

ACTIVE OXYGEN SPECIES (AOS) METABOLISM DURING POTATO TUBER DORMANCY

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Tuber dormancy is a stage of the potato plant ontogenetic cycle that begins with tuber formation and ends with tuber germination. This process can be divided in several phases, namely: preparation to dormancy, initiation of dormancy, dormancy maintenance, breakage of dormancy and sprouting. Now the question is which physiological process drives the evolution of tuber dormancy through these different phases. High levels of AOS are toxic for the cells but low levels can act as modulators of cell function (Remacle *et al.*, 1995), consequently capable to influence developmental processes like dormancy. Thus, Wang and Faust (1988) showed that free radicals are accumulated in dormant apple buds and diminished when bud-break is induced by thidiazuron. Inhibition of catalase using thiourea leads to dormancy break of lettuce seeds (Hendricks and Taylorson, 1975) and the direct application of H₂O₂ to the barley seeds can also break dormancy (Fontaine *et al.*, 1994). On the basis of this information, we speculated that during potato tuber dormancy there is a gradual build-up of AOS. When some threshold level is reached dormancy is broken and the activity of antioxidant enzymes is significantly stimulated. In order to examine this hypothesis, we are following three approaches: I) The presence and activity of antioxidant enzymes in different developmental contexts and during dormancy is being analyzed (northern, western and native gel assays). II) In order to modify the metabolism of AOS, potato plants (cv. Désirée) were genetically modified with a manganese superoxide dismutase gene from *Nicotiana glumbaginifolia* targeted either to mitochondria (overexpression) or to plastids (ectopic expression). The germination and tuberisation kinetics were analyzed in transgenic microtubers. III) Different molecules like H₂O₂, salicylic acid, aminotriazole, etc., that modify the metabolism of AOS will be applied to dormant tubers. Preliminary data obtained from different approaches will be presented.

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