Sri Krishnadevaraya University

AP STATE COUNCIL OF HIGHER EDUCATION

CBCS PATTERN FOR U.G. MICROBIOLOGY

B.Sc MICROBIOLOGY (CBCS) REVISED SYLLABUS – 2020
THIRD YEAR – SEMESTER- V

MBT- A1 : MICROBIAL QUALITY CONTROL IN FOOD AND PHARMACEUTICAL INDUSTRIES

TOTAL HOURS: 60 **CREDITS: 4**

UNIT – I: Introduction to biosafety **No. of Hours: 12**

Good laboratory practices - Good microbiological practices.
Biosafety cabinets – Working of biosafety cabinets, using protective clothing, specification for BSL-1, BSL-2, BSL-3.
Discarding biohazardous waste – Methodology of Disinfection, Autoclaving & Incineration

UNIT – II: Quality control in pharmaceuticals **No. of Hours: 12**

Culture and microscopic methods - Standard plate count, Most probable numbers, Direct microscopic counts, Biochemical and immunological methods: Limulus lysate test for endotoxin, gel diffusion, sterility testing for pharmaceutical products

UNIT – III: Molecular methods for quality control **No. of Hours: 12**

Molecular methods - Nucleic acid probes, PCR based detection, biosensors.
Molecular methods of detection of Salmonella Sp and Botulism toxin in food stuffs

UNIT – IV: Quality control tests in industries **No. of Hours: 12**

Enrichment culture technique, Detection of specific microorganisms - on XLD agar, *Salmonella Shigella* Agar, Manitol salt agar, EMB agar, McConkey Agar, Suboraud Agar; Ascertaining microbial quality of milk by MBRT, Rapid detection methods of microbiological quality of milk at milk collection centres (COB, 10 min Resazurin assay).

UNIT – V : Food safety systems **No. of Hours: 12**

Food preservation methods- Modern industrial techniques- Pasteurisation, vacuum packing, freeze drying, food additives, irradiation, modified atmosphere
Hazard analysis of critical control point (HACCP) - Principles, flow diagrams, limitations
Microbial Standards for Different Foods and Water – BIS standards for common foods and drinking water

Pallavi
(H. PALLAVI)

C. Madhavi
(Dr. C. MADHAVI)

MBP AL: MICROBIAL QUALITY CONTROL IN FOOD AND PHARMACEUTICAL INDUSTRIES

TOTAL HOURS: 30 CREDITS: 1

1. Sterility tests for Instruments – Autoclave & Hot Air Oven

2. Disinfection of selected instruments & Equipments

3. Sterility test of Air in Laboratory.

4. Sterility testing of Microbiological media

5. Sterility testing of Pharmaceutical products –Antibiotics, Vaccines & fluids

6. Standard qualitative analysis of water.

7. Analysis of food samples for Mycotoxins

SUGGESTED READING

1.Harrigan WF (1998) Laboratory Methods in Food Microbiology, 3rd ed. Academic Press

2.Garg N, Garg KL and Mukerji KG (2010) Laboratory Manual of Food Microbiology I K International Publishing House Pvt. Ltd.

3.Jay JM, Loessner MJ, Golden DA (2005) Modern Food Microbiology, 7th edition. Springer

4.Baird RM, Hodges NA and Denyer SP (2005) Handbook of Microbiological Quality control in Pharmaceutical and Medical Devices, Taylor and Francis Inc.

5. Microbiology - A laboratory manual, Cappuccino & Sherman , 6 th Ed, Pearson Education

6. Manual of diagnostic microbiology, Dr.B.J.Wadher & Dr.G.L.Bhoosreddy, First .Ed ., Himalaya publishing house, Nagpur.

7. Pharmaceutical Microbiology – W.B. Hugo

8. Pharmaceutical Microbiology – Purohit

9. Laboratory Exercises in Microbiology, George.A.Wistreich & Max.D.Lechtman, 3 rd Ed, Glencoe press, London.

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THIRD YEAR – SEMESTER- V

MBT- AII: MICROBIAL BIOTECHNOLOGY

TOTAL HOURS: 60 **CREDITS:4**

UNIT- I : Scope and applications of Microbia Biotechnology **No. of Hours: 12**

Microbial biotechnology: Scope and its applications in human therapeutics, agriculture (Biofertilizers, PGPR, Mycorrhizae), environmental, and food technology.
Genetically engineered microbes for industrial application: Bacteria and yeast

UNIT- II: Microbial production processes **No. of Hours: 12**

Recombinant microbial production processes in pharmaceutical industries - Streptokinase, recombinant vaccines (Hepatitis B vaccine).
Microbial polysaccharides, polyesters and bioplastics.
Microbial production of bio-pesticides
Microbial biosensors

UNIT- III: Biocatalytic processes **No. of Hours: 12**

Microbial based transformation of steroids and sterols.
Bio-catalytic processes and their industrial applications: Production of high fructose syrup and production of cocoa butter substitute.
Immobilization methods and their application: Whole cell immobilization

UNIT- IV: Biofuel technology **No. of Hours: 12**

Bio-ethanol and bio-diesel production: commercial production from lignocellulosic waste and algal biomass.
Biogas production: Methane and hydrogen production using microbial culture. Microorganisms in bioremediation: Degradation of xenobiotics.
Mineral recovery, removal of heavy metals from aqueous effluents.

UNIT- V: IPR **No. of Hours: 12**

Outlines of Intellectual Property Rights:
Patents and secret processes –History of patenting, composition, subject matter and characteristics of a patent, Inventor, Infringement, cost of patent

Copyrights, Trademark

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MBP AII- MICROBIAL BIOTECHNOLOGY

TOTAL HOURS: 30

CREDITS: 1

1. Yeast cell immobilization in calcium alginate gels
2. Enzyme immobilization by sodium alginate method
3. Pigment production from fungi (*Trichoderma / Aspergillus / Penicillium*)
4. Isolation of xylanase or lipase producing bacteria
5. Study of algal Single Cell Proteins

SUGGESTED READING:

1.Ratledge, C and Kristiansen, B. (2001). Basic Biotechnology, 2nd Edition, Cambridge University Press.

2. Demain, A. L and Davies, J. E. (1999). Manual of Industrial Microbiology and Biotechnology, 2nd Edition,
ASM Press.

3. Swartz, J. R. (2001). Advances in Escherichia coli production of therapeutic proteins. Current Opinion in Biotechnology, 12, 195–201.

4. Prescott, Harley and Klein's Microbiology by Willey JM, Sherwood LM, Woolverton CJ (2014), 9th edition, Mc Graw Hill Publishers.

5.Gupta PK (2009) Elements of Biotechnology 2nd edition, Rastogi Publications,

6. Glazer AN and Nikaido H (2007) Microbial Biotechnology, 2nd edition, Cambridge University Press

7.Glick BR, Pasternak JJ, and Patten CL (2010) Molecular Biotechnology 4th edition, ASM Press,

8. Stanbury PF, Whitaker A, Hall SJ (1995) Principles of Fermentation Technology 2nd edition., Elsevier Science

9.Crueger W, Crueger A (1990) Biotechnology: A text Book of Industrial Microbiology 2nd edition Sinauer
associates, Inc.