

Abstract

Standard quality parameters, consumer's acceptability, aroma compounds emission and ethylene production of 'Mondial Gala' apples (*Malus x domestica* Borkh.) were studied in relation to storage conditions, storage duration and shelf life period. Commercially ripe fruit were analysed after 12 and 26 weeks of cold storage in AIR ($210 \text{ L m}^{-3} \text{ O}_2 + 0.3 \text{ L m}^{-3} \text{ CO}_2$) or under three different controlled atmosphere (CA) treatments: LO ($20 \text{ L m}^{-3} \text{ O}_2 + 20 \text{ L m}^{-3} \text{ CO}_2$), ULO1 ($10 \text{ L m}^{-3} \text{ O}_2 + 10 \text{ L m}^{-3} \text{ CO}_2$), or ULO2 ($10 \text{ CO}_2 + 30 \text{ L m}^{-3} \text{ CO}_2$), after which apples were kept at 20°C for 1 OR 7 DAYS. The present work was carried out in order to find out the instrumental measurements mainly affecting acceptability of 'Mondial Gala' apples stored in CA during shelf life after storage. Data were subjected to principal component analysis (PCA). A PCA including 16 samples (4 atmospheres x 2 storage periods x 2 shelf-life periods), and 37 variables (30 volatile aroma compounds, five standard quality parameters, ethylene production and consumer's acceptability) was performed to provide a global overview of the samples and the variables. Principal component 1 (PCL) and 2 (PC2) accounted for 52 and 18% of total variance, respectively. The bipolar PCL vs. PC2 from this PCA model showed four well-separated groups. In general, the highest concentrations of the most of aroma volatile compounds were found for fruit stored under AIR for 12 weeks, regardless of shelf-life period. Conversely, samples stored under ULO- and LO- atmospheres during 12 weeks plus 1 day at 20°C were the most accepted by consumers. Interestingly, these samples showed the highest emission of ethyl 2-methylbutanoate, ethyl hexanoate, tert-butyl propionate and ethyl acetate, the two former contributing significantly to atoms profile of 'Mondial Gala' apples, in addition to the highest titratable acidity and firmness values. Results suggest that acceptability is not determined by total aroma emission but by the production of certain impact volatiles.