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USE OF ETHYLENE FOR REVERSING THE 1-METHYLCYCLOPROPENE (1-MCP) EFFECT ON HASS AVOCADOS

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1-MCP is very effective for regulating many of the undesirable effects of ethylene in postharvest fruits and vegetables such as accelerated ripening and decay. Most 1-MCP responses can be reversed with ethylene after a period of time has elapsed. However, it is not known whether the reversal is due to ethylene replacement or new ethylene sites being generated. 1-MCP has been shown to have an excellent effect on avocados for slowing down color development and pulp softening. Fruit treated with 1-MCP normally requires near 8-9 days to reach the ready-to-eat stage under shelf-life conditions, in comparison to the most common 3-4 days needed for the untreated avocados. The objective of this preliminary study was to determine the possibility of using ethylene to accelerate the ripening of 1-MCP treated avocados, after a simulated transit and temporary storage, and prior to their shipment to the retail market. The avocados for this study were obtained from a leading packer in Nayarit, and the experiment was conducted during February-March 2003. High quality first grade avocados (171 to 210 g) at physiological maturity (near 24.5% dry matter) were treated with 1-MCP at 200 ppb during 12 hours at 22 ± 2 °C and 70 ± 10 % 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 a shipment to the USA (6 days at 6 ± 0.5 °C and 90 ± 5 % R.H). Then, avocados were exposed to ethylene (100 ppm) during 24 hr at 24 °C, after having none, one or two days of preconditioning at room temperature (22-24°C). All the treated and untreated avocados were then held under shelf-life conditions (22 ± 2 °C; 75 ± 10 % R.H.). Percent of ripened fruits and pulp softening were evaluated. Under these conditions, the control fruits without 1-MCP and without ethylene needed 6 days to obtain at least 95% of ripened fruits, while the avocados without 1-MCP but exposed to ethylene required 4 days to obtain the same level of ripening. At that time, the 1-MCP treated fruit plus ethylene only reached a 10% percent of ripened fruits when the avocados were treated with ethylene immediately after leaving the cold storage. However, more encouraging results (near 50% ripened fruits) were obtained when the 1-MCP treated avocados were preconditioned at 22-24°C during two days, before being exposed to ethylene. A new series of studies are on the way including one, two and three days of simultaneous preconditioning and ethylene exposure of 1-MCP treated fruit, trying to further improve this approach for reversing the 1-MCP effect on avocados.