

Abstract

Carbon dioxide-enriched atmospheres extend the postharvest life based on appearance and textural characteristics of strawberries, but their effect on the flavor preservation of these fruits is not clear. Storage of 'Camarosa' strawberries in elevated CO₂ atmosphere at 5°C for 6 days did not affect pH and titratable acidity, but a larger decrease in the concentration of sucrose, reducing sugars and citric and malic acids was detected in the CO₂-exposed fruits. The concentrations of fermentative metabolites (acetaldehyde, ethanol and ethyl acetate) were higher in air + 20 kPa CO₂-stored fruits. Additionally, they exhibited higher levels of ethyl esters and a major reduction in the level of methyl and other esters. Thus, clear differences in the aroma profile of fruits before and after 3 and 6 days of storage at 5°C in air or air + 20 kPa CO₂ were observed.

Similar changes in flavor components and fermentative metabolites were found in 'Aromas' and 'Selva' strawberries stored at 5°C in air + 20 kPa CO₂. In contrast, in 'Diamante' fruits the aroma profile was essentially maintained in air or air + 20 kPa CO₂. The flavor life based on levels of flavor components and flavor perception was shorter than the postharvest life based on appearance in 'Aromas' and 'Selva' fruits kept in air + 20 kPa CO₂. 'Diamante' strawberries retained their flavor quality better than the other two cultivars during storage at 5°C in air for 9 days or in air + 20 kPa CO₂ for 11 days.

When harvested in early and mid season, 'Diamante' and 'Selva' strawberries had higher concentrations of flavor components and aroma quality, as indicated by aroma values, than 'Aromas' fruits. Also, they had a better overall flavor quality and were more preferred by consumers than 'Aromas' fruits and these differences were consistent over two harvest dates.

In addition to flavor, changes in other quality attributes were cultivar dependent. Flesh firmness was maintained in 'Aromas' and increased in 'Camarosa', 'Diamante' and 'Selva' fruits during storage at 5°C in both air and air + 20 kPa CO₂. The total content of anthocyanins increased in 'Selva' fruits stored at 5°C in air and the 20 kPa CO₂-enriched atmosphere inhibited this change, while in 'Diamante' fruits the concentration of anthocyanins was maintained in both atmosphere conditions.

These data indicate that the altered aroma profiles in combination with the reduction in concentration of sugars and organic acids are primary factors contributing to the loss of flavor during

storage. CO₂ -enriched atmosphere can affect the flavor and other quality attributes of strawberries depending on the cultivar. The ability of 'Diamante' fruits to maintain the aroma profile during the storage in air and to resist changes of this profile in CO₂ -enriched atmospheres merits further investigation.