

Increase of phytosterols content in response to cytokinin kinetin treatment of marigold (*Calendula officinalis*) hairy roots

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Phytosterols are plant primary metabolites known for being cell membranes constituents and substrates of synthesis of phytohormones brassinosteroids [1]. Their bioactivities in humans include reduction of cholesterol levels in plasma, antidiabetic, antiinflammatory and antitumor which makes them valuable resource for production of pharmaceuticals, cosmetics and functional food [2]. Phytosterols have rarely been regarded as the target products in plant *in vitro* cultures, however, this interest appeared recently due to their beneficial effects on human health and other possible applications. Different strategies have been applied to increase the sterol accumulation, including elicitation and metabolic engineering. However, the majority of elicitors (e.g. jasmonates, pectins) caused a decrease in sterol biosynthesis. In this study we treated hairy roots of marigold with four different phytohormones, auxins: IAA (indole-3-acetic acid) and NAA (1-naphthaleneacetic acid), and cytokinins BAP (6-benzyloamino purine) and kinetin in concentration of 0.75 mg/L. From all four phytohormones only natural cytokinin – kinetin affected phytosterols' levels. The total sterol content in control culture was approximately 435 µg/g DW, and after treatment with kinetin it was increased by 27%. Particular strong effect was observed in stigmasterol – 34% increase and isofucosterol up to 19 µg/g DW. Simultaneously, no remarkable effect of kinetin on hairy root culture growth was observed.

References

- [1] Valitova JN et al. *Biochem (Mosc)*. 2016; 81:819-834.
- [2] Miras-Moreno B et al. *J Agr Food Chem*. 2016; 64:7049-7058.