

Effect of maturity stage and cultivar on the efficacy of 1-MCP treatments in mango fruits

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Abstract

1-methylcyclopropene (1-MCP) is one of the postharvest technologies employed in postharvest systems to extend the shelf life of perishable commodities and minimize postharvest losses. Efficacy of 1-MCP is affected by various preharvest factors including species, cultivar and maturity stage of the commodities. In the present study, two commercial mango cultivars, 'Tommy Atkins' and 'Apple Mango' were harvested at two maturity stages. Flesh color and shoulder position were the maturity indices used to define the two stages as stage 1 (mature green) and 2 (advanced maturity). Within 24 hours of harvesting from a commercial farm, a homogenous sample of fruits of both cultivars were subjected to 1-MCP at 1 ppm for a duration of 24 hours and then allowed to ripen at ambient room conditions in comparison to untreated controls. A random sample of 5 fruits was taken every two days for determination of ethylene evolution and respiration rate until the end of storage, defined by marketability of the fruits. Sampling for other ripening-related physical and biochemical changes including firmness, cumulative weight loss, color (hue angle), total soluble solids (°Brix) and titratable acidity was done every 3 days until the end of the storage period. The results showed no varietal differences in response to 1-MCP between 'Tommy Atkins' and 'Apple Mango'. However, the response to 1-MCP treatment was significantly affected by the stage of maturity. Fruits harvested at stage 1 showed significant 1-MCP treatment effect, while no treatment effect was evident in fruits harvested at stage 2. In both cultivars, 1-MCP treated fruits (stage 1) had significantly lower respiration rates with a 3 to 4-day lag to the respiratory climacteric peak compared to untreated controls. Further, the flesh of 1-MCP treated fruits remained firmer and retained a higher hue angle throughout the observation period in both varieties. 1-MCP treatment also delayed other ripening related biochemical changes as evidenced by lower °Brix and higher titratable acidity

in treated fruits. The results show the efficacy of 1-MCP in prolonging the postharvest shelf life of the two cultivars of mango fruits. However, this effect was significantly affected by the stage of maturity of the fruits which should be considered while designing 1-MCP treatment regimes.