

**Title** Changes in aroma-related volatiles and gene expression during low temperature storage and subsequent shelf-life of peach fruit

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### **Abstract**

Melting flesh peach (*Prunus persica* L. Batsch., cv. Hujingmilu) fruit were harvested and stored at 0, 5, 8 °C for up to 21 d. Data on emission of characteristic aroma-related volatiles, and expression patterns of related genes, including lipoxygenase (LOX), hydroperoxide lyase (HPL), alcohol dehydrogenase (ADH), and alcohol acyltransferase (AAT), were obtained from fruit at the different low temperatures for 7, 14 and 21 d and a subsequent shelf-life for 3 d after each of those storage times. Production of volatiles was markedly influenced by storage temperature and time. In general, fruit at 5 °C were sensitive to chilling injury (CI) and had the lowest levels of volatile compounds, especially fruity note volatiles such as esters and lactones. An electronic nose (e-nose) was used to evaluate peach aroma, and the CI fruit could be separated from those at low temperature but which had not developed the disorder. Relative expression levels of genes involved in the LOX pathway were repressed in fruit with CI. Of the LOX family genes, *PpLOX1* and *PpLOX3* were upregulated in association with accumulated ethylene during shelf-life, while levels of *PpLOX2* and *PpLOX4* declined after removal. Expression of *PpHPL1*, *PpADH1*, *PpADH2*, and *PpADH3* exhibited similar decreasing patterns during shelf-life, whereas transcript levels of *PpAAT1* were induced. The results suggest that reduced levels of fruity note volatiles in fruit with CI were the consequence of modifications in expression of *PpLOX1*, *PpLOX3* and *PpAAT1*; the significance of ethylene in relation to aroma-related volatiles production after cold storage is discussed.