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HAIRY ROOT CULTURE: A SUCCESSFUL MODEL FOR PHARMACEUTICAL COMPOUNDS PRODUCTION

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Higher plants are still a major source of natural products also called secondary metabolites such as pharmaceuticals, colours, dyes, and flavours. Several secondary metabolites from plants are used medicinally as isolated compounds, such as morphine (pain killer), paclitaxel, vinblastine (tumor therapy). Over the past three decades, plant tissue culture and plant biotechnology techniques have proved to be a valuable tool for study biosynthesis and production of pharmaceutical compounds in plants. One of the plant tissue culture protocols that considered as an attractive alternative for the production of many valuable natural secondary metabolites is hairy root culture. Hairy roots, also called transformed roots, are produced after infection of susceptible plant cells with a soil bacterium, *Agrobacterium rhizogenes*, and are associated with the integration of T-DNA from the bacterial Ri plasmid into chromosomal DNA in plant cells. Hairy roots are characterized by high growth rate and genetic stability. These genetically transformed roots can produce higher levels of secondary metabolites or amounts comparable to those of intact plants. Hairy root cultures offer promise for production of valuable secondary metabolites in many plants. In addition, the altered phenotype of hairy root is useful in plant breeding programs with plants of ornamental interest. The present talk gives an overview on the advantages and applications of hairy root culture, how to establish and culture them in labs, and examples of real experiments for using hairy root culture as a model for pharmaceutical compounds production from some Egyptian medicinal and ornamental plants.

Biography

Raoufa AbdelRahman is an associate professor of plant biotechnology and the head of Pharmaceutical Bio-Products Research Dep., Genetic Engineering & Biotechnology Research Institute, City of Scientific Research & Technology Applications, New Borg El-Arab, Alex., Egypt. She was a Ph.D. student at university of Georgia, Athens, USA. She completed a research project entitled "Exploring IRES mediated discistrons for the phytoremediation of Mercury". She examined several internal ribosome entry sequences (IRES) to express the bacterial methylmercury lyase (*merB*) and mercuric ion reductase (*merA*) enzymes from single dicistronic transcripts in plants. Since 2003, she has been interested in using plant tissue culture techniques to conserve rare and endangered plant species, as well as enhance the productivity of important pharmaceutical compounds from plants. She is working in several projects dealing with the production of antiviral, anticancer, and antioxidant compounds from plants using *Invitro* culture. Also, she is using *Agrobacterium* mediated transformation methods to enhance pharmaceutical compounds productivity or establish transgenic plants resistant to specific environmental conditions.

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