected for their basic research in their respective disciplines, have been instrumental in bringing forward this timely volume. Although plant tissue culture used extensively in several laboratories across the globe in not a new innovation in plant science, however, the authors deserve credits in trying to bring about a nice balance in describing all the commonly used plant tissue culture approaches. The approach of including several examples and description of well-illustrated protocols from available primary literature and the author's own laboratory experiences and helpful guidelines make this volume a gem for conventional tissue culture practices.

The volume has been divided into 15 separate chapters dealing with introduction (chapter 1), history (chapter 2), callus culture (chapter 3), cell suspension culture (chapter 4), protoplast culture (chapter 5), and haploid techniques (chapter 6) to begin with. This is followed by nice coverage of plant propagation approaches, factors influencing cell culture systems, primary and secondary metabolism as chapters 7, 8, 9, and 10, respectively. Plant hormones and growth regulators, cell division, growth and differentiation, and genetic technology constitute chapters 11, 12, and 13. The last two chapters are summaries of physiological aspects and applications of plant cell and tissue culture technology.

The authors have avoided providing too much information and in-depth discussion about every individual aspect of tissue culture but have been cautious in highlighting most prevalent techniques and providing broad overviews. Additional references and associated primary literature are available for more serious and enthusiastic readers, advanced level

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students, and researchers. The book has numerous illustrations (153 in total) spread across different chapters in the form of images, flow charts, diagrams, and graphs that are invaluable in grasping the basic concepts behind the divergent application of plant cell and tissue culture technology. Both basic and applied versions of plant tissue culture are being well covered starting with the history of the subject, its relationship with other disciplines, and its evolution to present day technology platform. The basic structure of the book and the arrangement of the chapters within have been done very nicely; although dividing the chapters into three or more subsections on similar themes would have been even better. The nice and fluid language of the volume is worth mentioning and will be a delight reading for several students who are scared by biology and more particularly plant biology topics. It is not easy to generate a volume on an area so widely visible in several well-known competing titles, some of them by most respected names from the field and being available over few decades in subsequent editions. Hence, we would like to congratulate the authors for coming up with this volume on a very commonly reported approach in plant biotechnology in such a nice, simple, and elegant manner and deserves special mention as an excellent production.

Some typos were noted of very minor nature in some of the chapters. We would appreciate the breaking down of the chapters on introduction, history, plant hormones and cell division, growth, and differentiation like the other chapters in this volume. They seem to be deviant of the general style and structure of the book. Although haploid production has been discussed as a separate chapter; however, discussion on doubled haploidy, challenges and prospects, and isolated microspore culture (IMC) is not well covered or are completely missing. IMC has been now recognized as one of the most important mode of gene delivery even in plant groups recalcitrant to common *Agrobacterium*-mediated gene transfer such as monocots and deserves special mention. Also, the more advanced discussion dealing with colchicine treatment and problems of albino plants in haploid production has not been covered. The section in gene technology is too fundamental and needs to incorporate more recent information on modern gene delivery techniques including use of nanotechnology and cell-penetrating peptide-mediated approaches that integrate with plant tissue culture in future editions. We suggest having a separate section on challenges in generating in vitro transformed monocot plantlets particularly cereals in the laboratory. Since this is a fundamental book that would serve as a guide book or a handbook or a text book down the line, some practical tips on controlling bench contamination, challenges of fungal and bacterial contaminants, good practices, and how to deal with these issues in the laboratory and greenhouse and phytotrons would be extremely valuable for students and young researchers enthusiastic about looking into future prospects of plant tissue culture. Although some latest technology and information on modern plant biotechnology has been included in this volume; however, we do not recommend this as a highly specialized tissue culture research volume but as a fundamental book with general coverage of all the related practices in plant tissue culture under one roof; and as an excellent resource for beginners and students.

To the best of our experiences, this volume is suitable for both undergraduate and postgraduate level courses in life sciences, biotechnology, plant tissue culture, plant biotechnology, agricultural biotechnology, forestry or advances in silviculture, advances in plant breeding and genetics, advanced level biology and botany, or plant science courses. We also recommend this volume for M.Tech., M.Phil., and PhD level courses in the above-mentioned areas and related disciplines.