

VEER NARMAD SOUTH GUJARAT UNIVERSITY

M.Sc. Biotechnology

Semester -VI

IBT : 401 Microbiology-II

Unit - 1. Bacterial cell division and growth

- 1.1 Physiology of Bacterial Growth
- 1.2 Phases of Growth
- 1.3 Growth Conditions
- 1.4 Differentiation in Bacterial Cells - sporulation and spore germination.
- 1.5 Bacterial Cell Division

Unit - 2. Bacterial Metabolism

- 2.1 Respiration - EMP, HMP and EDP, Kreb's cycle, Oxidative, Phosphorylation
- 2.2 Bacterial Photosynthesis
- 2.3 Catabolism of Protein and Amino acids; general reaction and stickland reactions
- 2.4 Catabolism of Lipids

Unit - 3. Enzymes

- 3.1 Enzyme : Its key role in microbial physiology
- 3.2 Characteristics of Enzymes
- 3.3 Chemical and Physical Properties of Enzyme
- 3.4 Nature and Mechanism of Enzyme action
- 3.5 Conditions affecting enzyme activity
- 3.6 Inhibition of enzyme action
- 3.7 Condition affecting enzyme formation
- 3.8 Enzyme preparation
- 3.9 Regulation of enzyme activity and synthesis

Unit - 4. Antimicrobial agents

- 4.1 Development of Chemotherapy and Antibiotics
- 4.2 Characteristics of Antibiotics and their mode of action

Unit - 5.

- 5.1 Antifungal antibiotics
- 5.2 Antiviral chemotherapeutic agents
- 5.3 Development of resistance to antibiotics
- 5.4 Microbiological assay of antibiotics
- 5.5 Non medical uses of antibiotics

Unit - 6. Bacterial Membranes

- 6.1 Membrane lipids, membrane carbohydrates, membrane proteins, membrane transport of small molecules and macromolecules.
- 6.2 Signal transduction
- 6.3 Phosphotransferases system
- 6.4 Heat shock response

REFERENCE BOOKS :

1. Physiology and Biochemistry of Prokaryotes. 2nd edition by David White.
2. Outline of Biochemistry by Conn, E.E. and Stumpe, P.K. 4th edition.
3. General Microbiology by Stanier, R.Y. 5th edition.
4. Principles of Biochemistry by Lehninger.
5. General Microbiology by Powar and Dagainawala, Vol-I
6. Microbiology by Pelczar M. J., Chan E.C.S., 5th Edition
7. Microbiology by Prescott L.M.
8. Microbiology by Atlas R.M.

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Semester -VI

IBT : 402 BIOCHEMISTRY-III

Unit - 1

- * Factors affecting enzyme activity
- * M.M.Equation, derivation if M.M.Equationm graphical procedure for estimation. of Km.Vmax.
- * Regulation of enzyme activity

Unit - 2

- * Introduction to metabolism and metabolic pathway.
- * Compartmentalization of metabolic pathways.
- * Central and peripheral pathway, Integration of metabolic pathways.

Unit - 3

- * Catabolic pathways pf carbohydrates. Glycolysis, TCA. Pentose Prophase pathways. Other pathways sypplyng acetyl COA
- * Regulation of Glycolysis, TCA.
- * Electron-transport chain.

Unit - 4

- * Oxidative phorphorylation
- * Photosynthesis.
- * Anaerobic respiration and fermentation.
- * Lipid catabolism.

Unit - 5

- * Biochemistry of protein synthesis
- * Structure and organization of ribosome particles.
- * Post transnational modification.

Unit - 6

- * Biochemistry of DNA replication
- * DNA repair, mutation & recombination.
- * RNA synthesis and splicing, post transcriptional modification.

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M.Sc. Biotechnology

Semester -VI

Subject : Microbiology II (Practicals)

IBT : 406 (ii) Microbial Physiology and Metabolism

Unit - 1

1. Growth curve of bacteria by turbidometric method (E.coli.), Study of various phases of growth curve of E. coli in nutrient broth. Measurement of O.D. and Demonstration colony forming units.
2. Determination of generation time and growth rate of E.coli in nutrient broth.
3. Effect of following factors on E.coli. using turbidometric method
 - 3.1 Temperature
 - 3.2 pH
 - 3.3 Substrate concentration
 - 3.4 Salt concentration

Unit - 2

- 4 Determination of antibiotic resistance by plate method (Agar cup method and filter paper disc method).
- 5 Study of proteolytic enzyme activity on following biochemical media
 - 5.1 Proteins-Casein and gelatin
 - 5.2 Amino acids-phenyl alanine
 - 5.3 Other nitrogenous compound-peptone nitrate

Unit - 3

- 6 Study of saccharolytic enzyme activity on following media
 - 6.1 Starch
 - 6.2 Sugars-Glucose, Lactose, Sucrose, Mannitol, Maltose, Xylose, TSI.
 - 6.3 Other carbohydrates - Citrate

Unit - 4

- 7 Study of lipolytic enzyme activity on the following biochemical media
 - 7.1 Glycerol broth
 - 7.2 Trybutyrin agar

Unit - 5

- 8 Other Biochemical activities (DEMO)
 - 8.1 Blood Haemolytic Reaction
 - 8.2 Catalase Production
 - 8.3 Mehtylene Blue Reductase Test

REFERENCE BOOK :

1. BAKER, F.J. Handbook of bacterial technique, second edition London : Butterworth 1967.
2. Introduction to Microbial Techniques by Gunasekaran.
3. Microbiology - Elaborative Manual by James G.Chappuccina and Natalie Sherman.
4. An Introduction to Practical Biochemistry by D.T.Plummer, PubMed Central.
5. Laboratory Manual of Biochemistry by J.J.Raman.
6. Practical Biochemistry - Principles and Techniques by K.Wilson and Walker Cambridge University Press.