

Difference Between Micropropagation and Somatic Cell Hybridisation

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Key Difference – Micropropagation vs Somatic Cell Hybridisation

Clonal propagation is a technique which produces a large number of genetically identical plants through **asexual propagation**. Micropropagation is one type of clonal propagation. Micropropagation can be defined as the technique which produces a large number of progeny plants from stock plants through modern plant **tissue culture** techniques. New varieties with mixed characteristics are produced through **hybridization**. Development of hybrid plants through the fusion of two **somatic cell** protoplasts of two different varieties of same species or two different species of plants is known as somatic cell hybridization. The fusion of two nuclei results in a heterokaryote with a mixture of characteristics of both plant types. Hence, somatic cell hybridization technique allows the manipulation of cellular **genomes**. The key difference between micropropagation and somatic cell hybridization is that **micropropagation is a propagation technique of plants while somatic cell hybridization is a genome manipulation technique through somatic cell protoplast fusion.**

What is Micropropagation?

Plants are able to propagate by sexual methods and asexual methods. Seed generations are used in sexual propagating technique while vegetative parts are used in the asexual mode. Asexual propagation has several advantages over sexual propagation since asexual propagation is able to produce a large number of genetically identical plants within a short time period. Micropropagation is one method of asexual propagation which is done under *in vitro* conditions. Micropropagation is a technique of multiplying plants using plant tissue culture techniques. It is a practice of rapidly producing a large number of progeny plants from stock plants using modern plant tissue culture techniques.

The micropropagation technique has several steps as follows.

1. Selection and growth of stock plants for three months under controlled conditions
2. Selection of explants, and initiation and establishment of culture in a suitable medium
3. Multiplication of **shoots** or rapid **embryo** formation from the explants
4. Transfer of shoots to a medium for rapid development into shoots
5. Establishment of plantlets in soil

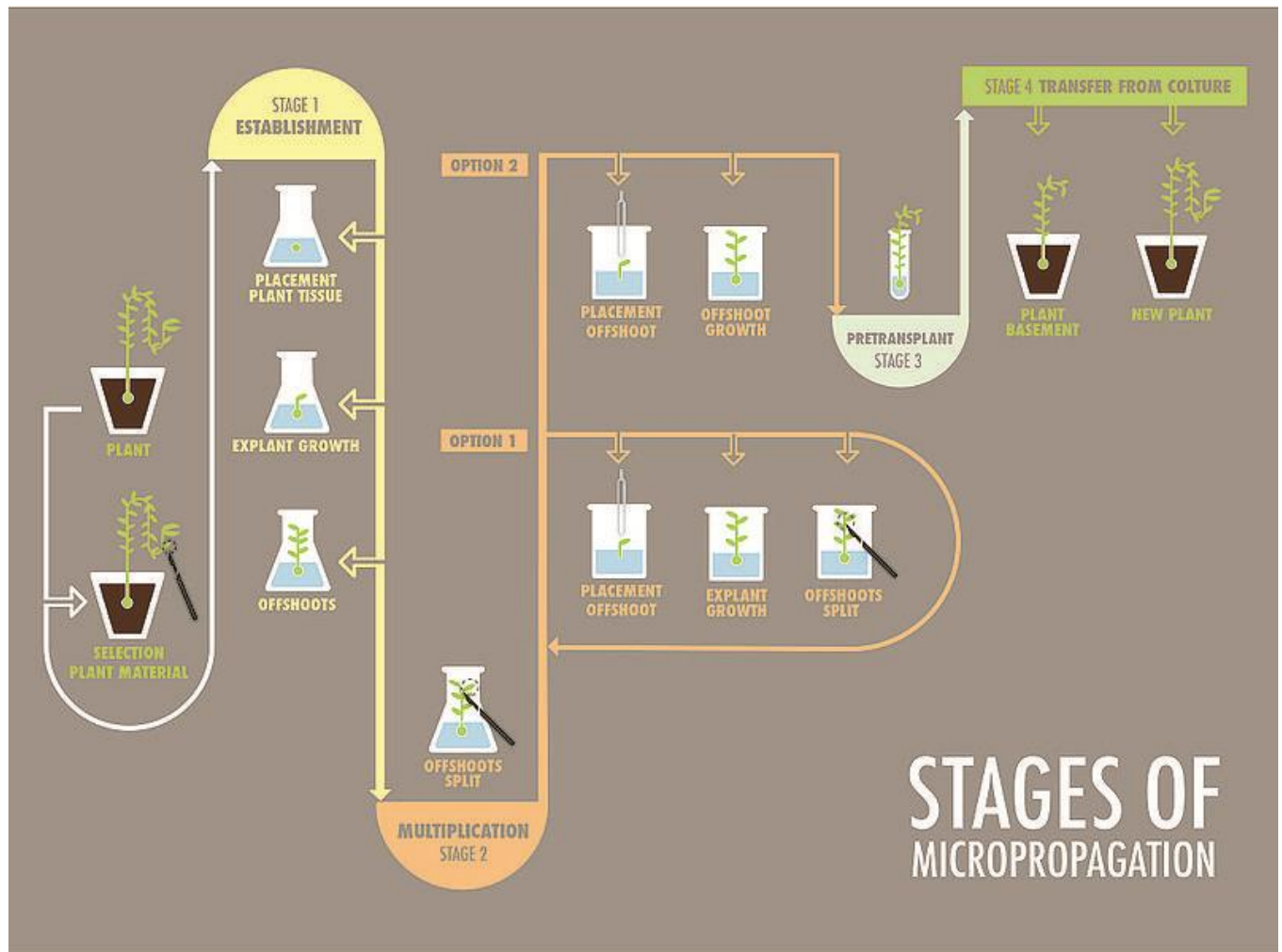


Figure 01: Micropropagation

Micropropagation is a widely applied method for multiplying transgenic plants. When stock plants do not produce seeds or do not respond to normal vegetative reproduction, micropropagation is the technique used to produce clone plants.

