

Title Effect of 1-methylcyclopropene on the sensory, visual, and analytical quality of greenhouse tomatoes

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Abstract

Sensory and analytical quality parameters were measured to evaluate the effect of 1-methylcyclopropene (1-MCP) on hothouse tomatoes (*Lycopersicon esculentum* Mill., cv. Rapsodie). Commercially grown tomatoes, harvested at the 'pink' maturity stage, were treated with 250 nL L⁻¹ 1-MCP for 8 h at 15 °C and held at 15 °C for a minimum of 5 d, prior to ripening at 22 °C for 5–8 d. This regime simulated storage conditions used by distributors, retailers, and consumers. Fruit quality parameters [color (*L*, *a*, *b*), weight, soluble solids, titratable acidity [H⁺], pH, expressed juice and tomato color index (TCI)] were determined. Sensory analysis was conducted to evaluate perceived flavor (aroma/taste), texture and visual attributes over the ripening period. Treated and untreated fruit were compared for intensity of aroma/flavor (vegetative aroma, ripe tomato aroma, tomato flavor and sourness), texture (firmness, mealiness) and visual attributes [external color (redness, greenness), internal color (redness, greenness), gel color (redness, greenness), juice color (redness, greenness), seed size] by eight judges in duplicate, in five sensory sessions. Statistical contrasts were used to determine differences between 1-MCP treated and untreated fruit, as well as between 'ripe' and 'advanced maturity' 1-MCP fruit. The 1-MCP treated fruit differed from the control fruit in textural and visual attributes, but not in flavor attributes. Treated fruit had a reduced red color, less red gel color, smaller seed size and greater mealiness. These changes were reflected by concomitant changes in pH, *L*, *b* and TCI values. Mealiness was positively correlated ($r = 0.824$, $p < 0.01$) with TCI for 1-MCP treated fruit, suggesting that 1-MCP influenced cell wall integrity during the delayed maturation process. However, it was unknown if this textural changes would be large enough to influence consumer acceptability of the fruit, and warrants further investigation.