



ANDHRA UNIVERSITY

TRANS-DISCIPLINARY RESEARCH HUB

GENERAL AND INDUSTRIAL MICROBIOLOGY

UNIT I: INTRODUCTION & METHODS IN MICROBIOLOGY

Role of microorganisms in transformation of organic matter and in the causation of diseases, Development of pure culture methods; Enrichment culture methods. Pure culture techniques; Theory and practice of sterilization; Principles of microbial nutrition Construction of culture media; Enrichment culture techniques for isolation of chemoautotrophs, chemoheterotrophs and photosynthetic microorganisms.

UNIT II: MICROBIAL GROWTH

The definition of growth, mathematical expression of growth, growth curve, availability of oxygen; Culture collection and maintenance of cultures. Media formulation: Principles of microbial nutrition, formulation of culture media, selective media, factors influencing the choice of various carbon and nitrogen sources, vitamins, minerals, precursors & antifoam agents. Importance of pH. Basics of Response surface Methodology (RSM)

UNIT III: HISTORY AND DEVELOPMENT OF FERMENTATION

History and development of fermentation industry, Shake flask, batch and continuous operations and their applications merits and demerits. Solid state fermentation. Design and operation of fermentors, Agitation and aeration, Types of fermentors continuous stirred tank fermentor (CSTF), air-lift fermenters.

UNIT IV: INDUSTRIALLY IMPORTANT METABOLITES

Antibiotics: penicillin, streptomycin, tetracycline and other antibiotics; biological production considerations; large scale production. Primary and secondary metabolites. Organic acids: Lactic, citric, acetic, gluconic, fumaric and itaconic acids; process variables and large scale production. Alcohols and alcoholic beverages: Ethanol production and purification, production of beer, wine and related beverages. Industrial Enzymes, Vitamins: Their importance and role as coenzymes; production of B, C and A.

UNIT V: FOOD & ALLIED PRODUCTS

Food industry: Bakers yeast and bread making, rennet and other proteolytic enzymes in cheese making, production of different cheeses; other products from dairy industry, sweeteners, single cell protein. Biofertilizers. Fuels: Methane generation, biological production of hydrogen.

Reference Books

1. "Principles of fermentation technology" by P F Stanbury and A Whitaker, Pergamon press (1984).
2. Industrial Biotechnology by S.N. Jogdand, First edition, Himalaya Publishing House, 2006.:
3. "General Microbiology" 5th Edition Stanier et al.
4. "Industrial Microbiology" by Prescott
5. "Industrial Microbiology" by Casida

