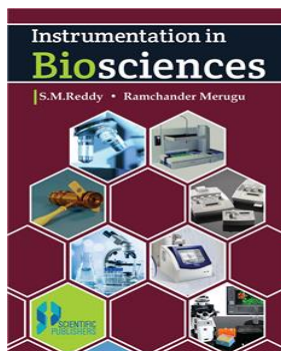


Instrumentation in Biosciences



S.M. Reddy & Ramchander Merugu

ISBN	: 9789389412543	Book Format	: Book
E-ISBN	: 9789389412550	Binding	: Hard Bound
Language	: English	Edition	: 1
Imprint	: Scientific Publishers	© Year	: 2021
Pages	: 334	Trim Size	: 6.00 x 9.00 x 1.25
Weight	: 640 Gms		
Book Type	: Reference Book		

Print Book : ₹2,950.00

Blurb

In recent times, the curriculum of the courses includes the instrumentation needed for understanding the different aspects of the discipline and has become an essential part. It is envisaged that students should the details and principles of the instrumentation used for biological investigations which will enable the students to be confident about the authenticity of his observations. This aspect will also promotes the students to plan different experiments which can give more evidences for any observed phenomenon. Further, the practicals are given more emphasis to train the students in any particular field. This also enables student to study independently and more confidently. So all Indian Universities are including instrumentation in the syllabi. As such very few books are available which can give information in totality to students all disciplines of biology.

Table of Contents

Chapter 1 : Instrumentation laboratory

- 1.1. Microscopes
 - 1.2. Slides, test tubes and petridishes
 - 1.3. Dyes and other indicators
 - 1.4. Forceps, probes and scalpels
 - 1.5. Beakers, flasks and burners
 - 1.6. Errors, precision and accuracy
 - 1.7. Significant figures
 - 1.8. Precision and accuracy
 - 1.9. Further Reading
- Review questions

Chapter 2: Units of measurement

- 2.1. Metric system
 - 2.2. Conversion of units
 - 2.3. Units used in preparation of solution
 - i) Standard solutions
 - ii) Molar solutions
 - iii) Molal solutions
 - iv) Normal solutions
 - 2.4. Units used in laboratory calculations
 - i) Weight relationship of hydrated and unhydrated salts
 - ii) Conversion of solution strength
 - iii) Photo metric calculations
 - iv) Titrimetric analysis
 - 2.5. Further reading
- Review Questions

Chapter 3: Microscopy

- 3.1. Historical developments
- 3.2. Types of microscopes

- 3.2.1. Simple microscope
- 3.2.2. Compound microscope
- 3.2. 3. Bright field microscope
- 3.2.4. Dark field microscope
- 3.2.5. Phasecontrast microscope
- 3.2.6. Fluorescence microscope
- 3.2.7.. Transmission Electron microscope
- 3.2.8. Scanning electron microscope
- 3.2.9. Scanning probe microscope
- 3.2.10. Scanning tunneling microscope
- 3.2. 11. Confocal microscope
- 3.2.12. Atomic force microscope
- 3.2.13. Electro chemical scanning tunneling microscope
- 3.2.14. Polarising photomicrography microscope
- 3.2.15. Interference microscope
- 3.2.16. Further reading

Review Questions

Chapter 4: Balance

- 4.1. Physical Balance
 - i) Triple beam single pan balance
 - ii) Double pan balance
- 4.2. Analytical Balance
 - i) Double pan balance
 - ii) Single pan balance
- 4.3. Methods of weighing
- 4.4. Maintenance of balance
- 4.5. Further reading

Review Questions

Chapter 5: Techniques in Microbiology

- 5.1. Culture medium
 - 5.1.1. Liquid Medium
 - 5.1.2. Solid medium
- 5.2. Types of culture
 - i) Streak culture or surface plating culture
 - ii) Dawn or carpet culture
 - iii) Streak culture
 - iv) Stab culture
 - v) Pour plate method
 - vi) Sweep plate method
 - vii) Methods in liquid medium
 - viii) Anaerobic culture
 - a) Displacement of oxygen
 - b) By chemical method
- 5.2.1 Isolation of microorganisms
- 5.2.2. Isolation of genetically pure culture
- 5.3. Preservation of fungal culture
- 5.4. Microbial growth
 - 5.4.1. Growth curve
 - 5.4.2. Continuous culture
 - 5.4.3. Synchronous growth
 - 5.4.4. Measurement of growth
- 5.5. Sterilization and Disinfection
 - 5.5.1. Physical
 - 5.5.2. Chemical

