

### Abstract:

'Cox's Orange Pippin' and 'Bramley's Seedling' apples were picked on 3 occasions and treated with 1-MCP (SmartFresh™) prior to storage in air and controlled atmosphere (CA). For each cultivar the first 2 picks were within the commercial period for long-term storage whereas the third picks were 2 weeks later than advised for storage. 1-MCP was applied at 500 and 1000 nL L<sup>-1</sup> for 12 h at 20°C or 24 h at 3.5°C. Fruit quality was assessed after 60, 120 and 180 d ('Cox') or after 90, 180 and 270 d ('Bramley') of air and CA storage followed by a further 7 d in air at 20°C. In 'Cox' the most notable effect of 1-MCP was the improved firmness of fruit in air and CA (<1 kPa CO<sub>2</sub> + 1.2 kPa O<sub>2</sub>) storage at 3°C and 3.5°C respectively. Benefits of 1-MCP diminished with harvest delay and time in store. The quality of air-stored fruit after 60 d was comparable with that of CA-stored untreated fruit after 180 d. 1-MCP promoted core flush in 'Cox' apples stored in air for 120 d and in CA-stored fruit after 180 d. There was no consistent effect of dose rate of 1-MCP on fruit quality although application of 1-MCP at 20°C was generally less effective than at 3.5°C although the differences were small. 1-MCP can provide a 30-day extension to the life of air-stored fruit provided that fruit are harvested at maturity appropriate for long-term storage. The improvement in the firmness of CA-stored 'Cox' apples treated with 1 MCP will help to resolve consumer concerns about the texture of the UK's premier dessert cultivar. 'Bramley' apples were particularly responsive to 1-MCP. Quality benefits included greater retention of greenness, firmness and acidity and a reduction in the amount of rotting and superficial scald. Benefits of 1-MCP diminished with harvest delay and time in store. The quality of air-stored (3°C) fruit after 90 d was comparable with that of CA-stored (4°C) untreated fruit after 270 d. 1-MCP increased slightly the incidence of 'corky core' a minor disorder found in the core area of the fruit. Apart from a slight increase in firmness with the higher rate of 1-MCP there was no affect of dose rate and, in contrast to 'Cox', application of 1-MCP at 20°C was more effective than at 3.5°C in retaining firmness and acidity and retarding scald. 1-MCP controlled scald in fruit picked at the optimum time and stored in 9 kPa CO<sub>2</sub> + 12 kPa O<sub>2</sub> (9/12) for 180 d and in 5 kPa CO<sub>2</sub> + 1 kPa O<sub>2</sub> (5/1) for 270 d. 1-MCP can provide a useful (30 day) extension to the life of air-stored fruit provided that fruit are harvested at maturity appropriate for long-term storage. It may also obviate the need for DPA treatment for fruit stored in 9/12 and 5/1 CA storage for up to 6 and 9 months respectively.