

Induction of Potato (*Solanum tuberosum* L.) tuber sprouting by hydrogen peroxide

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Tuber dormancy is an important aspect of potato (*Solanum tuberosum* L.) crop management. Depending on the intended purpose, accelerated (i.e. seed tubers) or delayed (i.e. industrial processing) sprouting of the harvested tubers may be favoured. Therefore, controlling the length of dormancy period is of considerable economic importance. Unfortunately, the underlying mechanisms governing the release of tuber dormancy and initiation of sprouting are still poorly understood.

In some plant species, the metabolism of active oxygen species (AOS) was found to be associated with dormancy break (Hendricks and Taylorson, 1975; Wang et al., 1991; Fontaine et al., 1994). For instance, catalase inhibition using thiourea or direct application of hydrogen peroxide released dormancy in lettuce and barley seeds, respectively. To our knowledge, no corresponding data are available in potato, though wounding is known to induce both H_2O_2 accumulation and tuber sprouting.

The present work has been undertaken to evaluate the relevance of AOS and antioxidants in the control of potato (cv. D sir e) tuber dormancy using complementary approaches:

- Time-course analysis of sprouting, H_2O_2 content and antioxidant enzyme activities in harvested tubers during storage;
- Direct application of H_2O_2 and of a chemical inhibitor of catalase (thiourea) to harvested tubers and assessment of their impact on sprouting;
- Generation of transgenic potato plants deficient in their catalase activity and characterisation of their tuber sprouting behaviour.

Our data suggest that hydrogen peroxide accumulation would be one of the early and determinant events leading to dormancy break in the potato tuber and open novel perspectives for controlling the sprouting time in transgenic plants.

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References:

- Fontaine et al., Plant Physiol. Biochem. 1994, 32:677.
Hendricks and Taylorson, Proc. Natl. Acad. Sci. USA 1975, 72:306.
Wang et al., Physiol. Plant. 1991, 82:231.