

**Title** Physiological response of plum (*Prunus salkina* L.) to cold stress and 1-MCP treatment, relationships with chilling injury

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### **Abstract**

During a two years study we determined the effect that cold storage and 1-MCP treatment have on plum physiology and we studied the biochemical factors involved in chilling injury incidence in this fruit. This work was carried out on the climacteric 'Larry Ann' cultivar and on the suppressed climacteric 'Angelino'. Both cultivars were stored at 0°C and treated with 0 or 400 nll<sup>-1</sup> 1-MCP. During cold stress 'Larry Ann' plums exhibited significant changes in ACC metabolism. 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 during cold storage, it did not inhibit the accumulation of MACC. In this study, it was also found that chilling injury susceptibility was directly linked to the capacity of the fruit to increase its climacteric during cold storage. In consequence the suppressed climacteric cultivar and 1-MCP treated fruit exhibited few disorders. On the opposite, suppressed climacteric plums treated with exogenous ethylene exhibited higher incidence of chilling injury. Collectively these results show that chilling injury in plums is related to the climacteric behaviour of the cultivar and that 1-MCP may be an interesting tool to prevent this disorder. They also highlight the underlying role that ACC metabolism, and more especially MACC and malonyl transferase play in plum ripening and also in the susceptibility of the cultivar to this disorder.