Applications of Plant Tissue Culture

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Applications of Plant Tissue Culture	2	NIL	NIL	2	Class XII	NIL

Learning Objectives

The learning objectives of this course are as follows:

- To discuss the principle of Plant Tissue Culture
- To understand the importance of Plant Tissue Culture and its applications
- To impart hands-on training on various aspects of Tissue Culture
- To understand the importance of aseptic culturing techniques
- To equip the learner to effectively utilize the techniques in various areas like basic research, genetic transformation studies, secondary metabolite production, pharmaceuticals etc

Learning Outcomes

By the end of this course, students will

- Get familiarized with aseptic culture techniques
- Be able to prepare stock solutions and media for experimental purposes
- Have understood the micro propagation mechanism and its intricacies.
- Be able to establish a regeneration protocol using different explant material
- Students will be able to appreciate the applications of plant tissue culture in various domains.
- Able to do mass propagation of true to type and disease free, quality medicinal plants/ornamental plants,/fruit and forest trees through tissue culture

Skill development and job opportunities

After completion of this course students may be engaged in following opportunities:

- Entrepreneurship development: Students can start their own Tissue culture set-up and do mass propagation of true to type and disease free, quality medicinal plants/ornamental plants,/fruit and forest trees through tissue culture
- Tissue culture industry: Individuals can work as researchers, technicians and support staff at tissue culture based industries
- Academia: Individuals can pursue higher education and research opportunities in the field of tissue culture and genetic transformation in universities and research institutions.

SYLLABUS 60 hours

Micropropagation of medicinally/economically important plants **32 hours**

1. Preparation of stock solutions of macronutrients, micronutrients, vitamins, PGRs
2. Preparation of MS medium fortified with the appropriate PGR for explant culture
3. Preparation of the explant material (shoot tips/nodal segments/leaf discs etc.) - excising the material and surface sterilization
4. Culturing of the explant on MS medium
5. Sub-culturing on maintenance medium / rooting medium
6. Acclimatization of the micropropagated plantlets
7. Transfer of plantlets to pots

Anther Culture for production of Adrogenic haploids **28 hours**

8. Identification of unicellular microspore stage of the anther
9. Media Preparation
10. Anther culture (*Datura innoxia)*
11. Complete regeneration of Haploid Plants

Recommended Books:

1. Bhojwani, S. S., & Razdan, M. K. (1986). *Plant tissue culture: theory and practice*. Elsevier.
2. Razdan, M. K. (2002). *Introduction To Plant Tissue Culture, 2/E*. Oxford and IBH publishing.
3. Gamborg, O., & Phillips, G. C. (Eds.). (2013). *Plant cell, tissue and organ culture: fundamental methods*. Springer Science & Business Media.
4. Taji, A., Dodd, W. A., & Williams, R. R. (1992). *Plant tissue culture practice*. University of New England.
5. Smith, R. H. (2012). Plant tissue culture: techniques and experiments. Academic press.

Examination scheme and mode:

Evaluation scheme and mode will be as per the guidelines notified by the University of Delhi.