

JOINT EVENT

20th Global Congress on Biotechnology

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3rd International Conference on Enzymology and Molecular Biology

March 05-07, 2018 London, UK

Efficiency of the antioxidative system is the first prerequisite for effective doubled haploids production with the use of isolated microspore culture methodIwona Żur¹, Jozsef Fodor², Katarzyna Gawrońska³, Gabriela Gołębiowska-Pikania³, Katarzyna Juzoń¹, Przemysław Kopeć¹, Ewa Surówka¹, Franciszek Janowiak¹, Monika Krzewska¹, Ewa Dubas¹ and Balazs Barna²¹Polish Academy of Sciences, Poland²Hungarian Academy of Sciences, Hungary³Pedagogical University of Kraków, Poland

The technology of doubled haploids as the fastest route to total homozygosity is highly appreciated in many domains of basic research and breeding. Among several methods, the one using isolated and *in vitro*-cultured immature cells of male gametophyte induced towards embryogenic development (microspore embryogenesis-ME) possesses the highest potential for commercial application. However, efficient ME induction requires a precisely balanced stress treatment, strong enough to induce microspore reprogramming but not exceeding cell stress tolerance threshold. As the general cause of injuries in *in vitro*-cultured cells is the overproduction of reactive oxygen species (ROS), an efficient antioxidative defence was suggested as the first prerequisite for stress survival and effective ME initiation. To establish the role of ROS and the antioxidative system in ME initiation, the generation of hydrogen peroxide, and the activities of antioxidative enzymes and low molecular weight antioxidants were analysed in isolated microspores of two cultivars of barley (*Hordeum vulgare* L.), winter cv. Igri and spring cv. Golden Promise, differing significantly with respect to embryogenic potential. The analyses were conducted in microspores redirected towards embryogenic development by low temperature tillers pre-treatment (4 weeks at 4°C). Additionally, the effects of compounds known as cellular redox status modifiers, e.g. glutathione and L-2-oxo-4-thiazolidinecarboxylic acid (OTC), on microspore viability and ME initiation efficiency were estimated. The received results suggest that the activity of the antioxidative system is the first prerequisite for successful ME initiation, though in the case of its low activity, antioxidative defence could be supported by the application of exogenous antioxidants.

Biography

Iwona Żur completed her PhD and Habilitation in the field of Agronomy and Plant Physiology at the University of Agriculture in Kraków, Poland. Since 2010, she has been the Head of the Department of Cell Biology at the Institute of Plant Physiology Polish Academy of Sciences. She has published 38 papers in peer-reviewed journals.

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