

Title Anaerobic metabolism during short and long term storage of kiwifruit
Author Rinaldo Botondi, Vincenzo Russo and Fabio Mencarelli
Citation Postharvest Biology and Technology, Volume 64, Issue 1, February 2012, Pages 83-90
Keywords ADH; PDC; LDH; GPT; Ethanol; Acetaldehyde; Lactic acid; Ethylene; Firmness

Abstract

Kiwifruit were stored in 0.25% O₂ (ULO), 1% O₂ (LO) and 2% O₂ + 5% CO₂ (CA) and the controls were kept in air. The fruit were held at 0 °C for 34 and 94 d of storage and, after these times, were transferred to 20 °C in air for 14 d of shelf life. During the short term storage (34 d), a significant increase in anaerobic metabolites, above all ethanol, was observed in ULO, LO, and CA fruit (166, 131, 120 µL/L). After the shift to shelf life, a large and unexpected increase in PDC (pyruvate decarboxylase), ADH (alcohol dehydrogenase in the direction of ethanol oxidation), LDH (lactate dehydrogenase), and GPT (glutamate–pyruvate transaminase) was observed, resulting in ethanol depletion (ULO) or no further increase, and an increase in acetaldehyde which, in turn, could have hastened fruit ripening. Even the control fruit showed an increase in ethanol during storage and an increase in enzyme activity during shelf life, especially in ADH, but to a lesser extent without an increase in acetaldehyde. During the long term storage, anaerobic metabolites (ethanol and acetaldehyde) still increased and GPT activity rose significantly in the ULO and CA samples. A burst of enzyme activity was also observed during the second shelf life in the CA and LO samples, but not in the control, while in ULO fruit the activity rose continuously. GPT activity showed the highest peaks in CA and ULO fruit. An ethylene burst was observed in ULO and CA fruit during the second shelf life (about 25 µL/kg-h) but not during the first shelf life. The potential role of these enzymes in kiwifruit stress response during storage and shelf life is discussed.