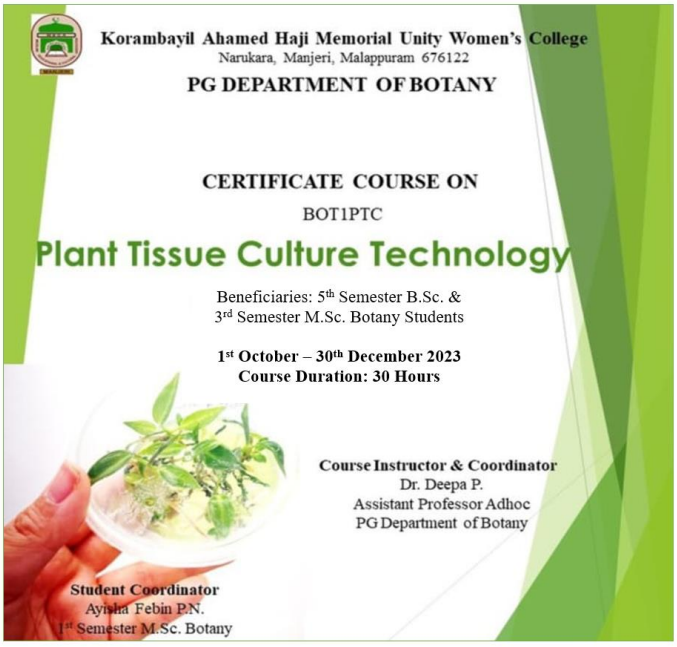
CERTIFICATE COURSE IN PLANT TISSUE CULTURE TECHNOLOGY

SUMMARY REPORT WITH OUTCOME

PG Department of Botany conducted a certificate course in Plant Tissue Culture Technology to the Third Semester MSc Botany and Fifth Semester BSc Botany students. The period of the course was 01st October 2023 to 31st December 2023 with 30 hours duration in which 81 students were enrolled and completed the same. Dr. Deepa P., Assistant Professor Adhoc, PG Department of Botany coordinated the course and the instructed the programme by Dr. Usman A., Head, PG Department of Botany. The aim of the course was to introduce the concept, methodology and applications of plant tissue culture technique to the participants. It makes an idea regarding germplasm conservation of rare and endangered plants of Kerala through micropropagation methods using different explants of desired mother plants. Moreover; it will make a better opportunity to propagate the tree plants which are difficult to propagate through normal agricultural methods. Propagation of medicinal and economically valuable plants are also successfully possible by this modern technique within a short period of time using the artificial media under sterile environmental conditions. After the completion of the course, the participants familiarized the protocols of the micropropagation methodology that included sterilization strategies, explant selection, media preparation, inoculation and hardening, in turn provided a better job-oriented practice to the participants.



PG DEPARTMENT OF BOTANY

KAHM UNITY WOMEN'S COLLEGE, MANJERI, MALAPPURAM, KERALA, 676122

CERTIFICATE COURSE

BOT1PTC - PLANT TISSUE CULTURE TECHNOLOGY

COURSE DESCRIPTION: Plant tissue culture technology provides better plant propagation method to produce a large number of plantlets from a desirable mother plant explant within a short period of time using the suitable artificial nutrient medium under sterile environmental conditions. The course provides a proper procedure for *in vitro* plant multiplication usable for agricultural practices and germplasm conservation. Beyond, it aims to provide the knowledge regarding sterilization methods, explant and media selection and hardening together with the familiarization about worldwide applications of plant tissue culture for the wellbeing of society.

SYLLABUS

CREDIT: 2 **DURATION: 30 HOURS**

OBJECTIVES

- To make awareness about the better strategy to multiply and establish the valuable plants needed for the welfare of human beings.
- To practice the proper procedure of *in vitro* multiplication of plantlets in germplasm conservation.
- To understand the method to produce stress tolerant plants that can grow under environmental stress.

LEARNING OUTCOMES

- Familiarize the correct procedure of *in vitro* plant multiplication
- Gain the knowledge on proper precautions to reduce the microbial contamination
- Understand about the necessity of rare plant conservation

- Obtain the information on income generating job practice to the society

MODULE I (10 HOURS)

1. Plant tissue culture: Principles and techniques; Cellular totipotency; *in vitro* differentiation-de differentiation and re-differentiation
2. Tissue culture medium: Basic components in tissue culture medium - Solid and liquid medium; Murashige and Skoog medium - composition and preparation
3. Aseptic techniques in *in vitro* culture: sterilization methods, sterilization of instruments, glass wares, medium, explants; working principle of laminar air flow and autoclave
4. Preparation of explants: Surface sterilization, inoculation, incubation, subculturing
5. Micropropagation: Different methods - Apical, axillary bud proliferation, direct and indirect organogenesis and somatic embryogenesis
6. Different phases of micropropagation: Multiple shoot induction, shoot elongation, *in vitro* and *in vivo* rooting hardening, transplantation and field evaluation; advantages and disadvantages of micropropogation, somaclonal variation

MODULE II (10 HOURS)

1. Methods and Applications of tissue culture:
    1. Shoot tip and meristem culture
    2. Somatic embryogenesis and synthetic seed production
    3. Embryo culture
    4. Protoplast isolation culture and regeneration: Transformation and transgenics
    5. Somatic cell hybridization, cybridization.
    6. *In vitro* secondary metabolite production: Cell immobilization, bioreactors
    7. *In vitro* production of haploids: Anther and pollen culture, *In vitro* preservation of germplasm

PRACTICAL (10 HOURS)

1. Preparation of nutrient medium: Murashige and Skoog medium using stock solutions

2. Familiarize the technique of preparation of explants, surface sterilization, inoculation and subculturing
3. Preparation of synthetic seeds
4. Demonstration of anther culture

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