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AND ABSTRACT BOOK
The impact of exogenous plant growth regulators on carotenoid composition and carotenoid pathway gene expression in carrot cells in vitro

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Carotenoid accumulation depends on a plant developmental stage and plastid biogenesis that may be affected by signal molecules. Plant hormones like abscisic acid, auxins or gibberellins may function as a factor regulating carotenoid biosynthesis and accumulation. Callus cultures in vitro are considered as model systems for research on genetic control of biosynthetic pathways.

The aim of our research was to determine the effect of exogenous plant hormones (GA₃, 2,4-D and ABA) on carrot callus cells in their ability to accumulate carotenoids. For this purpose we used three carrot cell suspension cultures of two varieties, Koral and Amsterdamka, and a double haploid line. Growth regulators were supplemented to the basal culture medium, on which cell suspension was evenly spread. After two months, part of callus mass was directed to UPLC analysis. Samples with changes in carotenoid content were directed to gene expression analysis.

UPLC analysis showed different amounts of individual carotenoids in 2,4-D and ABA treated callus in compare to control. Gene expression analysis of 2,4-D and ABA treated callus revealed differences in some of key enzymes in carotenoid pathway. Results of these experiments indicate optimal culture conditions for the assessment of genetic determinants in carrot carotenoid biosynthesis.

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Elimination of contaminating bacteria from plant tissue culture

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Plant-associated bacteria form both epiphytic and endophytic populations through plants and their complete elimination from plant tissues is not possible despite of superficial sterilization of initial explants. Microorganisms, even in cryptic stage, may have detrimental effects (called vitropathy) on the cultures concerning multiplication, rooting, acclimatization or phenotypic stability. They can also influence the results of experiments affecting metabolism of explants either directly or through changing the media and the atmosphere composition in the vessels. Sanitation protocol should eliminate as much as possible bacteria from initial explants, including: cultivating donor plants at high the phytosanitary condition, isolating the smallest possible shoot tips for culture initiation, using effective sterilization. To eliminate endophytic bacteria from long term raspberry shoot cultures, we applied an inner sterilization by infiltration of plantlets with different biocides, also at lowered pressure atmosphere. All treatments, especially those cyclically repeated were able to decrease bacteria population to some extent. The most effective approach was the use of 0.05% water solution of HgCl₂, with two periods of 15 min incubation under 300 mbar pressure.

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