Title Importance of cold chain maintenance and storage temperature to avocado ripening and quality

Author R.J. Blakey, J.P. Bower and I. Bertling

Citation ISHS Acta Horticulturae 911:555-564.2011.

Keywords postharvest; ripening; mannoheptulose; perseitol

Abstract

The South African avocado industry is export-based, with the majority of fruit exported to Europe. Fruit are cold-stored for a minimum of 28 days with a number of handling points in the cold chain. These breaks in the cold chain are thought to increase postharvest losses but have not been quantified. Fruit ('Hass') were harvested from Howick and subjected to a 9-h break in cold storage at 5, 10 or 20 days, or a delay of 24 h before cold storage to simulate shipping conditions from South Africa to Europe. Fruit were stored at 1 or 5.5°C for 28 days. After the storage period respiration, ethylene production, firmness, and fruit mass were measured and fruit quality assessed. Fruit only showed significant differences (P=0.05) in the physiological parameters on the first day after removal from cold storage, but fruit quality was severely reduced by breaking the cold chain. Storage temperature also had a significant effect on fruit quality. Storage at 5.5°C resulted in only having between 8 and 30% sound fruit while storing fruit at 1°C resulted in an increase in the percent of sound fruit to 80% for the control. In a related study, the concentration of individual sugars was measured in fruit sequentially over a 24-h period to ascertain the loss in total soluble solids during a cold chain break. Fruit lost 45% of mannoheptulose and 17% of perseitol in 24 h at room temperature. Breaking the cold chain anywhere in the shipping process severely reduces fruit quality. This is mitigated by storing fruit at 1°C but the maintenance of the cold chain is critical to fruit quality.