

Acknowledgments Preface

In its simplest definition, biotechnology is the technology based on biology. Biotechnology harnesses cellular and molecular processes to develop technologies and products that improve our lives and the health of our planet. We have used the biological processes of microorganisms to make useful food products, such as bread and cheese, and to preserve dairy products. Modern biotechnology provides breakthrough products and technologies to combat debilitating and rare diseases, reduce our environmental footprint, feed the hungry, use less and cleaner energy, and have safer, cleaner and more efficient industrial manufacturing processes.

Biotechnology is an intensive practical oriented subject. It requires laboratories with sophisticated instruments and modern facilities. It has made tremendous progress in the recent past with great scope for application in all fields of science. There has been rapid development of new methodologies and techniques in molecular biology and allied subjects that have been frequently used in the study and research in biotechnology. New techniques have been regularly introduced with greater sensitivity and improved methodologies have been developed with greater accuracy. Developments in the field of genetic engineering, in particular, have contributed a wide range of new techniques. It is essential to make the students and researchers familiar with the basic techniques used in biotechnology for enhancing their theoretical knowledge and practical skills to become a biotechnologist. Keeping these in view, this book is designed the application of biological sciences in engineering with theoretical and practical aspects of biotechnology. This book comprises questions and answers on all aspects of biotechnology. For this a number of techniques have been selected and presented in a simple way with theoretical background, principles, materials required, protocol, troubleshooting, and review questions pertaining to the experiment in order to make the students understand intricacies of the techniques and follow a healthy laboratory practice for successfully conducting the experiments. This book is designed as an introduction to the various tools of molecular biology. It introduces all the basic methods of molecular biology including cloning, PCR, Southern (DNA) blotting, Northern (RNA) blotting, Western blotting, DNA sequencing, oligo-directed mutagenesis, and protein expression.

We hope this book would be of use to all those engaged in biotechnology teaching and research.

Authors