

Effects of low temperature storage and cold chain breaks on anti-oxidants and C7 sugars in 'Fuerte' avocados from South Africa

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Abstract

To ensure avocados fruit not arriving softened at European markets, South African exporters make use of an average storage temperature of 5.5°C during the season as well as other expensive technologies such as, controlled atmosphere or 1-MCP. Various postharvest quality issues can be resolved by lowering the storage temperature, using waxes and other water loss preventing treatments, and by avoiding cold chain breaks. Why certain treatments result in reduced fruit quality is not known, but browning due to lack of anti-oxidant strength is likely. Therefore, the effect of these treatments on anti-oxidant and C7 sugar levels in 'Fuerte' avocados were investigated. 'Fuerte' avocados were harvested at three dates during the season, with moisture contents of 74% (early) 68% (mid) and 63% (late). Fruits were stored at different temperatures (2 and 5.5°C), treated with 1-MCP, waxed and subjected to cold chain breaks (24 hour delay and break at 14 days) and stored for 28 days. Anti-oxidant concentrations in the exocarp, as well as mannoheptulose and perseitol concentrations in the mesocarp, were highest in early-season fruit with a tendency to decline as the season progressed. Results suggest a link between anti-oxidant concentrations in the exocarp and the rate of metabolic activity during cold storage. Although trends were visible for different treatments, the level of C7 sugars found in the mesocarp at the end of storage did not conclusively indicate differences between storage treatments or breaks in the cold chain. Results indicate that postharvest stress conditions, such as high fruit moisture loss, cold chain breaks and ripening during cold storage, cause a reduction in anti-oxidant concentration in the fruit. Thus, treatments which reduce these stresses and prevent ripening during cold storage, could maintain the levels of anti-oxidants and C7 sugars in the fruit more effectively than a higher storage temperature; therefore, such treatments result in higher final fruit quality.