Title Study of anaerobic metabolism of kiwifruits in ULO, LO, or regular CA at room temperature

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Abstract

Kiwifruits were picked at an early ripening stage with firmness of 105 N and soluble solids content (SSC) of 6 °Brix. Fruits were placed in air (CK), ULO (ultra-low oxygen) with 0.25% O_2, LO (low oxygen) with 1% O_2, or regular CA (controlled atmosphere) 2% O_2 + 5% CO_2, all maintained at 20°C and 90% relative humidity (RH). After 19 days, fruits were removed from the atmospheres to SL (shelf life) in air at 20°C for 12 days. Kiwifruit kept in the modified atmospheres produced little ethylene and had reduced respiration during the atmosphere treatments while control fruit showed a typical climacteric curve. At the time of shift to SL, kiwifruit in ULO showed reduced rise of both ethylene, and respiration compared to LO and CA fruit. Softening occurred during the atmosphere treatment but fruit in ULO were firmer than in other treatments. Control fruit softened rapidly and continuously. During SL, atmosphere treated fruits did soften but after 19 days they were slightly firmer than control fruit. PDC (pyruvate decarboxylase), lactate dehydrogenase (LDH), and ADH (alcohol dehydrogenase, for the reaction ethanol to acetaldehyde) activities in atmosphere-treated fruits were low but two times higher than control fruit during storage; at the time of shift to SL, there was a large, rapid, burst for PDC and LDH while, slightly later, ADH increased, at the same extent. Control fruit showed a much lower increase in enzyme activities and the increase was delayed compared with atmosphere treatments. Ethanol increased initially at the time of the shift and then declined while acetaldehyde continued to rise. The potential role of anaerobic respiration on rapid softening of kiwis during SL is discussed.