

Title Chilling injury in stored nectarines and its detection by time-resolved reflectance spectroscopy
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Abstract

Nectarine fruit after cold storage soften normally, but become dry instead of juicy and can develop flesh browning, bleeding and a gel-like or glassy formation of the flesh near the pit. An experiment was conducted to see if time-resolved reflectance spectroscopy could distinguish these internal disorders non-destructively. The optical parameters of absorption coefficient (μ_a) and reduced scattering coefficient (μ'_s) were measured at 670 nm and 780 nm, on nectarine (*Prunus persica* cv. Morsiani 90) fruit held at 20 °C after harvest or after 30 d of storage at 0 °C or 4 °C. Each day for 5 d 30 fruit were examined both non-destructively and destructively. Other measurements were firmness with a penetrometer, peel colour on the blush and non-blush side, expressible juice, weight loss, and visual rating of internal browning, bleeding, and gel. The fruit had been sorted at harvest according to the value of μ_a670 so that each batch had a similar spread of fruit maturity. More mature fruit (lower μ_a670 values) developed internal browning and bleeding with more severe symptoms compared to less mature ones (higher μ_a670 values). It was found that μ_a780 could distinguish healthy fruits from the chilling injured ones. Canonical discriminant analysis indicated that fruit without cold storage had low μ_a780 , less water loss, low firmness, but high μ_a670 and high expressible juice compared with cool stored fruit. Fruit cool stored at 4 °C had high μ_a780 and less expressible juice, lower water loss and lower firmness compared with fruit cool stored at 0 °C. It was concluded that time resolved reflectance spectroscopy could detect internal woolliness and internal browning in nectarines after storage.