

Title Aroma volatiles associated with the senescence of climacteric or non-climacteric melon fruit

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Citation Postharvest Biology and Technology, Volume 52, Issue 2, May 2009, Pages 146-155

Keywords *Cucumis melo* L.; Near-isogenic lines; Aroma profile; Fruit quality; Fruit over-ripening; Postharvest behavior; Multivariate statistics

Abstract

This paper characterizes the changes in aroma volatiles associated with fruit senescence based on the climacteric or non-climacteric behavior found in a collection of near-isogenic lines (NILs) of melon (*Cucumis melo* L.). Data were analyzed by univariate and multivariate methodologies. In general, senescence led to a decrease in complexity of the aroma profile, but total area counts increased compared with harvest levels. The quantitative trait loci (QTLs) that induced climacteric behavior in the NILs strongly affected the aroma profile during senescence. In senescent climacteric fruit, the relative contributions of acetate and non-acetate esters to the overall aroma profile increased in relation to harvest levels, particularly propyl acetate, isobutyl acetate, methyl 2-methylbutanoate, ethyl butanoate, hexyl acetate and benzyl acetate. In the senescent non-climacteric NILs, 15–17 volatiles of the profile were undetectable, particularly some aldehydes, while other aldehydes were reduced, esters did not change from harvest to senescence and sulfur-derived compounds increased. Methyl propanoate decreased with senescence irrespective of the climacteric behavior. The climacteric senescent fruit of the NILs could be discriminated from the non-climacteric fruit by 11 compounds of the profile, mainly benzyl acetate, hexanal and pentanal among others (ethyl acetate, propan-2-yl acetate, nonanal, 2-ethylhexan-1-ol, methyl disulfanylmethane, acetone and 2-ethylfuran). The grouping of senescent climacteric NILs was mainly attributable to high relative values of ethyl acetate, methyl butyrate and propyl acetate. Finally, the physiological behavior of NILs also allowed to classify methyl propanoate, ethyl 2-methylpropanoate, pentanal, acetone and 2-ethylfuran as ethylene-independent aroma compounds while isobutyl acetate was classified as ethylene-dependent.