

Title Quality characteristics of fresh-cut watermelon slices from non-treated and 1-methylcyclopropene- and/or ethylene-treated whole fruit

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Abstract

Maintaining the postharvest quality of fresh-cut fruit after processing and throughout distribution and marketing is a major challenge facing the fresh-cut fruit industry. Analytical quality characteristics of packaged fresh-cut watermelon slices from non-treated and 1-methylcyclopropene (1-MCP)- and/or ethylene-treated whole fruit were investigated. Freshly harvested seedless watermelon ('Sugar Heart') were stored 7–14 days in air before exposure to 0, 0.5 or 1.0 $\mu\text{L L}^{-1}$ 1-MCP for 18 h followed by 5 days exposure to 0 or 10 $\mu\text{L L}^{-1}$ ethylene, all at 20 °C. Following treatment, fruit were processed into wedge-shaped slices, packaged into rigid trays sealed with a high oxygen transmission rate film overlap and stored 1, 6 or 12 days at 5 °C. During storage, fresh-cut watermelon slices from non-treated and 1-MCP- and 1-MCP + ethylene-treated whole fruit maintained similar respiration rates and internal atmospheres of CO_2 and O_2 and were of similar quality with total aromatic volatile concentrations decreasing and puncture firmness, soluble solids content (SSC), cut surface pH and color remaining relatively stable. In contrast, fresh-cut slices from fruit treated with ethylene alone had higher respiration rates and modified package atmospheres containing more CO_2 and O_2 ; lower firmness, SSC and chromaticity values; higher pH and an altered volatile profile compared to those of slices from non-treated and 1-MCP- and 1-MCP + ethylene-treated fruit. The 22 most abundant volatiles were various aldehydes, alcohols and ketones. During storage, many individual volatiles decreased in concentration but some increased including (*Z*)-6-nonen-1-ol, a volatile having a pumpkin-like aroma. The results indicated that low dosage 1-MCP treatments prior to ethylene exposure of whole watermelons prevented ethylene-mediated quality deterioration in fresh-cut slices stored under modified atmosphere conditions at 5 °C.