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EFFECT OF SOME PLANT GROWTH REGULATORS ON THE GROWTH AND ESSENTIAL OIL CONTENT OF CULTURED *SATUREJA KHUZISTANICA* JAMZAD PLANTLETS

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Satureja khuzistanica Jamzad is an important multipurpose medicinal plant in Iran. The essential oil of *S. khuzistanica* is characterized by high concentration of Carvacrol (93%). Micropropagation of *S. khuzistanica* through shoot-tips (1 cm) was achieved successfully on LS media. Micropropagated plantlets were cultured without plant regulators in the culture medium (control) or in media containing 0.5 to 5 μM of 6-benzyladenine (BA) and combinations of indole-3-butyric acid (IBA: 2 and 5 μM) with BAP (5 and 10 μM). These plantlets were examined for their yield essential oil and composition in relation to growth rate and density of glandular hairs at six weeks of culture. The highest biomass shoot growth was obtained with BA at 5 μM , while the higher frequency (77%) of shoot formation was observed in the media contained BAP (5 μM) in combination with IBA (2 μM). A positive correlation between the growth rates of these plantlets and essential oil content (0.6%–3.8% v/w) was observed and all growth regulators showed a positive correlation between oil accumulation and the percentage of glandular hairs. In response to growth regulators changed the amount of Carvacrol, therefore the effects of plant regulators on gene expression of 1-deoxy-d-xylulose 5-phosphate reductoisomerase (a key enzyme in a biosynthetic pathway for isoprenoids) is also discussed.

References

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INDUCED TAXOL PRODUCTION AND RELEASE BY ELICITATION IN A TWO-PHASE SUSPENSION CULTURE OF HAZEL (*CORYLUS AVELLANA*)

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Although the production of taxol by *Taxus* species is already a commercial reality is still not enough, so other natural sources of this compound are searched. Recently, a number of studies have shown hazel plant as a new source of taxol- (and related taxanes) among angiosperms [1, 2]. However, the production efficiency of taxol is low because of the inherent characteristics of plant cells. This prompts deep efforts to develop other methods for improved taxol production. Numerous strategies have been proposed for improving plant cell productivity and secondary metabolite production in suspension-cultured cells, including precursor and nutrient feeding, *in situ* extraction (two-phase culture), and treatment with elicitors. For this cell suspension cultures of hazel were challenged with salicylic acid (SA) concentrations and combination of SA and dibutyl phthalate (DBP). SA with concentrations of 12.5, 25 and 50 mg/L and DBP (10% (v/v)) were used. The results showed that on the growth curve basis, a couple of week was desired for subculturing and day 8 is a suitable time to apply treatments such as elicitation. The content of cell-associated and extracellular taxol increased gradually with time and reached values of 4.25 ($\mu\text{g/g}$ DW) and 22.25 ($\mu\text{g/L}$) after a cultivation period of 2 weeks, respectively. The growth, viability and protein content of cells were decreased by the treatments, compared to that of the control culture. In all treatments, hydrogen peroxide content and lipid peroxidation rate of cells increased compared to those of the control cells. Activity of phenylalanine ammonia-lyase increased by SA and, DBP exaggerated effect of SA. While flavonoids content decreased by the treatments, taxol content increased significantly. The extracellular taxol was more affected, compared to cell-associated taxol and all treatments increased taxol release and specific yield compared to that of the control. The most production of taxol (3 mg/l), release to the medium (92.4%) and specific yield (275 $\mu\text{g/g}$ cell dry weight) were observed under effect of combined use of SA (50 mg/L) and DBP, respectively which suggesting a synergistic accumulative effect.

References

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