

Preface

Biotechnology is multidisciplinary science subject involving a variety of distinct subject, where various living organisms and parts of organisms are used for the human welfare. The students obviously need a book that can provide complete and comprehensive aspects of the subjects and various biotechnological procedures applied in biology. This book *Basic Experiments in Biotechnology* aims to fulfill such a need of the students and teachers as well.

One of the exciting aspects of being involved in the field of biotechnology is the accelerating rate of progress. This book has been divided into four segments. The first segment discussed about biotechnology and its emerging fields; the segment '1' has 13 basic experiments for the students who are entering into the laboratory for the first time. In this segment, they will learn about the preparation of buffer and solutions, quantitative and qualitative tests about amino acids, protein, nucleic acids, (RNA & DNA) by different methods and isolation of casein protein from the milk. In the segment '2' about animal physiology, here, the students will learn about expression of solutions in concentrations, determination of urine urea nitrogen, calculating acid number of fats, calculation of saponification number and average molecular weight of triacylglycerols, salting in, salting out and dialysis of proteins, determination of serum albumin, total cholesterol, etc., blood group analysis, ouchterlony double diffusion test and determination of haemoglobin content by haemoglobinometer. The last segment 3 has 28 experiments about biotechnology and biological techniques for microbiology, plant tissue culture, genetic engineering and industrial biotechnology. Here the students will learn about culture of bacteria on solid and liquid medium, isolation of bacteria, methods of sterilization, sterilization of nutrient media, preparation of agar plates, simple staining, Gram staining, negative staining, biochemical characterization, determination of bacterial growth by turbidimetric method, preparation of alcohol from fruit juice, sterilizing plant materials, demonstration of *in vitro* morphogenesis and totipotency of seedling, effects of hormone balance on explant growth and morphogenesis, preparation from basal salt solutions, callus formation and multiplication, establishment of suspension cultures, anther culture, culture of primary chick embryo fibroblasts (CEF), transfer of cell cultures, preservation of cultured cells by freezing, isolation of DNA from animal

tissue, isolation of DNA from plant leaves (C-TAB Method), isolation of high molecular weight genomic DNA from bacteria, isolation of plasmid DNA from *E. coli* bacteria, purification of DNA, quantitative estimation of DNA by spectrophotometric method and Agarose Gel Electrophoresis (AGE) for separation of DNA. This book will extensively assist students, teachers and academicians to further extend their knowledge beyond the course work and related subject matter but onto the practical application to gain insights of what happening in the present era of applied science.

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