



Dr. Bhimrao Ambedkar University Agra

Department of Microbiology
School of Life Sciences, Khandari Campus

Value Added Courses

Course Name	Biofertilizer Production Technology
Course Code	MB-VAC-01
Duration & Credit	30 Hrs. & 2 Credits
Coordinator	Dr. Surabhi Mahajan, Assistant Professor
Evaluation	By the Coordinator
Organized by	Department of Microbiology, School of Life Sciences, Khandari Campus, Agra

Course Objectives

To develop an integrated organic bio-fertilizer technology that combines the utilization of adapted biofertilizer propagation (with the use of PGPB) and application practices with organic amendments to promote environmentally friendly crop production

Syllabus

UNIT I

- ✓ Brief Introduction History and Concept of Biofertilizers
- ✓ Scope and Importance of Biofertilizers (10 hrs)
- ✓ Classification of Fertilizers and Nitrogen Fixation

UNIT II

- ✓ Structure and characteristic features of Plant growth promoting rhizobacteria.
- ✓ General account of Biofertilizers (microbes) such as- *Azospirillum*, *Azotobacter*, *Bacillus*, *Pseudomonas*, *Rhizobium*, *Bradyrhizobium* and *Frankia* (10 hrs)
- ✓ Fungal biofertilizers- AM mycorrhiza and ectomycorrhiza and their influence on the growth and yield of crop plants

UNIT III

- ✓ Phosphate solubilizing microbes - Isolation, characterization, mass inoculum production, field Application (10 hrs)
- ✓ Cyanobacteria (blue-green algae), *Azolla* and *Anabaena*, *Azolla* association, nitrogen fixation.
- ✓ Factors affecting growth, blue-green algae and *Azolla* in rice cultivation.

Reference Books:

1. General Microbiology- Dubey and Maheswari
2. Subbarao, N.S. 1993. Biofertilizers in Agriculture and Forestry (Oxford and IBH Pub. Co., New Delhi)
3. Soil Microbiology Subha Rao, N.S. (2000), Oxford & IBH Publishers, New Delhi.
4. Bio-fertilizers and organic Farming Vayas, S.C, Vayas, S. and Modi, H.A. (1998) Akta Prakashan, Nadiad

Course Outcomes (COs)

- On the successful completion of the course, students will be able to-
- ✓ CO1. To Understand the role of microorganisms in improving the fertility of the soil, their isolation, and the role of various soil bacteria in bio-fertilizer production.
 - ✓ CO2. Improve professional competencies, knowledge and technical skills in biofertilizer production and restore soil fertility by performing sustainable agriculture practices via organic farming
 - ✓ CO3. Knowledge gained to generate opportunities of self-employability
 - ✓ CO4. To impart training to develop skills in both handling, cultivation and propagation of quality microbial inoculants


Faculty of Life Science
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Value Added Courses

Course Name	Microbiological Analysis of Food & Quality Assurance
Course Code	MB-VAC -02
Duration & Credit	30 Hrs. & 2 Credits
Coordinator	Dr. Surabhi Mahajan, Assistant Professor
Evaluation	By the Coordinator
Organized by	Department of Microbiology, S.I.S. Dr. Bhimrao Ambedkar University Agra

Course objectives:

The major learning objectives of this course will be to study: the scope of food microbiology and food safety and to obtain knowledge about important genera of microorganisms associated with food and their characteristics and applications of various techniques (traditional to advance) for preserving food

Syllabus

UNIT I

- ✓ Introduction to Food Microbiology and Food Safety
- ✓ Different Microflora of Food, Good Laboratory Practices (10 hrs)
- ✓ Intrinsic External Factors Affecting Microbial Growth and Survival in Food

UNIT II

- ✓ Microbiological Assessment of Food, Advances in Isolation and Quantification of Microorganisms in Food
- ✓ Preservation of Food by Physical methods (10 hrs)
- ✓ Principles of food Preservation & their importance

UNIT III

- ✓ Fermentative Microorganisms as Food and Value-Added Products
- ✓ Lactic Fermentation in Food, Spoilage of Dairy Products (10 hrs)
- ✓ Assessment of Foodborne Illnesses Outbreaks, Indicators of Food Microbial Safety and Quality
- ✓ Food Safety Laws & quality Management system

Reference Books:

1. Jay JM, Loessner MJ and Golden DA. (2005). Modern Food Microbiology. 7th edition, CBS Publishers and Distributors, Delhi, India.
2. Tortora GJ, Funke BR, and Case CL. (2008). Microbiology: An Introduction. 9th edition. Pearson Education.
3. Frazier WC and Westhoff DC. (1992). Food Microbiology. 3rd edition. Tata McGraw-Hill Publishing Company Ltd, New Delhi, India.
4. Adams MR and Moss MO. (1995). Food Microbiology. 4th edition. New Age International (P) Limited Publishers, New Delhi, India.

Course Outcomes (Cos):

On completion of this course, students will able to:

CO1. To understand the role of different microorganisms in food spoilage, food fermentation and foodborne disease

CO2. Learn about the Scope of food microbiology & important microbes associated with food

CO3. To gain knowledge of Microbiological quality control, procedures for ensuring food safety & hygiene and food safety rules and regulations, and Microbiological Risk Assessment.


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