



MCC, Department of Botany

Paper 2b MICROBIAL TECHNOLOGY

M.Sc. va (Candidates admitted from the academic year 2008-2009)

Elective Theory

Paper 2b MICROBIAL TECHNOLOGY

M.Sc. va (Candidates admitted from the academic year 2008-2009)

Elective Theory

UNIT I

Introduction – general information on microbial industries – substrates for industrial fermentation. Basic functions of a fermentation vessel, construction of typical fermentor and its attachments and role in the process.

Key words: Starter culture, Sulphite waste liquor, Antifoams, Maintenance media, Suspended growth, Supported growth, Aeration, Agitation, Stirrer shaft, Impeller, Intensive properties, Extrinsic properties.

UNIT II

Food, dairy and beverage industries: Production of single cell proteins (SCP) from bacteria, fungi, and algae, Lactic acid production, yogurt and cheese production. Alcoholic beverages: Beer and wine fermentation.

Key words: Poly β -hydroxybutyrate, Methane utilizing bacteria, Skimming, Bulgarian milk, Curdling, Roquefort cheese, Camembert cheese, Swiss cheese, Cheddar cheese, Dry wine, Racking, Brewing.

UNIT III

Pharmaceutical and related industries: Antibiotics – sources and types – production of penicillin and streptomycin. Recombinant drugs and vaccines – insulin and Hepatitis B vaccine. Principles of biotransformation – transformation of steroids. Vitamins – production of B12 and β – carotene.

Key words: Penicilloic acid, Corn steep liquor, Juvenile diabetes, Proinsulin, Serum hepatitis, Hydrocortisone, Pernicious anemia.

UNIT IV

Enzymes, Amino acids and Organic acids: Microbial enzymes – amylase, protease, pectinase, lipase production and uses. Microbes used for amino acid production – commercial production of L-glutamic acids, L-tryptophan. Organic acids – citric acid, acetic acid production.

Key words: Exoenzymes, Subtilisin Carlsberg, Acid proteases, MSG, Surface culture process, Submerged culture process, Quick vinegar process.

UNIT V

Biofertilizers and Biopesticides: Biofertilizers – mass production of phosphate solubilizing bacteria – BGA and Mycorrhizae. Biopesticides – principles, production and application. Exopolymer production.

Key words: Nitrification, Denitrification, Ammonification, *Bacillus thuringiensis*, Liquid formulation, Dust formulation.

Suggested Reading

ADAMS, M.R. AND M.O. MOSS. 1995. Food Microbiology. New Age International (p) Ltd., Chennai.

AGARWAL, 2006. Industrial Microbiology: Fundamentals and Application, IBD publishers, New Delhi.

ANATHANARAYAN, R AND C.K.J. PANIKER. 2000. Text book of Microbiology, 6th Edition. Orient Longman.

ATLAS, R.M. 1989. Microbiology - Fundamentals and Applications. McMillan Publishing Company. New York.

CRUEGER F. AND ANNELIESE CRUEGER, 2000. Biotechnology: Industrial Microbiology. Panima Publications.

GLAZER, A.Z. AND H. NIKAIDO. 1994. Microbial Biotechnology. W.H. Freeman and Company.

MADIGAN, M.T. AND J.N. MARTINKO. 2006, Brock Biology of Microorganisms. 11th edition. Pearson Education, Inc. Upper Saddle River, USA

MCKANE, L. AND J. KANDEL. 1996. Microbiology - Essentials and Applications. McGraw Hill Inc., New York.

PELCZAR Jr. M.J., E.C.S. CHAN AND N.R. KRIEG. 1986. Microbiology. 5th Edition. McGraw Hill Book Company. New York.

PRESCOT, L.M., J.P. HARLEY AND B.A. KLEIN. 2005. Microbiology. 6th Edition. McGraw Hill Book Company, New York.

PUROHIT. 2005. Microbiology Fundamentals and Applications 6th edition. International book distributors, Dehradun.

RAJA, K. 2005. Microbial Biotechnology for sustainable development and productivity. IBD Publishers, New Delhi.