

**Title** Physiological response of 'Larry Ann' plums to cold storage and 1-MCP treatment  
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#### **Abstract**

The aim of this work was to study the specific effects of low temperature and 1-MCP treatment on ethylene metabolism and oxidative behaviour in plums (*Prunus × salicina* cv. Larry Ann). Control fruit were stored at 20 °C or 0 °C and the 1-MCP (625 nL L<sup>-1</sup>) treated fruit at 0 °C. Changes in the kinetics of ethylene production upon removal were related to changes in ACC metabolism (ACC and MACC levels), oxidative behaviour (H<sub>2</sub>O<sub>2</sub> content) and enzymatic antioxidant potential (SOD, CAT and POX enzymes) during cold storage. Low temperature stress inhibited the synthesis of MACC, which appeared to be the basic process that regulated ACC and ethylene production at ambient temperature. Although 1-MCP treatment inhibited ethylene production and ACC accumulation in the cold, it did not inhibit the accumulation of MACC. Neither cold nor 1-MCP treatment induced oxidative stress. Nevertheless, the 1-MCP treatment significantly impaired the increase in POX activity observed during cold storage. Collectively these results showed the underlying role that ACC metabolism plays in the ripening behaviour of cold-stored plums, confirming previous results. The results also indicate that MACC and malonyl transferase activity are the key regulatory factors that control ripening and possibly some ethylene-related disorders such as chilling injury in cold-stored plums.