

The Complete Book on Biotechnology Based Bulk Drugs

Author: NPCS Board of Consultants & Engineers

Format: paperback

Code: NI194

Pages: 488

Price: Rs 1050 | US\$ 125

Publisher: NIIR PROJECT CONSULTANCY SERVICES

Shipping: 5 days

About the Book

Biotechnology has played an essential role in the development of the healthcare chemical industries. The range of product includes diagnostic, prophylactic and therapeutic agents. The discovery of a potentially active compound starts a sequence of exhaustive chemical and biological testing that may culminate in manufacture of the agent or an improved analog. The role of biotechnology in this complex path to regulatory approval and marketing is diverse. Biotechnology is a field of applied biology that involves the use of living organisms and bioprocesses in engineering, technology, medicine and other fields requiring bio products. Biotechnology also utilizes these products for manufacturing purpose. Some of the examples of drugs produced through biotechnology are penicillin, lincomycin, streptomycin, tylosin, peptide antibiotics, cephalosporins, etc. Modern use of similar terms includes genetic engineering as well as cell and tissue culture technologies. Biotechnology draws on the pure biological sciences and in many instances is also dependent on knowledge and methods from outside the sphere of biology. Conversely, modern biological sciences are intimately entwined and dependent on the methods developed through biotechnology and what is commonly thought of as the life sciences industry. The development of biotechnology is taking place in almost all fields of human life. The recent advances in the field of basic genetics have opened up new vistas, potentials and possibilities. Some of the fundamentals of the book are the pharmaceutical industries, marketing strategy, common features in the evolution of products and processes, process technology fermentation, product recovery, new trends in biotechnology, penicillins, biosynthesis and regulation of thienamycin, olivanic acids and epithienamycins, aminoglycoside antibiotics, streptidine and deoxystreptamine, streptomycin, neomycin, paromomycin, ribostamycin and butirosin gentamicin, micronomicin and sisomicin, tylosin, peptide antibiotics, current applications of peptides, blasticidin S: an agricultural antibiotic bleomycin and bestatin: peptides used in anticancer therapy etc.

The present book contains process of biotechnology based bulk drugs like penicillin, B lactam antibiotics, aminoglycoside antibiotics, peptide antibiotics, anti cancer agents, lincomycin etc. This is very resourceful book for entrepreneurs, technocrats, research scholars, libraries etc.

Contents

CHAPTER 1

INTRODUCTION

The Pharmaceutical Industries

Marketing Strategy

Common Features in the Evolution of Products and Processes

Process Technology

Fermentation

Product Recovery

New Trends in Biotechnology

CHAPTER 2

PENICILLINS

Historical Perspective History

Biosynthetic Penicillins

Process Overview

Fermentation Technology

The Culture: Strain Development

Mutation

Selection

Genetics

Fermentation Process : Flow Sheet

Facilities

Inoculum Development

Fermentation Stage: Medium

Process Control

Physiological Variables and Their Effect on Product Formation

Duration of the Fermentation

Recovery of Penicillin

Carbon Process (Obsolete)

Solvent Extraction Process (Industry Standard)

Process Overview

Filtration

Solvent Extraction

Carbon Treatment

Further Extraction

Crystallization

Drying

Further Processing

Penicillin Acid Process (State of the Art)

Semisynthetic Penicillins

6-Aminopenicillanic Acid

Enzymic Cleavage of Penicillins to Yield 6-Aminopenicillanic Acid

Chemical Preparation of 6-Aminopenicillanic Acid

Synthesis of Clinically Useful Penicillins and Closely Related Congeners

Automation

Process Economics

Costs

CHAPTER 3

NOVEL β -LACTAM ANTIBIOTICS

Thienamycin

Discovery

Chemistry

Pharmacological Activity

Chemical Synthesis

Biosynthesis and Regulation of Thienamycin

Biosynthesis

Regulation

Classical Fermentation Process

Introduction
Seed Stages
Production Stage
Fermentation Process Development
Strain Improvement
Fed-Batch Techniques
Synthetic Media
Novel Fermentation Processes
Ultrafiltration Coupled Fermenter
Immobilized Cells
Thienamycin Purification
Future Prospects
Market Projections
Clavulanic Acid
Introduction
Production
Market
Olivanic Acids and Epithienamycins
Nocardicins
Introduction
Production of Nocardicin A
Market Projections
Monobactams

