

Title Ethanol fermentation metabolism and accumulation of off flavors in citrus fruit
Author Shi JX, Goren R, Goldschmidt EE and Porat R
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Abstract

During postharvest storage and shelf life mandarins tend to develop off-flavors much more rapidly than other citrus varieties, and the occurrence of these off-flavors is associated with increase in juice ethanol and acetaldehyde levels. Moreover, the reasons why mandarins accumulate under anaerobic conditions more off-flavor volatiles than other citrus varieties are not yet understood. The aims of our research were: 1) to evaluate the postharvest storage conditions that enhance ethanol fermentation and accumulation of off-flavors; 2) to examine the sensitivity of different citrus varieties to anaerobic stresses; 3) to characterize ethanol fermentation metabolism in citrus fruit at the molecular (gene expression) and biochemical (protein accumulation and activity) levels; and 4) to determine key factors governing ethanol fermentation metabolism and accumulation of off-flavors in citrus fruit. To achieve these goals we compared ethanol fermentation metabolism in two different citrus varieties; ‘Murcott’ mandarins, which tend to suffer from build-up of ethanol in their juice and accumulation of off flavors, and ‘Star Ruby’ grapefruit, which does not suffer from accumulation of off-flavors after harvest. Overall, our results indicate that mandarins accumulate higher levels of ethanol and acetaldehyde in their juice since they have higher respiration rates, and because their peel is less permeable to gases resulting in build up of anaerobic conditions in the internal atmosphere of the fruit.