

Title Commercial packing and storage of navel oranges alters aroma volatiles and reduces flavor quality

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Citation Postharvest Biology and Technology, Volume 47, Issue 2, February 2008, Pages 159-167

Keywords Soluble solids; Titratable acidity; Ethanol; Waxing; GC–olfactometry

Abstract

Navel oranges were sampled either from the harvest bin, after the washer, after the waxer or at the end of the packing process in a commercial packing house and stored for 0, 3 or 6 weeks at 5 °C followed by 4 d at 13 °C and 3 d at 20 °C. Individual oranges were analyzed for percent juice, SSC, TA and ethanol concentration and a portion of each fruit tasted and rated for freshness, tartness, sweetness and likeability (hedonic score). Ethanol levels increased in the fruit as a result of storage and as a result of the waxing step of the packing line in both of the two tests. In one of the tests there was a significant increase in ethanol caused by each of the packing line steps, indicating a physiological effect on the fruit of the packing line itself. The freshness and likeability rating both decreased as a result of storage and packing, although packing had a lesser effect. The individual packing line steps could not be differentiated between each other in terms of an effect on flavor but the waxing step seemed to have the most impact. The SSC/TA ratio increased significantly during storage, mainly due to a decline in TA. In the third test navel oranges were sampled from the harvest bin and after the packing line and stored for 0, 3 or 6 weeks at 5 °C followed by 4 d at 13 °C and 3 d at 20 °C. Quality and sensory attributes were evaluated as in the previous two tests and fruit were also characterized for changes in aroma-active volatiles using GC–olfactometry. Freshness and likeability decreased as a result of storage, but only in packed fruit. Percent juice, SSC and TA did not change as a result of any of the treatments. Ethyl butanoate, ethyl hexanoate, and four constituents with uncertain identification were aroma-active compounds that increased, while limonene decreased in amount to a greater degree in the packed fruit and may be at least partially responsible for the observed flavor changes. Ethanol was not identified by GC–olfactometry but was more abundant in packed fruit and may have influenced flavor.