

21ELCT333 BIO PESTICIDES AND BIO FERTILIZERS

Hours Per Week :

L	T	P	C
2	-	2	3

Total Hours :

L	T	P
30	-	30

COURSE DESCRIPTION AND OBJECTIVES:

Main objective is to familiarize the students about the bio-pesticides and bio-fertilizers which are free from harmful chemicals and more environment friendly.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes
1	Students will learn about bio-pesticides, its importance, scope and potential
2	Students will be aware about bio fertilizers its status and scope. Characteristic features of various bio fertilizers
3	Students will be aware about production technology: Strain selection, sterilization, growth and fermentation, mass production etc

SKILLS

- ✓ *Identify different bio control agents used in agriculture*
- ✓ *Rearing of bio-control agents like predators and parasitoids*
- ✓ *Knowledge on mass multiplication of microorganisms used as bio fertilizers*



Source:

<https://tamilcrew.com/agricultural-products/biofertilizers-biopesticides-and-bioinsecticides/>

ACTIVITIES:

- o Visit to Bio-control agent's production laboratory
- o Visit to Bio-fertilizers mass production unit
- o Practice Inoculative and Inundative release of Bio-control agents under field conditions

UNIT - 1

History and concept of biopesticides: Importance, scope and potential of biopesticide. Definitions, concepts and classification of biopesticides viz. pathogen, botanical pesticides, and biorationales. Botanicals and their uses.

UNIT - 2

Mass production technology of bio-pesticides. Virulence, pathogenicity and symptoms of entomopathogens. Methods of application of biopesticides. Methods of quality control and techniques of biopesticide evaluation. Impediments and limitation in production and use of biopesticide

UNIT - 3

Biofertilizers - Introduction, status and scope. Structure and characteristic features of bacterial biofertilizers - *Azospirillum*, *Azotobacter*, *Bacillus*, *Pseudomonas*, *Rhizobium* and *Frankia*; *Cyanobacterial* biofertilizers - *Anabaena*, *Nostoc*, *Hapalosiphon* and fungal biofertilizers- AM *mycorrhiza* and *ectomycorrhiza*. Nitrogen fixation - Free living and symbiotic nitrogen fixation. Mechanism of phosphate solubilization and phosphate mobilization, K solubilization

UNIT - 4

Production technology: Strain selection, sterilization, growth and fermentation, mass production of carrier based and liquid biofertilizers. FCO specifications and quality control of biofertilizers.

UNIT - 5

Application technology for seeds, seedlings, tubers and setts. Biofertilizers - storage, shelf life, quality control and marketing. Factors influencing the efficacy of biofertilizers

LABORATORY EXPERIMENTS**LIST OF EXPERIMENTS**

- 1 Study on preparation or mass production technology of important biopesticides bacteria, *Bacillus thuringiensis*
- 2 Study on preparation or mass production technology of important biopesticides Entomopathogenic virus - *SINPV* and *Ha NPV*
- 3 Study of mass production technology of important biopesticides – Entomopathogenic fungi *Beauveria bassiana*, *Metarhizium anisopliae*, *Nomuraea rileyi*
- 4 Study of mass production technology of important biopesticides – EPN (*Steinernema carpocapsae*); Isolation and identification of soil borne EPNs (*Galleria* larval bait/trap technique)
- 5 Identification and preparation of important botanical insecticides (NSKE; Tobacco decoction, *Pongamia* and *Annona* leaf extracts)
- 6 Visit to nearby biopesticide laboratory
- 7 Field visit to explore naturally infected cadavers of *Bt*, Virus, Fungus
- 8 Identification of potential entomopathogenic entities in the field - from soil and plants & Studies on quality control of biopesticides
- 9 Isolation of *Rhizobium* from soil and root nodules
- 10 Isolation and purification of *Azospirillum* and *Azotobacter* from rhizosphere soil

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- 11 Isolation and purification of P and K solubilizers from rhizosphere soil
 - 12 Mass production technology of BGA (Blue Green Algae). Production Technology of *Azolla*
 - 13 Isolation of and purification of VAM (Vascular Arbuscular Mycorrhiza) fungi from rhizosphere soil by wet sieving and decantation and sucrose gradient method
 - 14 Mass multiplication and inoculum production of biofertilizers
 - 15 Quality assessment of different biofertilizers (both carrier and liquid based) including plant infection test

REFERENCES:

1. BS Parmar and C. Deva Kumar 1993. *Botanical and Bio pesticides*. West Will Publishing House, New Delhi pp 199
2. Srivastava, K. P. and Dhaliwal, G.S 2015. *Applied Entomology*. Vol I & II , Kalyani Publishers, New Delhi
3. Kannaiyan, S., K. Kumar and K. Govindarajan (eds.) (2004). *Biofertilizers Technology* (Scientific Pub., Jodhpur).
4. Motsora, M.R., P. Bhattacharya and Beena Srivastava (1995). *Biofertilizer Technology, Marketing and Usage - A Source Bookcum - Glossary* (FDCO, New Delhi).
5. Subbarao, N.S. 1993. *Biofertilizers in Agriculture and Forestry* (Oxford and IBH Pub. Co., New Delhi)

