

SOME ASPECTS OF COLD STORAGE OF 'FUERTE' AVOCADOS (*Persea Americana* Mill.) GROWN IN THE NATAL MIDLANDS

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ABSTRACT

The South African avocado industry is largely export orientated and export by sea to European markets necessitates cold storage for up to 4 weeks at temperatures around 5.5°C. Avocado fruit is subject to chilling injury which is manifested as mesocarp discolouration, and pitting and blackening of the rind. Of the South African cultivars exported, 'Fuerte' is the most susceptible to chilling injury, and accounts for >50% of avocado exports.

A number of temperature regimes where temperature was reduced in a step-wise fashion from 8.5 or 7.5°C to 4.5 or 5.5°C during 3 to 5 weeks of storage were tested weekly throughout the 1993 and 1994 'Fuerte' harvesting seasons in the Natal Midlands (a cool mesic subtropical area), in attempt to find cold storage temperature regimes which would minimise chilling injury. No definite trends with regard to certain temperature regimes resulting in fruit with less chilling injury were evident. Overall, stepped down temperature regimes produced fruit of quality no better than storage for 5.5°C for 4 weeks. There was no significant difference in concentration of total phenolics in 'Fuerte' fruit mesocarp throughout the 1994 harvesting season ($P < 0.05$). Levels of ethylene evolution during 4 weeks of storage at 7.5 and 5.5°C ranged from 0 to 5 $\mu\text{l.kg}^{-1}.\text{h}^{-1}$, and peaked at 109 and 75 $\mu\text{l.kg}^{-1}.\text{h}^{-1}$ in fruit stored at 7.5 and 5.5°C respectively at room temperature on removal from cold storage. Rapid moisture removal from 'Fuerte' fruit after harvest and before cold storage by placing the fruit in glass jars to which a suction of -75 kPa was applied, resulted in increased susceptibility to external chilling injury, the severity of which was proportional to the amount of moisture removed from the fruit.

Pre-storage heat treatments with a view to decreasing sensitivity of fruit to cold storage were carried out on 'Fuerte' fruit. Dry heat and warm water baths at temperatures of 36 to 40°C caused rind blackening of varying severity, depending on temperature and duration. Vapour heat treatments at temperatures of 36 to 48°C for 10 min to 48 h also caused rind blackening, with the exception of 10 min at 48°C and 1.5 and 3 h at 40°C which produced fruit of higher overall quality after 4 weeks of cold storage at 3.5°C than fruit not heat treated. These treatments however, could not be repeated in 1994 to confirm the results obtained as the harvesting season was over by the time the trial was completed.