

Title Changes in the concentrations of ACC and conjugated ACC in relation to the development of cool storage disorders in 'Arctic Snow' nectarines

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#### **Abstract**

The objective of this study was to test whether the development of low temperature disorders in nectarines is a result of chilling stress. Arctic Snow nectarines were harvested at two maturities from a commercial orchard at Picton, New South Wales, Australia. The fruits were enclosed in steel drums ventilated with air, air+15 ppm ethylene, air+15% CO<sub>2</sub> or air+15% CO<sub>2</sub>+15 ppm ethylene and kept at 0 deg C. ACC and conjugated ACC were measured in fruits: (1) ripened immediately after harvest; (2) immediately on removal from cool storage; and, (3) after cool storage then ripening for 5 or 8 days at 20 deg C. Firmness, juice recovery and concentrations of ACC and conjugated ACC were measured and the incidence of internal disorders assessed. ACC concentrations remained low during ripening following cool storage and were not affected by the storage atmospheres. Internal disorders developed from 3 weeks of storage but a significant increase in ACC was not observed until after 4 weeks of storage. Conjugated ACC concentrations were at least 10 times higher than ACC and no significant changes were observed during ripening following cool storage. Our results show that low temperature disorders in nectarines are not the result of a typical chilling injury that would be expected to stimulate ACC production. They lend some support to the proposal by Walsh et al [see Acta Horticulture (2002) 592, 629-633] that these disorders are a form of senescence resulting from an imbalance between ethylene production and action at low temperatures. However, this proposition is not fully supported because we did not observe clearly beneficial responses to ethylene added to the storage atmosphere.