CHAPTER 4

AMINOGLYCOSIDE ANTIBIOTICS

Streptidine and Deoxystreptamine
Streptomycin
Neomycin, Paromomycin, Ribostamycin and Butirosin
Gentamicin, Micronomicin and Sisomicin
Fortamine and Fortimicins
Mutasyntesis
A-Factor
Metabolic Grid
Manufacture
Fermentation
Microorganisms
Equipment
Inoculum Development
Media
Procedures
Isolation
Strain Improvement

CHAPTER 5

TYLOSIN

Production Technology
Structure of Tylosin and Related Compounds
Biosynthetic Pathway
Growth of Producer Microorganisms
Product Recovery and Purification

Product Development
Development in the Genetic Improvement of Producing Strains
Developments in Fermentation Technology

CHAPTER 6

PEPTIDE ANTIBIOTICS

Current Applications of Peptides
Blasticidin S : an Agricultural Antibiotic
Bleomycin and Bestatin: Peptides used in Anticancer Therapy
Cyclosporin: an Immunosuppressor
Structural Types of Peptides
Biosynthesis of Peptide Antibiotics
Ribosomal and Nonribosomal Mechanisms
Reactions Involved in Enzymatic Peptide Formation
Carboxyl Activation
Peptide Bond Formation
Modification Reactions
Production of Peptides
Screening Methods
Biotechnological Production Methods
Improvements and Modification Procedures
Compilation of Peptides
Abbreviations Used in the Table
Alternative Names and Synonyms Compounds Listed in the Table
Appendix

CHAPTER 7

STREPTOMYCIN AND COMMERCIALY IMPORTANT AMINOGLYCOSIDE ANTIBIOTICS

Generalities on Aminoglycoside Antibiotics
Historical Background
Structure of Different Classes of Aminoglycoside Antibiotics
Microbiological Activity and Clinical use
Mode of Action
Problems with Toxicity and Bacterial Resistance
Toxicity
Bacterial Resistance
Streptomycin
Generalities
Physicochemical Properties
Assay and Identification Methods
Assay Methods
Identification Methods
Biosynthesis
Production Technology
Fermentation
Product Recovery
Other Major Aminoglycoside Antibiotics
Screening and Genetic Engineering of Strains for New Aminoglycosides
Screening of new strains
Use of Idiopathic Mutants
Structural Modification of Known Aminoglycosides

Hemisynthesis
Bioconversion
Chemical Synthesis of New Aminosides
Streptothricins, Aminoglycoside-like Antibiotics
Structure
Physicochemical and Biological Properties
Production by Fermentation and Isolation
Uses
Marketing Prospects

CHAPTER 8

CEPHALOSPORINS

Mode of Action of Cephalosporins
Structure and Biosynthesis of Bacterial Cell Wall
Sensitivity and Resistance
Structure/Activity Relationships
Cephalosporin Market
Biosynthesis of Cephalosporins
Biosynthesis Pathway
Regulation of Cephalosporin Biosynthesis
i•j-Aminoadipic Acid
Valine
Cysteine
Effect of Oxygen Tension
Catabolite Repression
Specific Growth Rate
Fermentation Process
The Fermenter-Its Design and Instrumentation
Fermentation Microbiology
Production Kinetics
Strain Development
Fermentation Development
Alternative Process-DAC Process
Recovery Process
Purification of Cephalosporin C
Cleavage of Cephalosporin C to 7-ACA

CHAPTER 9

COMMERCIAL PRODUCTION OF CEPHAMYCIN ANTIBIOTICS

Cephamicin Product Description
Discovery
Mode of Action
Cefoxitin
Physicochemical Characteristics
Cephamicin C Assay Techniques
Fermentation Microbiology
Introduction
Metabolic Origins
Carbon Metabolism
Nitrogen Metabolism
Sulfur Metabolism

Phosphate Metabolism
Cephamycin Production Technology
Inoculum Development Stage
Antibiotic Production Stage
Isolation and Purification Stage
Conclusions and Implications

CHAPTER - 10

LINCOMYCIN

Discovery
Chemistry
Spectrum
Mode of Action
Lincomycin Assays for Fermentation Development and Production
Production Technology
Lincomycin Biosynthesis
Fermentation
Lincomycin Production by Other Actinomyces Species
Fermentation Power Requirements
Isolation
Chemical Derivatives of Lincomycin
Commercial Markets
Current Manufacturers
Product Outlook

