

Title Aroma volatile emission and expression of 1-aminocyclopropane-1-carboxylate (ACC) synthase and ACC oxidase genes in pears treated with 2,4-DP

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Abstract

Effects of the synthetic auxin 2,4-dichlorophenoxy-propionic acid (2,4-DP) on 1-aminocyclopropane-1-carboxylate (ACC) synthase and oxidase gene expression in 'La France' and aroma production in 'Bartlett' pears (*Pyrus communis* L.) were investigated. In non-stored, non-treated 'La France' fruit, the accumulation of ACC synthase (ACS) and ACC oxidase (ACO) transcripts was not observed. In 2,4-DP treated 'La France' fruit, the level of mRNAs hybridized with *ACS4* probe increased strongly while *ACS1*, *ACS3*, and *ACO1* mRNA levels were similar between 2,4-DP treated fruit and stored non-treated fruit. The result indicates that *ACS4* may be an ACC synthase gene which is induced by auxin in pears. Thirty-eight volatile compounds were detected from 'Bartlett' pears. The composition and amount of aroma volatiles were similar between 2,4-DP treated fruit and stored non-treated fruit. Esters were the most prevalent compounds and butyl-, ethyl-, and hexyl acetate were produced in the largest amounts. In non-stored, non-treated fruit, aldehydes constituted a high percentage of the total volatiles detected, although the amount of total volatiles detected was relatively low. Internal browning in 2,4-DP treated 'Bartlett' fruit developed on the tree within 30 days of application. Possible effects of pre-harvest ethylene, carbon dioxide, and temperatures, are discussed.