Pre-storage application of 1-methylcyclopropene does not affect the flavour of 'Conference' pears ripened after 8 months of commercial-standard controlled atmosphere storage

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Abstract

Postharvest 1-methylcyclopropene (1-MCP) applications are commercially used on 'Conference' pears to obtain an improved fruit quality after storage for up to 11 months. Treatment with 1-MCP may result in firmer and greener fruit at the end of storage. During subsequent shelf life, 1-MCP treated pears may show slower ripening, including a reduced rate of softening and a reduced production of aroma volatiles. The lower levels of aroma volatiles and consumer complaints of reduced flavour suggest that flavour is negatively affected by 1-MCP treatments, which has raised concern within in the Dutch fruit industry.

In the present study, the effect of pre-storage 1-MCP treatment on post-storage ripening and flavour perception was studied. Untreated and 1-MCP-treated pears (325 nL L^{-1}) were stored for 8 months at -0.8 °C under controlled atmosphere conditions of 3 kPa O_2 and 0.6 kPa CO_2 according to commercially used protocols. At day 7 and 9 of the subsequent shelf life at 10 °C, 1-MCP-treated fruit showed decreased yellowing and ethylene production, whereas firmness was similar to that of untreated fruit. The production of aroma volatiles was significantly reduced in 1-MCP-treated fruit; this was especially observed for different acetate esters, ethanol and butanol. Despite the reduction in aroma volatiles, a consumer panel could not distinguish (in a Tetrad test) between samples from untreated and 1-MCP-treated fruit with similar firmness. This indicates that the important aroma volatiles, although reduced in abundance, were still above threshold levels and did not affect overall flavour perception. We conclude that 1-MCP does not affect flavour when pears within equal firmness classes are compared.