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1-METHYLCYCLOPROPENE (1-MCP) FOR EXTENDING THE POSTHARVEST QUALITY OF HASS AVOCADOS UNDER NAYARIT (MEXICO) CONDITIONS

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There are approximately 800,000 tons of Hass avocados produced annually in Mexico. Most of this production is commercialized in the national market, while only a small portion of it (9%) is exported mainly to the USA, Europe and Japan. However, there are significant fruit losses (near 40%) and export challenges, due to the rather inconsistent and short postharvest life of the avocados, under the present handling processes. The high respiration and the internal ethylene production rates of avocados are well known to play an important role in the postharvest quality of this fruit. Therefore, managing ethylene is very key for maintaining quality and extending shelf-life of avocados. 1-MCP is an innovative product that blocks the action of ethylene in harvested fruits and vegetables. Its mode of action is via a preferential attachment to the ethylene receptor, thereby, blocking the effects of ethylene from both internal and external sources. The objective of this study was to evaluate the activity of 1-MCP for extending the quality and shelf-life of Hass avocados, under conditions simulating the national market and the USA or Canada exports. The avocados for this study were obtained from the Association of Hass Avocado Producers in Nayarit, and the experiment was conducted during August-September 2002. High quality first grade avocados (171 to 210 g) at physiological maturity (near 22.5% dry matter) were treated with 1-MCP at 200 ppb during 12 hours at $12 \pm 0.5^\circ\text{C}$ and $90\% \pm 5\%$ R.H. A set of untreated fruit was kept under similar conditions to those of the avocados being treated, under a complete randomized design with five replications. Respective sets of treated and untreated fruits were then held under conditions simulating de national market ($22 \pm 2^\circ\text{C}$; $75 \pm 10\%$ R.H.) or exports to the USA or Canada (6 days at $12 \pm 0.5^\circ\text{C}$; $90 \pm 5\%$ R.H. followed by shelf-life). Color development, pulp softening, percent of ripened fruits, weight loss, general external appearance, and incidence of physiological disorders and fungi diseases were evaluated. 1-MCP was very effective, under both the national market and export conditions, for delaying avocado ripening for up to 6 days, slowing down color development and pulp softening, improving external appearance and reducing the incidence of fungi diseases. 1-MCP was also very effective for reducing weight loss of fruit held under national market conditions, but this effect was less significant in the case of avocados kept at low temperature. 1-MCP has an excellent potential for handling avocados for the Mexican local market (room temperature) or for the exports to the USA or Canada (low temperature).