

**Title** Evaluation of shelf life and ripening of imported avocado cv. Hass fruit following treatment with e+™ ethylene remover or 1-methylcyclopropene (1-MCP) during medium-term cold storage

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### Abstract

Minimizing the effects of ethylene in storage facilities is fundamental to maintain postharvest quality of harvested crops. The ethylene action inhibitor 1-methylcyclopropene (1-MCP) has been used successfully on various climacteric commodities. On avocado (*Persea americana* Mill.) fruit, 1-MCP has been shown to delay the respiration climacteric, ethylene peak, softening and color change. However, under certain conditions, 1-MCP-treated avocado fruit may ripen sub-optimally or unevenly when ripening is required. A recent study demonstrated the ability of a newly developed palladium (Pd)-promoted material to remove ethylene at cool temperatures to sub-physiologically active levels, hence to delay the ethylene-induced ripening of pre-climacteric avocado cv. Hass. Subsequent work showed that e+™ Ethylene Remover effectively delayed late season avocado cv. Hass ripening during 26 days storage at 5°C and in condition of high relative humidity. The present study compares the effects of e+™ Ethylene Remover and 1-MCP on 1) manipulating ripening of early season avocado cv. Hass during 21 days storage at 5°C and 2) assess fruit capability to subsequently ripen when held 6 days under shelf life condition (20°C). Fruit firmness, colour, fatty acids and sugars content were assessed at defined intervals.

e+™ Ethylene Remover reduced ethylene levels to below 0.1  $\mu\text{L L}^{-1}$  within experimental boxes and maintained better firmness and greenness of fruit vs. controls. Likewise, 1-MCP strongly delayed fruit ripening during 21 days at 5°C. However, upon transfer to shelf life conditions, fruit previously held with e+™ Ethylene Remover ripened similarly to controls and were at eat-ripe stage (firmness < 10 N) within 3 days at 20°C. Contrarily, fruit pre-treated with 1-MCP remained firmer and greener during 6 days shelf life and exhibited greater heterogeneity in ripening. Whilst delaying ripening of climacteric commodities is often desirable, it is equally important that the product shall ripen when required for consumption. In this context and unlike 1-MCP, e+™ Ethylene Remover proved not only effective at delaying avocado cv. Hass fruit ripening during cold storage but also allowed ripening when removed.