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***In Vitro* Analysis for Drought Tolerance of Different Transgenic Potato Lines Resistant to PVY**

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Potato is an excellent staple food, but it is very sensitive to diseases, pests and different abiotic factors. Potato viruses are between the diseases causing great losses in potato crop production. In our previous research two different potato cultivars ('Baltica' and 'Désirée') were transformed using *A. tumefaciens* C58C1 pGV2260 with the hairpin construct pRGGYCPiPCY to obtain different potato varieties PVY^{NTN} resistant (Rakosy-Tican *et al.*, 2010).

On the other hand, abiotic stress, such as drought, is another cause which determine the decrease of productivity in potato. One of the main methods for producing drought-tolerant plants is *in vitro* selection under water stress.

The amino acid proline is an organic osmolyte that accumulates in a variety of plant species in response to abiotic stress such as drought (Szabados and Savoure, 2010). Proline accumulation may influence the stress tolerance of the plant in different ways. The stabilization of proteins and protein complexes from chloroplasts and cytosol, protection of photosynthetic apparatus and enzymes involved in ROS detoxification are also some of the important functions, determined by the accumulation of proline (Chaves, 2009).

The aim of this study was to combine gene transfer and *in vitro* stress selection in order to obtain potato varieties 'Baltica' and 'Désirée' that are resistant to PVY^{NTN} and tolerant to drought. The drought stress was simulated in two stages. First, the callus cultures regenerated from internodes were maintained for three weeks on MS-T medium with 5% polyethylene glycol (PEG) 6000. In the second stage, the

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regenerated plants were selected on RMB5 medium with 5%, 10% and 15% PEG. At each stage, the plants were analyzed for viability, root development, the regeneration of axillary buds (Mustață *et al.*, 2014) and also at biochemical level, for proline and hydrogen peroxide biosynthesis. The results obtained reveal that three clones of cv. 'Baltica' positive for the hairpin construct of CP (coat protein) gene of PVY^{NTN} and tolerant to drought could be selected also based on enhanced proline biosynthesis, which was significantly higher than in sensitive or control plants. Hydrogen peroxide (H₂O₂) as an indicator of reactive oxygen species synthesis (ROS), evaluated at the end of selections on PEG 6000, reveals a reduced accumulation in stressed tissues as well as a significantly lower concentration in the tolerant potato cv. 'Baltica' transgenic lines. These results suggested that increase of proline contributes to ROS homeostasis in potato clones tolerant to drought and putatively resistant to PVY.

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