

Title Roles of climacteric ethylene in the development of chilling injury in plums
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Abstract

The aim of this work was to study the relationship between ethylene production and chilling injury sensitivity in climacteric (*Prunus × salicina* cv. ‘Larry Ann’) and suppressed climacteric (*Prunus × salicina* cv. ‘Angeleno’) plums. Both cultivars were stored at 0 °C and treated with 0 or 400 nL L⁻¹ 1-MCP. In order to confirm our results, in a second year the suppressed climacteric cultivar was treated with exogenous ethylene and then stored at 0 °C. Changes in the kinetics of ethylene production associated with storage and symptoms of chilling injury were assessed both immediately after removal and during shelf life. The first chilling symptoms were observed in ‘Larry Ann’ plums after 30 days of storage, whereas ‘Angeleno’ fruit remained healthy until the end of the experimental period. The incidence of chilling symptoms in ‘Larry Ann’ plums was clearly related to a cold-induced increase in their ability to produce ethylene after removal. Concomitant changes in membrane permeability were also observed for this cultivar. The incidence of chilling symptoms was clearly reduced, reaching the same level as the suppressed climacteric ‘Angeleno’ cultivar, when ‘Larry Ann’ was treated with 1-MCP. To further support this result, we observed that the suppressed climacteric cultivar treated with ethylene exhibited a higher incidence of disorders after long term storage. Collectively, these results showed that chilling injury in plums was related to the climacteric behaviour of the cultivar and that 1-MCP may be an interesting tool with which to prevent this disorder.