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**GPB-322**

**Micro propagation Technologies**

**3(1+2)\***

### Theory

Meaning and concept of *in vitro* culture and micro-propagation; Historical milestones, advancement and future prospects of micro-propagation; totipotency, dedifferentiation; Tissue culture methodology: Sterile techniques, synthetic and natural media components, growth regulators, environmental requirement, genetic control of regeneration; Plant regeneration pathways - Organogenesis and Somatic embryogenesis;

Micro-propagation- Definition, methods, stages of micro-propagation and its significance; Axillary bud proliferation approach- Shoot tip and meristem culture; Organogenesis- Purpose, methods and requirements for organogenesis, indirect and direct organogenesis; Somatic embryogenesis- Procedures and requirements for organogenesis, indirect and direct embryogenesis; Differences between somatic and gametic embryogenesis, Synthetic seed-Concepts, necessity, procedure and requirements for production of synthetic seeds. Agencies working on micro propagation.

### Practical

Laboratory organization, sterilization techniques for explants, glassware, plastic wares, lab wares and working platform. Preparation of stocks and working solution. Preparation and sterilization of growth regulators. Preparation of working medium and experimentation on determining optimum concentration of growth regulators. Callus induction and regeneration of whole plants from different parts of plants. Direct regeneration into whole plants using bud, node and other tissues. Induction of somatic embryos. Experiments of synthetic seeds production and testing storability and germination efficiency.

### Lecture Schedule: Theory

S.N.	Topic	No. of lectures
1	Meaning and concept of <i>in vitro</i> culture and micro-propagation	1

2	Historical milestones of <i>in vitro</i> culture and micro-propagation	1
3	Advancement and future prospects of micro-propagation	1
4	Totipotency, dedifferentiation	1
5	Tissue culture methodology: Sterilization techniques	1
6	Synthetic and natural media components	1
7	Growth regulators used in tissue culture media	1
8	Environmental requirement	1
9	Genetic control of regeneration	1
10	Plant regeneration pathways - Organogenesis and Somatic embryogenesis	1
11	Micro-propagation- Definition, methods, stages of micro-propagation and its significance	1
12	Axillary bud proliferation approach- Shoot tip and meristem culture	1
13	Organogenesis- Purpose, methods and requirements for organogenesis, indirect and direct organogenesis	1
14	Somatic embryogenesis- Procedures and requirements for organogenesis, indirect and direct embryogenesis	1
15	Differences between somatic and gametic embryogenesis	1
16	Synthetic seed-Concepts, necessity, procedure and requirements for production of synthetic seeds	1

#### Lecture Schedule:Practical

S.N.	Topic	No. of lectures
1	Laboratory organization	1
2	Sterilization techniques for explants	2
3	Sterilization techniques for glassware	2
4	Sterilization techniques for plastic wares	2
5	Sterilization techniques for lab wares	2
6	Sterilization techniques for working platform	2
7	Preparation of stocks and working solution	1
8	Preparation of stocks and working solution	1
9	Preparation and sterilization of growth regulators	1
10	Preparation of working medium	2
11	Experimentation on determining optimum concentration of growth regulators	2

12	Callus induction and regeneration of whole plants from different parts of plants	4
13	Direct regeneration into whole plants using bud	2
14	Direct regeneration into whole plants using node	2
15	Direct regeneration into whole plants using other tissues	2
16	Induction of somatic embryos	1
17	Experiments of synthetic seeds production	1
18	Testing storability of synthetic seed	1
19	Germination efficiency of synthetic seed	1

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