

V SEMESTER
COURSE 13 A: APPLIED MICROBIOLOGY
credits -3

I. Course Outcomes:

By the completion of the course the learner should be able to—

1. Identify the areas of entrepreneurship, and assess the scope for establishment.
2. Explain production of fermentation products and economics
3. Explain the production method of biofertilisers and mushrooms
4. Explain the process of baking and brewing
5. Prepare DPR and understand patenting

Unit–I: Entrepreneurial skill

No of Hours: 9

Entrepreneurial skills—Institutes involved, Government support to entrepreneurs, Incubation centers, risk assessment. Scope for small, medium and Large scale industries in Microbiology

Unit–II: Fermentation Products No of Hours: 9

1. Microbial cells as fermentation products–
2. Bakers yeast, food and feed yeasts, SCP, Bacterial Insecticides, Legume Inoculants, Algae.
3. Enzymes as fermentation products–
4. Bacterial and Fungal Amylases, Proteolytic Enzymes, Pectinases, Invertases, and other enzymes
5. Fermentation Economics

Unit–III: Bio-fertilisers and Mushrooms No of Hours: 9

1. Mushroom cultivation—Cultivation of *Agaricus campestris*, *Calocyba indica*, *Agaricus bisporus*, and *Volvariella volvacea*; Preparation of compost, filling tray beds, spawning, maintaining optimal temperature, casing, watering, harvesting, storage.
2. Biofertilizers –Chemical fertilizers versus biofertilizers, organic farming. Production of biofertilisers–*Rhizobium* sp, *Azospirillum* sp, *Azotobacter* sp.
3. Microbial consortia for composting and as biofertilisers

Unit–IV: Baking and Brewing processes No of Hours: 9

Brewing—Media components, preparation of medium, Microorganisms involved, maturation, carbonation, packaging, keeping quality, contamination, by products. Bread making- Yeast activation,

Unit–V:DPR and Patents

No of Hours: 9

1. Preparation of DPR (Detailed Project Report)
2. Patents and secret processes –History of patenting, composition, subject matter and characteristics of a patent, Inventor, Infringement, cost of patent

Skill Outcomes:

By the completion of the course the learner should able to–

1. Prepare Microbial consortia for composting
2. Prepare a report on the working of production unit of mushrooms/biofertiliser
3. Prepare sample DPR

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credits -1

1. Preparation of Microbial consortia for composting
2. Field visit and report preparation of Mushroom cultivation unit/ Biofertiliser production centre/or any other
3. Preparation of sample DPR

References:

1. Entrepreneurial Development in India -By Arora.
2. Sathyanarayana.U, Biotechnology.(2005)1st Ed. Books and Allied(P)Ltd.
3. Casida, LEJR,(2019). Industrial Microbiology. New Age International Publishers
4. K.R. Aneja, Experiments in Microbiology, Plant pathology, Tissue culture and Mushroom production technology, 6th Ed. S Chand Publication
5. Nduka Okafor. Modern Industrial Microbiology and Biotechnology. 2007. CRC Press
6. Michael J. Waite, Neil L. Morgan, John S. Rockey, Gary Higton. Industrial Microbiology: An Introduction. 2013. Wiley Blackwell Publishers.
7. A.H. Patel. Industrial Microbiology. 2016. 2nd Ed. Laxmi Publications, New Delhi.
8. Dubey RC. A Textbook of Biotechnology. (2014). S Chand Publishers.