Abstract

This study was undertaken to optimize ethanol vapor application as a ripening inhibitor on whole mangoes to extend fresh-cut mango shelf life. Freshly harvested mangoes were first subjected to hot water (+HW) at 46 °C for 60 or 90 min to simulate quarantine heat treatments, or remained untreated (−HW). Fruit of each batch (+ or −HW) were then held at 20–25 °C for 4 or 7 d (D4 and D7) after the hot water treatment before being exposed to ethanol vapors [0 h (E0), 10 h (E10), or 20 h (E20)]. Fruit were then peeled and cut into slices, packed in plastic clamshells, and stored at 7 °C for 15 d. Only slices from +HW-D4-E20-treated fruit maintained higher firmness, hue angle, and titratable acidity (TA) in storage. The +HW-D7-E10- or E20-treated fruit had higher hue angle than E0, but firmness, total soluble solids, TA, pH, and respiration rate did not differ. Internal ethanol and acetaldehyde were very high in slices from +HW, D4 and D7, E20 and −HW-D7-E20-treated fruit. A sensory panel could perceive higher firmness and acidity in slices from fruit treated with ethanol. However, E20 induced off-flavor, and these fruit were least preferred.

Ethanol exposure on fruit was repeated with purchased mangoes that had been subjected to a commercial quarantine heat treatment. A second heat treatment of 18 h at 38 °C and 98% relative humidity was added to one batch of fruit in this experiment. Ethanol vapors did not result in delayed ripening in those mangoes. However, this treatment inhibited microbial growth. The second heat treatment did not improve fresh-cut mango shelf life, and further, microbial growth increased compared to other treatments. It is concluded that, due to inconsistent results, ethanol vapor applied for 20 h to whole mangoes prior to processing for fresh-cut is not a practical approach to delay ripening; however, at lower doses (10 h), it could be used as a safe microbial control in a fresh-cut production sanitation system.