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ABSTRACT BOOK



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PL-068 Studies on secondary metabolites production and proteins and enzymes of in vitro cultivated *Artemisia alba* Turra and relations with some endogenous phytohormones

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Studies on secondary metabolites production and proteins and enzymes of in vitro cultivated *Artemisia alba* Turra and relations with some endogenous phytohormones Yuliana Raynova¹, Krassimira Idakieva¹, Vaclav Motyka², Petre Dobrev², Yuliana Markovska³, Milka Todorova¹, Antoaneta Trendafilova¹, Ljuba Evstatieva⁴, Evelyn Wolfram⁵, Kaliva Danova¹ 1 Institute of Organic Chemistry with Centre of Phytochemistry, BAS, 1113 Sofia, Bulgaria 2 Institute of Experimental Botany, CAS, Prague, Czech Republic 3 Faculty of Biology, Sofia University "St. Kliment Ohridski", Sofia 1164, Bulgaria 4 Institute of Biodiversity and Ecosystem Research, BAS, 1113 Sofia, Bulgaria 5 Zurich University of Applied Sciences, Institute of Biotechnology, Phytopharmacy, Wädenswil, Switzerland Aim: *Artemisia alba* Turra is an essential oil bearing shrub, characterized with great variability of the essential oil profile of wild grown plants, related to genetic, geographic and environmental factors. It was previously established that inhibition of rooting in vitro caused by cytokinin/auxin treatment affected the essential oil profile of the plant and these changes were also related to bioactive endogenous cytokinin levels in vitro (1, 2). The aim of the present work was to perform a complex study on the relations between soluble protein levels, enzyme activities (studied spectrophotometrically and by SDS-PAGE and zymography); malondialdehyde and hydrogen peroxide levels, endogenous hormones (cytokinins, salicylic acid, as well as jasmonic acid and its conjugates), polyphenolics and terpenoids in a model system of *A. alba* in vitro with inhibition of rooting and stimulation of callusogenesis by means of individual and combined cytokinin and cytokinin/auxin treatments. Results: It was established that inhibition of rooting and stimulation of callusogenesis caused by benzyl adenine (BA) or combinations of BA and indole-3-butyric acid (IBA) in vitro were related to elevation of sesquiterpenoids in the essential oils, as well as polyphenolics content, accompanied by a drop of stress hormones, bioactive cytokinins and preservation of oxidative stress and lipid peroxidation levels, as compared with non-treated control. Individual treatments with either IBA or BA, also increased the sesquiterpenoid content in the essential oil of the plant, in a concentration related manner, this effect being more profound after BA treatment. In addition, BA treated plants exhibited a drop of protein levels of the aerial samples, as well as profound differences of enzymatic activity in the callus tissues, as compared with callus of plants treated with different combinations of BA and IBA. Conclusion: The results of the present work indicate that alterations of endogenous phytohormonal levels, caused by exogenous plant growth regulators treatment, might be the mediator between primary and secondary metabolism by means of affecting protein levels and activity of key enzymes in vitro. Acknowledgements: PhytoBalk, SNF No. IZEBZ0_142989 and SD-MEYS No. DO2-'01:153; MEYS CR, project No. LD14120; bilateral cooperation project between BAS and CAS, Reg. No. 29. References 1. Danova K, Todorova M, Trendafilova A, Evstatieva L (2012) Cytokinin and auxin effect on the terpenoid profile of the essential oil and morphological characteristics of shoot cultures of *Artemisia alba*. Natural Product Communications 7: 1-2. 2. Krumova S, Motyka V, Dobrev P, Todorova M, Trendafilova A, Evstatieva L, Danova K (2013) Terpenoid profile of *Artemisia alba* is related to endogenous cytokinins in vitro. Bulgarian Journal of Agricultural Science, 19: 26–30.