

Enzymatic activity and physiological status affect essential oils and polyphenolics production in *Artemisia alba* tissue cultures

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In previous research of *Artemisia alba* Turra, we reported that stimulation of root development *in vitro* was related to domination of monoterpenoids, while callus formation and rooting inhibition led to the prevalence of sesquiterpenoids in the essential oils of the aerial parts [1]. Interestingly, these two essential oil types correlated to the results of other authors concerning the oils of contrasting wild accessions of this species [2]. Here, we study the biochemical parameters of *A. alba* response to exogenous indole-3-butyric acid (IBA) and benzyl adenine (BA) treatment *in vitro*.

The aerials of plants with a well developed root system (monoterpenoid domination in the oils in PGR-lacking control, as well as in IBA rooting stimulated media) were characterized by elevated CAT (EC 1.11.1.6), APX (EC 1.11.1.11) and GPOX (EC 1.11.1.7) levels, as compared with aerials of the plants from the "sesquiterpenoid group" (where combinations of IBA and BA led to suppressed rooting and callusogenesis). Interestingly, the plants from the "intermediate oil type" (bearing the terpenoid features of both root and callus forming plants) were characterized by a considerable drop of PAL (EC 4.3.1.24), CAT and GR (EC 1.8.1.7) and a drop of polyphenolics leading to marked elevation of lipid peroxidation and oxidative stress *in vitro*. In addition, electrophoretic profiles indicated differing enzymatic activities for the aerial, root and callus tissue samples. Modification of the essential oil profile through affecting morphological development *in vitro* will further be utilized for the targeted delivery of plant biomass with desired properties.

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References: [1] Danova K et al. (2012) Natural Product Communications 7: 1-2. [2] Radulovi• N, Blagojevi• P. (2010) Natural Product Communications, 5, 1117-1122

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