5.5.3. Tests for disinfection

5.6. Principles of staining

5.6.1. Common staining techniques

5.6.2. Further Reading

Review Questions

Chapter 6: Cell and Tissue Culture

6.1. Plant Cell and Tissue culture

6.2. Animal Cell and Tissue Culture

6.3. Further Reading

Review Questions

Chapter- 7 BIOSENSORS

7.1. Components of on-line monitoring and control

7.2 . Biosensors

7.3. Categories of biosensor instruments

7.4 . Application of biosensors

7.5 Biosensors in fermentation technology

7.6. Further Reading

Review Questions

Chapter 8: Electrophoresis

8.1. Types of electrophoresis

8.1.1. Moving boundary electrophoresis

8.1.2. Zone electrophoresis

8.2.1. Support media

i) Agar gel

ii) Agarose gel

iii) Starch gel

iv) Polyacrylamide gel electrophoresis

8.3. Isoelectric focusing

8.4.. Two dimensional Polyacrylamide electrophoresis

8.5. Continuous flow electrophoresis

8.6. Pulse field gel electrophoresis

8.7. Capillary electrophoresis

8.8. Immunoelectrophoresis

8.9. Detection, estimation and recovery of proteins from gels

8.10. Further reading

Review Questions

Chapter 9: Centrifugation

9.1 Principles of centrifugation

9.2 Types of centrifuges

9.2.1. Small bench centrifuge

9.2.2. Large refrigerator centrifuge

9.2.3. High speed refrigerator centrifuge

9.2.4. Ultra centrifuge

9.3. Types of Rotors

9.3.1 Ventricle tube Rotors

9.3.2 Fixed angle Rotors

9.3.3 Swinging bucket Rotors

9.3.4 Zonal Rotors

9.3.5 Elutriator Rotors

9.4. Types of Centrifugations

9.4.1 Analytical Centrifugation

9.4.2 Preparative Centrifugation

9.5. Safety in the use of Centrifugation

9.6. Further reading

Review Questions

Review Questions

Chapter 10 pH and its measurement

- 10.1 Definitions
- 10.2 Determination of pH
- 10.3 Acids and bases
- 10.4 pH meter
- 10.5 Types of pH meters
- 10.6 Buffers and their importance
- 10.7 Care of pH meter
- 10.8. Further Reading

Review Questions

Chapter 11 Techniques in radiation biology

- 11.1 Radioisotopes
- 11.2 Dosimetry
- 11.3 Radio isotopic techniques
- 11.4 Isotope dilution technique
- 11.5 Radio dating
- 11.6 Radioactive tracer technique
- 11.7 Radio immunoassay (RIA)
- 11.8. Detection and measurement of radioactivity
 - 11.8.1 Fountain-pen Dosimeter
 - 11.8.2. Geiger-Muller Counter
 - 11.8.3. Scintillation – Counter
 - 11.8.4. Cerenkov counting
 - 11.8.5. Auto radiography
- 11.9. Safety in the radiation laboratory
- 11.10. Further Reading

Review Questions

Chapter 12 Spectroscopy

- 12.1 Electromagnetic radiation
 - 12.1.2. Electromagnetic spectrum
- 12.2. Colorimetry
- 12.3. Spectrophotometry
- 12.4. UV-VIS spectroscopy
- 12.5. Flame photometry
- 12.6. Nephelometry and turbidimetry
- 12.7. Fluorimetry and phosphometry
- 12.8. Infrared spectrophotometry
- 12.9. Raman spectroscopy
- 12.10. Electron spin Resonance spectroscopy (ESR)
- 12.11. Nuclear Magnetic Resonance (NMR)
- 12.12. Atomic Emission spectroscopy
- 12.13. Atomic Absorption spectroscopy
- 12.14. Further Reading

Review Questions

Chapter 13 Chromatography

- 13.1. Classification of chromatography
- 13.2. Paper chromatography
- 13.3. TLC chromatography
- 13.4. Column chromatography
- 13.5. Absorption chromatography
- 13.6. Ion exchange chromatography
- 13.7. Liquid – Liquid Chromatography
- 13.8. Gas chromatography

- 13.10. Immunoelectrophoresis
- 13.11. Gel permeation chromatography
- 13.12. Affinity chromatography
- 13.13. Selectivity of chromatography
- 13.14. Further Reading

Review Questions

Chapter 14 Manometer and Polarimeter

- 14.1. Manometry
 - i) Gison Constant Pressure manometer
 - ii) Piezometer tube manometer
 - iii) U-Tube manometer
- 14.2. Polarimetry
 - i) Principle
 - ii) Construction of Polarimeter
 - iii) Applications
- 14.3. Further Reading

Review Questions

Chapter 15 Protein sequencing

- 15.1. Amino acids
- 15.2. Reaction of α -amino acids
- 15.3. Synthesis of α -amino acids
- 15.4. Levels of structure
- 15.5. Amino acids composition
- 15.6. Sequencing
- 15.7. Protein sequencing by mass
- 15.8. Further reading

Review Questions

Chapter 16 Polymerase

- 16.1. Procedure
- 16.2. Types of PCR
- 16.3. Real time PCR
- 16.4. Touch down PCR
- 16.5. Applications of PCR
- 16.6. Human health and human genome projects
- 16.7. Further reading

Review questions

Chapter 17 Genetic Engineering

- 17.1. Types of vectors
- 17.2. Cloning genes
- 17.3. Site specific mutagenesis
- 17.4. Detection of hereditary diseases
- 17.5. Further reading

Review Questions

Chapter 18 Bioinformatics

- 18.1. Genome analysis
- 18.2. Gene prediction software
- 18.3. Protein folding
- 18.4. Metabolomics
- 18.5. Basic local alignment tools (BLAST)
- 18.6. Multiple sequence alignment tools
- 18.7. Secondary databases
- 18.8. Protein databases (Amino acid sequence)
- 18.9. Applications of Bioinformatics
- 18.10. Further reading

This is computer generated document and does not require signature

Scientific Publishers

Date :- Fri Mar 21 2025