

Abstract

Grapefruits (*Citrus paradisi* Macf.) shipped to certain US states and some export markets such as Japan and South Korea, must be certified free of quarantine pests. Short-term refrigerated storage of grapefruit under ultra-low (<1 kPa) oxygen (ULO) during marine transport may provide quarantine security against fruit fly. Grapefruit functional compounds such as carotenoids (lycopene, beta carotene), flavanones [naringin, naringin glycosides (NR)], limonin 17--D glucopyranoside (LG), and vitamin C have potential human health benefits including prevention of cancer and cardiovascular disease. This study was undertaken to determine whether storage in refrigerated ultra-low oxygen (ULO) for insect disinfestation altered grapefruit functional components. 'Rio Red' grapefruit was washed and waxed on a commercial packing line the day of harvest. Three commercial shipping cartons of grapefruit harvested from each of three trees were stored for 35 days: 21 days inside a 20-ft marine container under 0.05 kPa oxygen at 140C (treated) or inside a walk-in cooler in air at 100C (control), and then 14 additional days in air at 210C. Thirty treated and control fruit were analyzed for quality (total soluble solids and titratable acidity) and functional components after the initial 21day storage and again after the 14 additional days of storage in the air. Fruit stored under ULO had significantly higher concentrations of beta carotene, lycopene and vitamin C, but similar levels of naringin, NR, and LG after 35 days. However, after 21 days of storage, no significant differences in any functional components were observed between treated and control fruit. Results suggest that short-term ultra-low refrigerated storage may enhance and/or maintain certain functional components in grapefruit.