

Preface to the Second Edition

While this revised edition shall provide an enjoyable way to comprehensively review various topics relating to Biodiversity and Biotechnology, more number of students, we are sure, will want to have this volume on their shelf for frequent use. A well written and carefully referenced compendium of twenty-two outstanding articles on the subject, as the text is, the book explores recent developments and advances in the subject, making these more accessible to the discerning readers – students and teachers alike. That the book has already been accepted as a timely resource for the rapidly growing field of Biotechnology, is evident from the speedy disposal of its first edition, in an unusually short span of time.

An optimist, as they say, discovered the plane, a pessimist the parachute – and we needed them both. Likewise, we have taken in our stride all positive and negative observations – fortunately, the positives predominating – from various quarters, and have paid serious heed to them all, while revising the text. Biodiversity and Biotechnology is an emergent area, where students always need to be at the cutting edge; and with that aim in view, this new edition has been meticulously planned. We shall be happy if this edition wins critical acclaim from the readers in general, and Biotechnology-enthusiasts in particular.

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Preface to the First Edition

Biodiversity and Biotechnology are two domains of Life Sciences that are interrelated and occupy the centre stage of any modern teaching and research curricula. Biodiversity is defined as the variability among living organisms from all sources, including inter alia, terrestrial, marine, and other aquatic ecosystems and the environment of which they are part. This includes diversity within species, between species and of ecosystem. In recent times, study of diversification of the living organisms is not restricted only to macromorphology and the basic biology of an organism. Without belittling the importance of studying the classical aspects of biology, it is emphasised that to understand clearly the true nature of various structures (similarity and dissimilarity of the same structure from different organisms) of an organism, ultrastructural studies by electron microscopy are needed. Macromorphologically similar

organisms may exhibit very important differences with regard to ultrastructural, biochemical, genetic, and molecular features. These features reflect their true phylogenetic relationship. This approach of studying living organisms has revealed the most minute differences among the organisms and divided the living world into six kingdoms. The true potentiality of any organism with regard to its exploitation for human welfare and the surrounding environment in its natural or genetically altered form is also better understood from such studies. It is already well-established that true understanding of the diversified living world is absolutely necessary to develop a database for future exploitation.

Biotechnology involves commercial techniques that use living organisms or substances from those organisms to make or modify a product. It includes techniques used for the development of microorganisms to act on the environment and produce materials for the benefit of human health and welfare. It is definitely an integration of bio-disciplines such as cell biology, biochemistry, microbiology, molecular biology, and molecular genetics that establish diversified nature of an organism, with engineering. Such an integrated approach resulted in developing suitable devices for proper utilisation of living organisms. An actual biotechnological method to be applied depends on the basic biology, ultrastructural, and biochemical features of the organisms concerned. A close relationship between these two domains of Life Science is thus established.

This book contains twenty two articles covering various aspects of Biodiversity and Biotechnology. Both these subjects are involved directly with nature study and human welfare. The topics included are relevant to the syllabi of Life Science related courses of Indian universities. The articles are written by experienced teachers/scientists/experts of concerned fields who have long experience of teaching and working in these fields. The topics cover fundamental as well as advanced and modern aspects of biodiversity and biotechnology. It is very difficult for the students to keep pace with the recent developments in various fields. Here, we have attempted to present before them the fundamental as well as very modern findings in a manner considered suitable for the students. Definitions of various terms related to biodiversity and its conservation, measurement of biodiversity, evolution of diversified groups of organisms through billions of years, diversity at cellular and molecular level, monitoring of diversity by study of DNA have been given. Similarly, the fundamental aspects of biotechnology have been emphasised upon. The tools and techniques involved in biotechnology and the application of biotechnology in different groups of organisms starting from bacteria to higher animals have been covered. An article concerning environmental biotechnology is also included. Very modern topics like Probiotics, Antisense RNA technology, Single nucleotide polymorphism, Protoplast culture also find their place in this book. The articles have been written and edited for the benefit of the honours and postgraduate students of Botany, Zoology, Microbiology, and Biotechnology.

We are grateful to all the eminent scholars who have contributed their valuable articles to this volume. We also extend our appreciation to Mr Amitabha Sen, Director, New Central Book Agency Pvt. Ltd for his valuable suggestions and constant cooperation. Thanks are also due to Sri Soumen Paul for his help in the preparation of the manuscript. The book will also be a reference guide for the teachers and the students appearing for GATE, NET, and SLET examinations will find this book helpful in preparing objective as well as explanatory questions.

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