

GOVERNMENT DEGREE COLLEGE, NANDIKOTKUR

DEPARTMENT OF BOTANY

Plant Biotechnology

Unit 1: Basic Techniques in Plant Tissue Culture

Short Answer Questions:

1. Define plant tissue culture and explain its significance.
2. What infrastructure is required to establish a tissue culture laboratory?
3. Discuss the concept of totipotency in plant tissue culture.
4. Write a brief note on synthetic seeds and their applications.
5. List the factors affecting somatic embryogenesis and organogenesis.

Long Answer Questions:

1. Explain the sterilization techniques used in plant tissue culture laboratories.
2. Describe the formulation of media for plant tissue culture.
3. Discuss the initiation and maintenance of callus cultures and their role in plant biotechnology.
4. Elaborate on the process and applications of somatic embryogenesis.
5. Write an essay on the role of morphogenesis in vitro in plant tissue culture.

Unit 2: Organ and Haploid Culture Techniques

Short Answer Questions:

1. What is the importance of meristem culture in plant biotechnology?
2. Explain the applications of zygotic embryo and endosperm culture.
3. Define micropropagation and mention its uses.
4. How are haploids produced using anther and pollen cultures?
5. What are the commercial benefits of micropropagation?

Long Answer Questions:

1. Discuss the procedure and applications of meristem culture in agriculture.
2. Write an essay on the production and applications of haploids in plant breeding.

3. Explain the process of micropropagation and its role in large-scale plant production.
4. Describe the techniques for producing haploids using unfertilized ovule cultures.
5. Discuss the challenges and strategies involved in the commercial exploitation of micropropagation.

Unit 3: Cell and Protoplast Cultures

Short Answer Questions:

1. What are cell suspensions? Differentiate between continuous and batch cultures.
2. How are bioreactors used for mass cultivation of plant cells?
3. Discuss the strategies used for enhanced production of secondary metabolites.
4. Explain the methods used for protoplast isolation and purification.
5. Define somatic hybridization and mention its applications.

Long Answer Questions:

1. Write a detailed note on the production of secondary metabolites from cell cultures.
2. Explain the process of protoplast fusion and the selection systems for somatic hybrids.
3. Describe biotransformation using plant cell cultures and its significance in biotechnology.
4. Discuss the role of cell suspension cultures in large-scale plant cell production.
5. Elaborate on the characterization and applications of somatic hybrids and cybrids.

Unit 4: Transgenic Plants

Short Answer Questions:

1. Define transgenic plants and discuss the ethical issues associated with them.
2. What is the significance of herbicide resistance in transgenic plants?
3. Explain the mechanism of coat protein-mediated virus resistance.

4. Discuss the quality improvement achieved through Golden Rice.
5. How is shelf life enhanced in Flavr Savr tomato?

Long Answer Questions:

1. Write an essay on the biosafety concerns related to transgenic plants.
2. Discuss the role of transgenic plants in herbicide and insect resistance.
3. Explain the genetic modifications used for disease resistance in plants.
4. Elaborate on the strategies for virus resistance in transgenic plants.
5. Discuss the applications and limitations of quality improvement through transgenic plants.

Unit 5: Advances in Plant Biotechnology

Short Answer Questions:

1. What is plant synthetic biology? Mention its applications.
2. Discuss the role of plant-based vaccines and therapeutics in biotechnology.
3. What is biofortification? Provide examples of genetically modified foods.
4. How are biodegradable plastics like polyhydroxybutyrate produced?
5. Explain the applications of plant biotechnology in bioenergy production.

Long Answer Questions:

1. Write a detailed note on the applications of plant synthetic biology in agriculture.
2. Discuss the process and significance of producing biodegradable plastics through plant biotechnology.
3. Explain the role of plant biotechnology in environmental remediation.
4. Elaborate on the contributions of biofortification and genetically modified foods in improving nutrition.
5. Discuss the advancements in plant-based