

Abstract:

1-Methylcyclopropene (1-MCP), also known as SmartFresh™ (0.14%), blocks ethylene action in harvested fruit. 1-MCP's mode of action is via a preferential attachment to the ethylene receptor, thereby blocking the effects of both endogenous and exogenous ethylene. This study determined the potential of 1-MCP as an alternative to modified atmosphere (MA) and controlled atmosphere (CA) storage of apples and pears. Three concentrations of 1-MCP were applied for 12 hours at 20°C to 'Granny Smith' and 'Pink Lady' apples, and 'Bon Chretien' and 'Packham's Triumph' pears, harvested at the start and at the end of commercial maturity. Apples and pears were examined after 2, 4 and 6 months, or 6 weeks of storage at -0.5°C respectively, followed by a shelf-life period of 7 days at 15°C. 1-MCP-treated apples were firmer and less ripe than control fruit after storage and had higher levels of titratable malic acid and soluble solids. Untreated fruit developed superficial scald that was exacerbated with increased storage duration. By contrast, 1-MCP resulted in scald-free fruit for the full 6 months of cold storage and during the 7-day shelf-life period. Treated pears showed no maturity differences at the start of shelf-life, but ripening was markedly held back during the shelf-life duration. However, 1-MCP-treated pears remained green after storage and ripened normally after 3 weeks at 15°C. 1-MCP-treated fruit invariably had a firmer, crisper texture compared to untreated fruit. The significance of these findings is the potential use of 1-MCP as an alternative to MA and CA storage of apples and pears, and as a replacement for the use of DPA (diphenylamine) for the control of superficial scald in apples.