

5. Plant Tissue Culture

Learning Objectives

The learner will be able to

- ❖ Perceive the concepts of tissue culture.
- ❖ Cognize the steps of tissue culture techniques and its types.
- ❖ Understand the protoplast culture in detail.
- ❖ Elicit the list of secondary metabolites obtained through cell suspension culture.
- ❖ Learn plant regeneration pathway.
- ❖ Appreciate the uses of micro propagation, somatic hybridization, shoot meristem culture and germplasm conservation.
- ❖ Acquire the knowledge of patenting Biosafety and Bioethics.

Important Notes and Points

- ❖ **Explant** : The tissue taken from a selected plant transferred to a culture medium often to establish a new plant
- ❖ **Totipotency** The property of live plant cells that they have the genetic potential when cultured in nutrient medium to give rise to a complete individual plant.

- ❖ **Differentiation** The process of biochemical and structural changes by which cells become specialized in form and function.
- ❖ Sterilization is the technique employed to get rid of microbes such as bacteria and fungi in the culture medium, vessels and explants.
- ❖ **Agar:** A complex mucilaginous polysaccharide obtained from marine algae (sea weeds) used as solidifying agent in media preparation.
- ❖ The callus cells undergoes differentiation and produces somatic embryos, known as **Embryoids**.
- ❖ Synthetic seeds are produced by encapsulation of embryoids in agarose gel or calcium alginate.
- ❖ **Somaclonal variations:** Somatic variations found in plants regenerated in vitro (i.e. variations found in leaf, stem, root, tuber or propagule).
- ❖ **Gametoclonal variations:** Gametophytic variations found in plants regenerated in vitro gametic origin (i.e. variations found in gametes and gametophytes).