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Biological Base of Plants by Seolncr

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The asexual reproduction in tissue culture plants is possible because, in general, a plant cells have the capacity to allow growth and development of a new individual, without there being any type of sexual cell fusion gametes. This ability is called cell totipotency and is characteristic of a group of plant cells known as meristematic cells , present in various organs of the plant. The potential of a differentiated cell (a cell transmission, epidermal) to generate new tissues and eventually a complete body, decreases with the degree of differentiation achieved by that cell, but may partially or completely reversed by the culture conditions to those the subject. 4 The successful propagation of a plant is achieved depends on the expression of cell potential, namely, that some cells regain their meristematic condition. To do so, dedifferentiation induced first and then the cell redifferentiation. Under natural conditions, a process of this nature happens during adventitious root formation on rooting of cuttings, adventitious bud formation or when looking for the spread of any plant. Among the most important factors for achieving the desired morphogenetic response is the composition of the culture medium. Any attempt to plant propagation, either in vitro or in vivo , the nature of the differentiation process is regulated by the hormonal balance itself and the physiological state of the organ, tissue or cell culture setting. However, this balance can be modified by the addition of compounds that mimic the action of plant hormones. These compounds, termed growth regulators , are used in growth media to achieve a plant micropropagation.

The cellular totipotency was enunciated as theory by Gottlieb Haberlandt in 1902, who proposed that all plant cells have the ability to regenerate whole plants. 5 Haberlandt failed to prove his hypothesis because he could not get cell division and that the means of culture used did not include growth regulators because these compounds were unknown at that time. 6 7 Only in 1934, Philip White was able to maintain, in perpetuity, root growth in liquid media from the stem apices of tomato . 8 At the same time identified the indole acetic acid (IAA), which allowed the indefinite maintenance of callus of carrot and snuff in vitro. Later it was discovered the effect of coconut milk as stimulating the formation of callus on embryo culture of Datura stramonium . In 1948 Folke Skoog and Tsui Cheng , working with callus cultures of snuff, demonstrated the existence of chemical regulation the shoot and root. 9 Subsequent work in callus of the same species, with the addition of kinetin, the first cytokinin discovered, allowed to show that the differentiation of shoots, roots or both, was regulated by the balance of auxin and cytokinins.

The plant tissue culture is the process that begins with an explant and ends with the attainment of complete plants, which involves a series of stages, which are listed below:

Election of the plant and / or tissue donor explants. This phase will include treatment, preparation and selection of mother plants from which it starts growing, being essential to check the identity (species, variety or cultivar) and state of health (free of pathogens, deficiencies or stress .)

Establishment: is the disinfection of explants (usually sodium hypochlorite) and its subsequent adaptation to the artificial way of inducing callus, bud, root and somatic embryo, as desired. Surface disinfection is required to prevent the material of choice in the culture medium to grow microorganisms, mainly bacteria and fungi, which compete favorably with the explant

Multiplication: To generate a sufficient amount of plant mass for regeneration of the number of plants needed.

Rooting is the process of induction of root formation to convert alos shoots or somatic embryos on seedlings complete. Rooting can be performed both in vitro and ex vitro. In the first case the shoots obtained are transferred in the previous stage to a medium free of growth regulators, or containing only auxins. This is done under sterile conditions (in flow cabinet). In the second case the sprouts are immersed in a concentrated solution of auxins and transferred to a clean substrate, not necessarily sterile, which may be a mixture of peat with perlite or vermiculite . The buds are used in the ex vitro rooting should be strong and have well-developed leaves and the plants must perform photosynthesis to obtain energy to grow and form roots.

Rustication: the step of acclimatization of the plantlets in vitro to the usual environmental conditions outside the tube or bottle, ie the ground or an inert substrate. 4

Ex vitro rooting allows the rooting phase and the acclimation phase are achieved simultaneously and rarely callus forming at the base of the explants, thus ensuring a vascular connection, continuous between the stem and root.

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