Abstract

The quality of apple fruit is not only determined by appearance, firmness and texture, but to a large extent also by taste and volatile aroma compounds. In order to maintain quality, apple fruit are often stored under modified atmospheres (MA). However, though most of the quality attributes are well preserved under MA, the aroma production capacity decreases. When comparing post storage production of the different volatile compounds, the time lapse for the different compounds can vary largely (Fellman et al., 2003).

Experimental data was collected on the volatile production of ' Jonagold' apples (*Malus sylvestris* subsp. mitis (Wallr.) Mansf.) during two weeks shelf life following 8 months of ether ULO, CA or RA (Saevels et al., 2004). The experimental results show a wide range of different time lapses during shelf life. Depending on the volatile compound the maximum production is reached earlier or later during shelf life. Also depending on the compound, either ULO or RA stored fruit resulted in the highest peak value during shelf life, with CA stored fruit showing an intermediate volatile production. A simple model was proposed consisting of three consecutive reactions describing how the substrate, via one intermediate compound is degraded into an aroma compound that subsequently evaporates from the fruit into the surrounding air. This simplified scheme can be interpreted as a simplification of any linear chain of consecutive reactions breaking down some substrate into an end product. The simple linear reaction chain approach was able to capture the behaviour of all measured volatile compounds by attributing the effect of the applied MA conditions solely to an effect on the reaction step. The aroma production during shelf life can thus be interpreted in terms of how well substrate was conserved during the preceding storage period. By suppressing the production of volatile during storage, more substrate will be available during the subsequent shelf life. If the aroma production is not inhibited enough during storage, the substrates are exhausted by the time the fruit were taken out for shelf life. Of course this should be seen in connection with parallel delay in ripening by MA. Even though the underlying biochemistry is more complex than the simplified model might suggests, the model can add value to interpreting experimental data on aroma production of MA stored fruit versus air stored fruit. The model can be used to test different working hypotheses and thus create a better understanding of the underlying processes.