PHARMACEUTICAL MICROBIOLOGY

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PREFACE

Micro-organisms are the oldest inhabitants of earth. They are masters in versality and adaptability to the changing environment. They will definitely prove to be most cost-effective partners in our efforts for sustainable development. The microorganisms influence the man in several ways. The diversity of their activities varies from causing diseases in human and other animals and plants to the production of various useful products. Microbes have a very significant role in the era of biotechnology and hence microbiology has today come forth as one of the most demanding subjects in the science stream of graduate and post graduate courses. The contents of the present book have been divided into 5 chapters covering basic studies of microorganisms excluding their application part. Book covers detailed information on history of microbiology, evolution of microorganisms, classification, Nomenclature and latest information of Bergey's manual. Chapter covers information about structure, metabolism reproduction, function and diseases caused by Bacteria, Viruses, Bacterial viruses, Plant viruses, Animal viruses, Archaea, Mycoplasma and Phytoplasma. General account of cyanobacteria including their nutrition and reproduction have been given. Book provides detailed information about Gram negative and Gram-positive Bacteria and Eukaryotes viz. Algae and fungi. At end of book appendix and various types of questions have been given for the benefit of students. A concise account of microorganisms is given in the text book, so as to make the students aware of the nature and other important aspects of the microorganisms. Present book is a compilation of information on microbiology done in a manner so as to meet the need of students of microbiology of the Indian Universities. A large number of standard books on the subjects and research journals have been consulted.

Grateful thanks are due to the authors, editors and publishers of these books and journals. Although we have tried our best to supply correct and latest information in this book, errors or omissions might have crept in. We shall welcome comments suggestions and constructive criticism for future guidance and improvements. We are specially indebted to VSRD Academic Publishing (A Division of Visual Soft India Private Limited) for his keen interest in bringing out the book in a nice form.

✍ *Authors*

SYLLABUS

UNIT I **10 HOURS**

Introduction, History of microbiology, Its branches, Scope and its importance. Introduction to Prokaryotes and Eukaryotes. Study of ultra-structure and morphological classification of bacteria, Nutritional requirements, Raw materials used for culture media and physical parameters for growth, Growth curve, Isolation and preservation methods for pure cultures, Cultivation of anaerobes, Quantitative measurement of bacterial growth (total and viable count). Study of different types of phase contrast microscopy, dark field microscopy and electron microscopy.

UNIT II **10 HOURS**

Identification of bacteria using staining techniques (Simple, Gram's and Acid-fast staining) and biochemical tests (IMViC). Study of principle, Procedure, Merits, Demerits and applications of physical, Chemical, Gaseous, Radiation and mechanical method of sterilization. Evaluation of the efficiency of sterilization methods. Equipment employed in large scale sterilization. Sterility indicators.

UNIT III **10 HOURS**

Study of morphology, Classification, Reproduction / Replication and cultivation of Fungi and Viruses. Classification and mode of action of disinfectants. Factors influencing disinfection, Antiseptics and their evaluation. For bacteriostatic and bactericidal actions. Evaluation of bactericidal and bacteriostatic. Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.

UNIT IV **08 HOURS**

Designing of aseptic area, Laminar flow equipment; Study of different sources of contamination in an aseptic area and methods of prevention, Clean area classification. Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids. Assessment of a new antibiotic.

UNIT V **07 HOURS**

Types of spoilage, Factors affecting the microbial spoilage of pharmaceutical products, Sources and types of microbial contaminants, Assessment of microbial contamination and spoilage. Preservation of pharmaceutical products using antimicrobial agents, Evaluation of microbial stability of formulations. Growth of animal cells in culture, General procedure for cell culture, Primary, established and transformed cell cultures. Application of cell cultures in pharmaceutical industry and research.

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