

## Abstract

'Manar' beita and 'Thunder' and 'Sweet Marketmore' fresh-market slicing cucumber (*Cucumis sativus* L.) fruit were harvested at an immature stage of development (commercial maturity) and subsequently exposed to either air or  $1.0 \mu\text{l l}^{-1}$  1-methylcyclopropene (1-MCP) prior to storage in air or  $10 \mu\text{l l}^{-1}$  ethylene at  $15^\circ\text{C}$ . Fruit exposed to  $10 \mu\text{l l}^{-1}$  ethylene exhibited rapid and acute cellular breakdown reminiscent of other members of the Cucurbitaceae exposed to ethylene. Symptoms were evident following as few as 4 d of ethylene exposure and included fruit softening, mesocarp watersoaking, epidermal sloughing and limited loss of epidermal green color. As one index of cellular deterioration, exposure of 'Manar' cucumber to ethylene induced a rapid and significant decline (40%) in total cell wall uronic acid (UA) content compared with losses of about 5–6% in fruit treated with 1-MCP prior to ethylene exposure or in fruit receiving only 1-MCP. Molecular mass downshifts in both water and chelator-soluble pectins (CSP) were markedly accelerated in fruit receiving only ethylene, becoming evident after only 4 d of exposure. In contrast, control fruit receiving neither 1-MCP nor ethylene showed greatly reduced rates of uronic acid loss and pectin depolymerization, with significant declines in molecular mass not being noted until after 16 d of storage at  $15^\circ\text{C}$ . Prior treatment of cucumber fruit with 1-MCP delayed fruit deterioration and pectin depolymerization. Pectin depolymerization was also suppressed in 1-MCP-treated fruit receiving continuous ethylene exposure throughout storage and was substantially lower than rates of depolymerization noted for control fruit. Inhibition of ethylene responsiveness in the fresh-market slicing cucumbers 'Thunder' and 'Sweet Marketmore' revealed marked differences in cultivar response to the ethylene antagonist. During storage without supplemental ethylene, prior exposure to 1-MCP resulted in significant retention of firmness and surface color in 'Sweet Marketmore'. In contrast, 1-MCP had minimal effects on these attributes in 'Thunder', largely due to higher firmness and color retention of the control fruit in general. Parallels between ethylene-induced deterioration and natural senescence of cucumber fruit are discussed.