CHAPTER 11

PHARMACOLOGICALLY ACTIVE AND RELATED MARINE MICROBIAL PRODUCTS

Pharmacologically Active Compounds From Marine Microorganisms
Products From the Culture of Microalgae in Coastal Ponds
Agricultural Applications
Conclusions

CHAPTER - 12

ANTICANCER-AGENTS

The Drug Development Process
Market Information
Containment Technology for Cytotoxic Agents
Containment of Process Equipment
Personnel Protection
Decontamination of Waste Streams
Microbial Process Examples
Fermentation Processes for Production of Anthracyclines
Strain Improvement
Batch Fermentation Processes
Isolation and Purification
Fermentation Processes for Production of Nucleosides
Strain Improvement
Batch Production Process
Therapeutic Enzymes
Batch and Continuous Fermentation Processes
Isolation and Purification

Examples of Products of Mammalian Cells in Culture
Interferon Production
Fibroblast Processes (HuIFN- γ)
Leukocyte Processes (HuIFN-a)
Lymphoblastoid Processes (Hu Ly, IFN)
Immune Interferon Processes (HuIFN-Y)
Future Technologies: Lymphokines and Monoclonal Antibodies
Summary
Appendix

CHAPTER 13

SIDEROPHORES

The Need for Iron-Solubilizing Agents
The Role of Siderophores
Uptake and Release of Iron from the Siderophore Complex
Production of Siderophores
Conditions for Siderophore Production
Extraction
Adsorption
Ion-exchange Chromatography
Restricted Growth
Protein Binding of Contaminant Iron
Range of Molecular Structures
Hydroxamates
Catecholates (sometimes referred to as phenolates)
Siderophores with Antibiotic Activity
Sideromycins
Interference with Iron Uptake
Siderophore Analogues
Sideromycins
Extraction and Purification of Siderophores
Mycobactin
Enterochelin
Ferrichrome
Commercial Production of Desferrioxamine B (Desferal)
Uses of Siderophores
Iron Metabolism in the Body
Iron Poisoning and Chelation Therapy
Haemochromatosis and Chelation Therapy
Chelation Therapy
Other Medical Application for Siderophores
Applications for Siderophores Outside Medicine
Future Trends

CHAPTER 14

STEROID FERMENTATIONS

Bioconversions of Practical Importance
Bioconversions of Limited or Potential Practical Importance
Progesterone Side Chain Cleavage
Ring A Aromatization

17 and 21-Hydroxylations
Alternative Bioconversion Methods
Sterol Degradation
Steroid Solubility
Methods of Steroid Addition
Steroid Conversion in Organic Solvents
Future Trends in Steroid Bioconversions
Recovery of Steroids
Split Process
Whole-beer Process
Cake-extraction Process
Products of Commercial Importance
Summary

CHAPTER 15

RODUCTS FROM RECOMBINANT DNA

Production Technology
Methods for Cloning and Expression
Range and Relative Advantages of Host Microorganisms
Stability of Strains and Plasmids
Product Recovery and Purification
Commercial Markets
Markets for Recombinant Products

NIIR PROJECT CONSULTANCY SERVICES (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.

Our various services are: Detailed Project Report, Business Plan for Manufacturing Plant, Start-up Ideas, Business Ideas for Entrepreneurs, Start up Business Opportunities, entrepreneurship projects, Successful Business Plan, Industry Trends, Market Research, Manufacturing Process, Machinery, Raw Materials, project report, Cost and Revenue, Pre-feasibility study for Profitable Manufacturing Business, Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Business Opportunities, Investment Opportunities for Most Profitable Business in India, Manufacturing Business Ideas, Preparation of Project Profile, Pre-Investment and Pre-Feasibility Study, Market Research Study, Preparation of Techno-Economic Feasibility Report, Identification and Section of Plant, Process, Equipment, General Guidance, Startup Help, Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

NPCS also publishes various process technology, technical, reference, self employment and startup books, directory, business and industry database, bankable detailed project report, market research report on various industries, small scale industry and profit making business. Besides being used by manufacturers, industrialists and entrepreneurs, our publications are also used by professionals including project engineers, information services bureau, consultants and project consultancy firms as one of the input in their research.

Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to venture into Project. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.



AN ISO 9001 : 2015 CERTIFIED COMPANY

NIIR PROJECT CONSULTANCY SERVICES, 106-E, Kamla Nagar, New Delhi-110007, India. **Email:**
npcs.india@gmail.com **Website:** NIIR.org