

Abstract

Emission of aroma volatile compounds and some related enzyme activities (LOX, PDC, ADH, and AAT) were assessed in 'Fuji' apples (*Malus × domestica* Borkh.) during shelf life at 20 °C following cold storage under air or under three different CA conditions (3 kPa O₂:2 kPa CO₂; 1 kPa O₂:1 kPa CO₂; or 1 kPa O₂:2 kPa CO₂). Data were used for principal component analysis (PCA) and partial least-square regression (PLSR) analysis of results. LOX activity was partly inhibited by hypoxic conditions, and thus could have contributed to differentiation between air- and CA-stored fruit. Accordingly, emission of straight-chain esters was also higher in air- than in CA-stored fruit. In contrast, PDC activity was responsible for part of the differences between low (3 kPa) and ultra-low (1 kPa) O₂ storage conditions, probably by providing substrates for AAT action. AAT activity afforded no satisfactory differentiation between samples, and therefore it is suggested that substrate availability is a more decisive factor than enzyme activity for volatile production after storage. The PCA and PLSR models developed in this work were not useful for discrimination between the two studied ultra-low O₂ conditions.