BOOK of ABSTRACTS

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(23rd SPPS Meeting)

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Enhanced metabolism of gibberellins is involved in the induction of somatic embryogenesis from root apices of spinach

PP1-9

Maja Belić[1], Danuše Tarkowská[2], Snežana Zdravković-Korać[1], Jelena Milojević[1]

(szk@ibiss.bg.ac.rs)

[1] Department of Plant Physiology, Institute for Biological Research "Siniša Stanković"- National Institute of Republic of Serbia, University of Belgrade, Bulevar despota Stefana 142, 11060 Belgrade, Serbia

[2] Laboratory of Growth Regulators, Faculty of Sciences, Palacký University and Institute of Experimental Botany of the Czech Academy of Sciences, Křížkovského 511/8, 771 47 Olomouc, Czech Republic

Gibberellic acid (GA_3) and α-naphthaleneacetic acid (NAA) are essential for efficient somatic embryo (SE) induction from root apices of spinach seedlings, while neither is sufficient to provoke an embryogenic response. To gain insight into the role of gibberellins (GAs) in SE induction, the levels of bioactive GAs, their precursors and inactivation products, were determined in embryogenic and non-embryogenic explants, cultivated on medium supplemented with 20 μM NAA + 5 μM GA_3 and 20 μM NAA, respectively, for 24 h and 7 days, and in control explants - root apices that were frozen immediately after isolation. The content of GAs was determined using ultra-high performance liquid chromatography coupled to tandem mass spectrometry. The levels of biosynthetic GA precursors GA_{44}, GA_{19} and GA_{20} were 7–18-fold higher in embryogenic explants, and only 1.1–2.8-fold higher in non-embryogenic explants compared to the control. In embryogenic explants, the levels of bioactive GA_1, GA_3, GA_4 and GA_7 increased 843-, 50433-, 60- and 136-fold, respectively, after 24 h, and remained high after 7 days of treatment. In non-embryogenic explants, only a transient increase of GA_3 level (22-fold) was observed after 24 h of treatment. Expectedly, the products of GA2ox inactivation (especially GA_8) were significantly higher in embryogenic than in non-embryogenic and control explants. The results evidence a positive impact of enhanced GA metabolism on the acquisition of embryogenic competence, confirming their important role in SE induction and indicating that the 13 hydroxylation pathway is a prevalent pathway of bioactive GA synthesis in embryogenic explants.

Keywords: Gibberellins, root apices, *Spinacia oleracea*, somatic embryogenesis

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