

PLANT TISSUE CULTURE – THEORY AND TECHNIQUES

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FOREWORD

This book is an elegant piece of work which combines the research experience in plant tissue culture with the extensive knowledge of the needs of undergraduate and post graduate students for a subject that is increasingly pervading the public and private sector and offers a vast scope for future. This book provides a clearly written, well documented text that covers all the basic and applied aspects of plant tissue culture and enables the students to formulate their experiments independently. The illustrative text and references of this book enables the reader to follow up the points of interest in greater detail.

The coming years will see the spread of plant tissue culture in all the fields of Agriculture, Botany, Genetic manipulations, Environmental science and in varied industrial applications, which requires better understanding of the subject. This book titled “ Plant tissue culture – theory and techniques” by Shailesh Kumar, Sweta Mishra and A.P. Mishra, will undoubtedly contribute significantly by inspiring students in this direction.



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PREFACE

The purpose of this book is to introduce a basic experimental method for each of the major areas of investigation involving the isolation and culture of plant cells, tissues and organs. Each chapter is devoted to a separate aspect of plant tissue culture and the chapters are arranged in the order of increasing technical complexity. This book is mainly written for the undergraduates and postgraduate students and also for the research workers working in this area. The book is designed keeping in mind the problems faced by the scientists and research scholars working with plant tissue culture, however, it can be used as a supplementary text for developmental botany and biology.

The opening chapters present a brief historical survey of the field of plant tissue culture, a background in sterilization techniques. Various components of the nutrient medium have been dealt in greater detail. The text deals with the experimental details of each and every technique. Several chapters introduce diverse approaches to plant propagation by in vitro techniques. The protocols have been simplified legibly to include details and notes that we hope will help the user avoid unnecessary errors and confusion. All the applications of plant tissue culture have been very well discussed and the techniques associated with them described in detail. The various sections have been written with safety in mind, but users should ensure that they are fully familiar with all safety requirements of the equipments and media. Plant tissue culture is not without risk to the experimenter.

Tissue culture, however, is still sometimes more art than science. It has been said that the greatest thing that anyone can achieve is to make a difference. We hope that, in writing this book, we will, in some small way, do just that.

The authors acknowledge all the contributions made by the scientists of the present and past era who have been working in the field of plant tissue culture due to which the science has gained such an importance today.

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A.P. MISHRA**

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Plant tissue culture depends on the ability of plant tissue to give rise to an entire new plant when provided with a growth medium and appropriate environment. This ability of plant cells or tissues is termed "totipotency."™ The fundamental steps of plant tissue culture are fourfold: Select a healthy parent plant (explant). Eliminate any microbial contamination from any exposed explant surfaces. Inoculation the explant in an adequate culture medium. Plant tissue culture is defined as culturing plant seeds, organs, explants, tissues, cells, or protoplasts on a chemically defined synthetic nutrient media under sterile and controlled conditions of light, temperature, and humidity. From: Modern Applications of Plant Biotechnology in Pharmaceutical Sciences, 2015. 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. It is widely used to produce clones of a plant in a method known as micropropagation. Different techniques in plant tissue culture may offer certain advantages over traditional methods of propagation...