Preharvest 1-methylcyclopropene treatment enhances ‘stress-associated watercore’ dissipation in ‘Jonagold’ apples

Burak E. Algul, Yosef Al Shoffe, DoSu Park, William B. Miller and Christopher B. Watkins

Postharvest Biology and Technology, Volume 181, November 2021, 111689

Abstract

The objective of this study was to evaluate the effect of the preharvest application of 1-methylcyclopropene (1-MCP) on postharvest dissipation of stress watercore incidence and severity rating over 30 d at 20 °C. ‘Jonagold’ trees were untreated or sprayed with 1-MCP one week before harvest. Harvest indices and quality factors at 20 °C, were assessed on days 2, 5, 9,15, 20, and 30. Fruit treated with preharvest 1-MCP treatment had lower internal ethylene concentrations and lower starch pattern indices (higher starch concentration) at harvest compared with untreated fruit, but no effects on flesh firmness, soluble solids concentration, titratable acidity, watercore incidence and severity rating, and soluble sugars were detected. At 20 °C, however, preharvest 1-MCP treated fruit had a faster decrease of stress water core incidence and severity than untreated fruit, and delayed development of senescent breakdown and skin shriveling. Sorbitol concentrations were lower in preharvest 1-MCP treated fruit than untreated fruit, but effects on glucose, fructose, sucrose, and starch concentrations were not consistent. More rapid loss of stress-associated water core in preharvest 1-MCP treated fruit was consistent with lower sorbitol concentrations in the cortical tissues.