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Book review

Loyola-Vargas, Victor M., Vázquez-Flota, Felipe (Eds.), Plant Cell Culture Protocols: second ed., Methods in Molecular Biology vol. 318 Humana Press Totowa, New Jersey, 2006. pp. 393. ISBN: 1-58829-547-8.

Plant cell and tissue culture techniques are standard procedures in modern biotechnology. They are used in most academic laboratories and an increasing number of commercial institutions. Widely used applications of tissue culture technology include large-scale propagation of elite materials, preservation of endangered species, generation of genetically modified individuals, metabolic engineering of secondary metabolite biosynthesis, and studies of basic aspects of plant biology and biochemistry.

The volume provides an updated step-by-step guide to the most common and applicable methods for plant tissue culture. Authors from 10 countries contribute protocols that are currently used in their research programs. The book contains six sections with 30 chapters. Its scope extends from general methods such as culture induction and maintenance to highly specialized techniques such as chloroplast transformation. All contributors provide detailed methodological information that makes the protocols readily reproducible. Each chapter starts with a summary. Most figures are printed in black and white, some of them reproduced in high-quality colour plates.

The book's 'Introduction' section comprises two chapters addressing the historical development, current applications and future trends of the in vitro technologies. The second section – 'Cell culture and plant regeneration: The fundamentals' – contains eight chapters dealing with contamination management, growth measurements, culture induction and maintenance, measurement of cell viability, cryopreservation of cell suspensions, somatic embryogenesis in spruce, indirect somatic embryogenesis in cassava, and direct somatic embryogenesis in coffee. The six chapters of the third section – 'Plant propagation in vitro' – describe a temporary immersion bioreactor system, generation of photoautotrophic coconut in vitro plants, statistics in plant biotechnology, micropropagation of *Agave* species, micropropagation of endangered plant species, and clonal propagation of softwoods. The fourth section – 'Applications for plant protoplasts' – includes five chapters on plant regeneration from *Passiflora* protoplasts, plant regeneration from *Echinacea* protoplasts, production of cybrids in Brassicaceae, plant regeneration from tobacco guard cell protoplasts, and production of interspecific hybrid plants. The fifth section provides 'Protocols for genomic manipulation', its five chapters introduce the reader to transformation of *Petunia* via *Agrobacterium*, transformation of wheat via particle bombardment, chloroplast transformation, biochemical resistance to aluminum, and transformation of maize via *Agrobacterium*. The last section – 'Accumulation of metabolites in plant cells' – covers four chapters focusing on capsaicin accumulation, ribosome-inactivating proteins, production of monoterpenoid indole alkaloids, and regeneration and transformation in *E. californica*.

Two new appendices have been added. The formulation of high, intermediate, and low salt media and the composition of the eight most commonly used culture media is explained. The second appendix lists more than 100 useful Internet sites.

The editors have produced an excellent volume in an impressive and well established series. Covering a variety of current in vitro culture methods, the book will be a major resource of information for researchers who desire a comprehensive overview of plant tissue culture techniques. Like the first edition, the new volume deserves widespread attention.

Ludger Beerhues
Institut für Pharmazeutische Biologie, Technische Universität Braunschweig, Mendelssohnstrasse 1, D-38106 Braunschweig, Germany
E-mail address: l.beerhues@tu-bs.de

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