

Abstract

The effect of treatment with diphenylamine (DPA) and duration of postharvest storage of whole apple fruit on the responses of fresh-cut apple slices to elevated CO₂ storage atmospheres has been investigated. On the day of harvest, 'McIntosh', 'Empire' and 'Delicious' apples were untreated or dipped in DPA, and were held at 0.5 °C overnight or for 6 weeks before slicing. Slices were then stored at 0, 15, 30, 45 or 60% CO₂ in 1% O₂ (balance N₂), atmospheres. Color, firmness and accumulation of acetaldehyde, ethanol and ethyl acetate of the slices were measured. Generally slices were lighter (higher L^* values) when stored in elevated CO₂ atmospheres, but atmosphere and DPA effects varied by cultivar and were affected by pre-slice storage time. Slices prepared from stored fruit were softer compared with slices prepared at harvest. Slice firmness was not affected consistently by CO₂ or DPA concentration, whether they were prepared at harvest or after storage. The effects of increasing CO₂ concentration on acetaldehyde and ethanol accumulations were variable, being affected by cultivar and storage period. DPA treatment did not affect acetaldehyde accumulation of any cultivar, or ethanol accumulation of slices prepared from fruit at harvest. However, DPA-treated 'Empire' and 'Delicious' apples stored before slicing accumulated less ethanol compared with untreated fruit. Storage of apples before processing increased the accumulation of fermentation volatile compounds by cut apples under storage atmosphere conditions.