Title Maturity assessment at harvest and prediction of softening in a late maturing nectarine cultivar after cold storage

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Abstract

The absorption coefficient μ_a measured at 670 nm in fruit pulp at harvest by time-resolved reflectance spectroscopy (TRS) has been shown to be a good maturity index for early nectarine cultivars. By including individual fruit maturity as a biological shift factor (BSF) into a kinetic model for softening it is possible to select fruit with different shelf-life potential. The BSF approach combined with TRS measurement and kinetic modeling of firmness was applied to a late maturing nectarine cultivar ('Morsiani 90'), ripened at 20 °C after harvest or after storage at 0 °C and 4 °C, the latter conditions inducing chilling injury. At harvest the absorption coefficient μ_a had low values and low variability, indicating advanced maturity, while firmness was similar to that of early cultivars. The softening model took into account these differences, showing parameters similar to those of the early cultivars with the exception of the softening rate which was 2–6 times lower, indicating a slower softening in 'Morsiani 90' fruit. Decay of μ_a at 20 °C was also slower. Softening continued during storage at 4 °C, but not at 0 °C. After storage at 0 °C softening was resumed similarly to non-stored fruit, but with much variability. Fruit stored at 4 °C, which showed chilling injury, had a softening rate at 20 °C significantly higher than that of 0 °C fruit. It is suggested that the same changes in cell wall metabolism which induce the appearance of chilling injury also affect firmness and increase softening rate.