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ENTO. 221 Biopesticides & Biofertilizers 3(2+1)

Theory

Part - I

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. Mass production technology of bio-pesticides. Virulence, pathogenicity and symptoms of entomopathogenic pathogens and nematodes. Methods of application of biopesticides. Methods of quality control and Techniques of biopesticides. Impediments and limitation in production and use of biopesticide.

Part - II

Biofertilizers - Introduction, status and scope. Structure and characteristic features of bacterial biofertilizers- *Azospirillum*, *Azotobacter*, *Bacillus*, *Pseudomonas*, *Rhizobium* and *Frankia*; Cynobacterial 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. Production technology: Strain selection, sterilization, growth and fermentation, mass production of carrier based and liquid biofertiizers. FCO specifications and quality control of biofertilizers. Application technology for seeds, seedlings, tubers, sets etc. Biofertilizers -Storage, shelf life,

quality control and marketing. Factors influencing the efficacy of biofertilizers

Practical

Isolation and purification of important biopesticides: *Trichoderma* *Pseudomonas*, *Bacillus*, *Metarhizium* etc. and its production. Identification of important botanicals. Visit to biopesticide laboratory in nearby area. Field visit to explore naturally infected cadavers. Identification of entomopathogenic entities in field condition. Quality control of biopesticides.

Isolation and purification of *Azospirillum* , *Azotobacter*, *Rhizobium*, P-solubilizers and cyanobacteria. Mass multiplication and inoculums production of biofertilizers. Isolation of AM fungi -Wet sieving method and sucrose gradient method. Mass production of AM inoculants.

Lecture Schedule:Theory

| S.N. | Topic | No. of lectures |
|------|--|-----------------|
| 1. | History and concept of biopesticides. | 3 |
| 2. | Importance, scope and potential of biopesticide. Definitions, concepts and classification of biopesticides viz. pathogen, botanical pesticides, and biorationales. Botanicals and their uses. | 3 |
| 3. | Mass production technology of bio-pesticides. | 2 |
| 4. | Virulence, pathogenicity and symptoms of entomopathogenic pathogens and nematodes. | 2 |
| 5. | Methods of application of biopesticides. | 2 |
| 6. | Methods of quality control and Techniques of biopesticides. | 3 |
| | Impediments and limitation in production and use of biopesticide | |
| 7. | Biofertilizers - Introduction, status and scope. Structure and characteristic features of bacterial biofertilizers- <i>Azospirillum</i> , <i>Azotobacter</i> , <i>Bacillus</i> , <i>Pseudomonas</i> , <i>Rhizobium</i> and <i>Frankia</i> ; Cynobacterial biofertilizers- <i>Anabaena</i> , <i>Nostoc</i> , <i>Hapalosiphon</i> and fungal biofertilizers- AM mycorrhiza and ectomycorrhiza. | 4 |
| 8. | Nitrogen fixation -Free living and symbiotic nitrogen fixation. Mechanism of phosphate solubilization and phosphate mobilization, K | 3 |
| 9 | Production technology: Strain selection, sterilization, growth and fermentation, mass production of carrier based and liquid biofertiizers. | 3 |
| 10 | FCO specifications and quality control of biofertilizers | 2 |
| 11 | Application technology for seeds, seedlings, tubers, sets etc. | 2 |
| 12 | Biofertilizers -Storage, shelf life, quality control and marketing. | 1 |
| 13 | Factors influencing the efficacy of biofertilizers | 2 |

Lecture Schedule:Practical

| S.N. | Topic | No. of lectures |
|------|--|-----------------|
| 1. | Isolation and purification of important biopesticides: <i>Trichoderma</i> , <i>Pseudomonas</i> , <i>Bacillus</i> , <i>Metarhizium</i> etc. and its production. | 2 |
| 2. | Identification of important botanicals. | 2 |
| 3. | Visit to biopesticide laboratory in nearby area. | 2 |
| 4. | Field visit to explore naturally infected cadavers. | 1 |
| 5. | Identification of entomopathogenic entities in field condition. Quality control of biopesticides. | 2 |
| 6. | Isolation and purification of <i>Azospirillum</i> , <i>Azotobacter</i> , <i>Rhizobium</i> , Psolubilizers and cyanobacteria. | 2 |
| 7. | Mass multiplication and inoculums production of biofertilizers. | 1 |
| 8. | Isolation of AM fungi -Wet sieving method and sucrose gradient method. | 2 |

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|----|-----------------------------------|---|
| 9. | Mass production of AM inoculants. | 2 |
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