What is Somatic Cell Hybridisation?

Somatic cell hybridization is a type of genetic modification in plants. It is a hybridization technique which facilitates the manipulation of two genomes by

protoplast fusion. Two distinct plant species or two different varieties of the same species are fused together to mix their characteristics and make a new hybrid variety. The characteristics are transferred to a hybrid through somatic cell hybridization. This technique was first introduced by Carlson in *Nicotiana glauca*.

Somatic cell hybridization technique is performed via following steps.

1. Selection of the sources of protoplast
2. Production of protoplasts by removing the cell walls of one cell of each cell type
3. Fusion of two protoplasts and two nuclei by using electric shock or chemical treatment
4. Induction of cell wall synthesis in somatic cell hybrid (heterokaryote)
5. Growth of fused hybrid in callus cultures
6. Generation of plantlets
7. Identification and characterization of the somatic hybrid plants
8. Growth of complete plants in soil

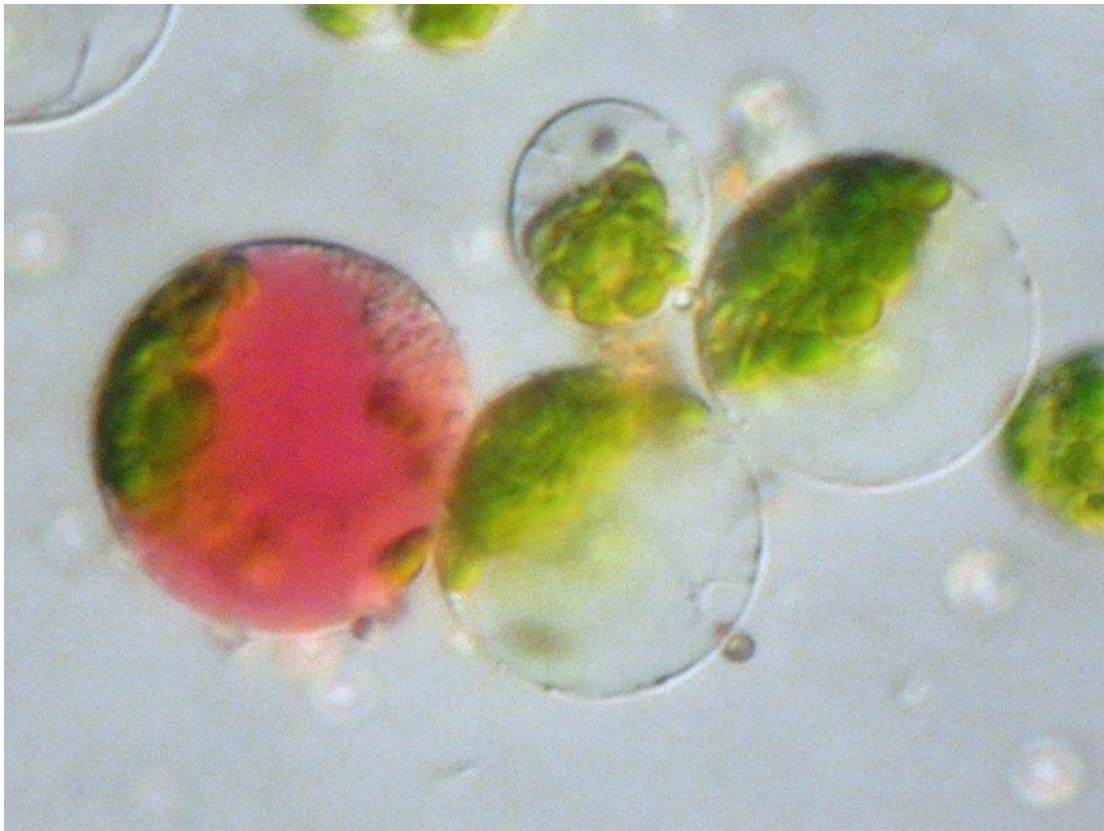


Figure 02: Somatic cell hybridization or protoplast fusion

Animal somatic cells are also can be hybridized, and hybrids can be obtained for various purposes such as to study and control of gene expression and cell division, to study malignant transformations, to study viral replication, to map genes or chromosomes, to produce monoclonal antibodies, etc.

What is the difference between Micropropagation and Somatic Cell Hybridisation?

Micropropagation vs Somatic Cell Hybridisation	
Micropropagation is a technique of rapid multiplication of plants.	Somatic cell hybridization is technique which allows manipulation of cellular genomes through protoplast fusion.
Applications	
Micropropagation is used for plants.	Somatic cell hybridization can be used for both plants and animal cells.
Use of Plant Tissue Culture Technique	
Micropropagation involves plant tissue culture techniques.	If the genotype is to be maintained, plant tissue culture techniques are involved in making clones.

Summary – Micropropagation vs Somatic Cell Hybridisation

Micropropagation is an important technique for rapid multiplication of plants. It uses plant tissue culture techniques to produce a large number of genetically identical plants. Somatic cell hybridization is a hybridization technique which produces new hybrids through the fusion of two types of somatic cell protoplasts. This is the difference between micropropagation and somatic cell hybridization. Somatic cell hybridization is useful for the production of novel interspecies or intergenetic hybrids.

References:

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