

**Title** Antioxidant function of alternative oxidase in mitochondria of winter wheat during cold hardening

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### **Abstract**

The activity of alternative oxidase (AOX) and generation of reactive oxygen species (ROS) in mitochondria of winter wheat *Triticum aestivum* L. isolated from seedlings subjected to one (7-day exposure to 2–3°C) and two (7-day exposure to 2–3°C and 2-day exposure to –2°C) phases of a cold hardening has been studied. The antioxidant role of AOX in the first phase of the cold hardening has been determined using inhibitors of respiratory chain. Exposure to low temperature was shown to lead to inhibition of cytochrome pathway in mitochondria, increase of ROS production, and switching of the electron transport to the alternative pathway. Decrease in succinate- and antimycin A-induced ROS generation was found during two phases of cold hardening. This fact may point out to functioning of uncoupling proteins under these conditions. Thus, antioxidant function of AOX during the first phase of cold hardening may be an important component of the cold adaptation mechanism in winter crops. The data suggest that ROS and free fatty acids may be signal molecules regulating the activity of two energy-dissipation systems (AOX and uncoupling proteins).

<http://www.springerlink.com/content/4087h24432118243/fulltext.pdf>