

Title Postharvest physiology of 'Aroma' apples in relation to position on the tree
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Abstract

The effects of fruit position within the canopy on the onset of the respiratory climacteric and the rise in ethylene production as well as changes in peel colour and chemical composition were studied in apples (*Malus x domestica* Borkh. cv. Aroma) during ripening in normal air at 20 °C for 6–8 weeks over two crop seasons. The commencement of the rise in both CO₂ and ethylene production was equal independent of fruit position but the peak of ethylene was behind that of CO₂ with a lag of several days. While the climacteric ethylene peak was considerably higher in shaded inside apples, the internal ethylene concentration was at the same level independent of canopy position. During maturation on the tree outside fruit developed a red peel colour while inside fruit remained green. Outside fruit had a higher content of dry matter, soluble solids and soluble sugars but a somewhat lower amount of titratable acidity than inside fruit. High summer temperatures in the second year resulted in a significantly higher content of soluble solids and organic acids independent of fruit position but diminished the soluble solids difference between outside and inside fruit and increased the difference in malic and citric acid concentrations. High summer temperatures also increased the difference in peel colour between outside and inside fruit. Independent of canopy position, the soluble solids concentrations remained unchanged during ripening while the amounts of sucrose as well as malic acid and the titratable acidity decreased with a concomitant rise in the cell sap pH. The higher content of soluble sugars and a somewhat lower amount of titratable acidity in outside red-coloured apples probably contribute to improved fruit quality but the difference seems to be strongly dependent on the growing conditions, especially the sum of heat units.