Abstract:

Oxidation of α-farnesene in the cuticle is related to the appearance of scald in many apple and pear cultivars. No references were found in the literature as regards 'Conference' pears. The aim of this work was to determine if the biochemical mechanism for scald is the same in Conference as in other cultivars. Hexane extracts of fruit peel were prepared and GC-MS profiles were examined from different types of pears immediately after storage: (a) healthy peel from healthy pears and scald affected peel from scald affected pears were compared in pears from commercial controlled atmosphere (CA) storage (4.5% O2 + 1.5% CO2); (b) healthy fruits of different harvest maturity were compared after CA storage in 2% O2 with 0.7 or 5% CO2. α-Farnesene was the major compound detected in the peel. It was significantly higher in healthy than in scalded samples, in 0.7% than in 5.0% CO2, and in early harvest than in late harvest. A conjugated trienol (2,6,10-trimethyl-dodeca-2,7(E), 9(E), 11-tetraen-6-ol), known as the only well detectable oxidative metabolite of α-farnesene, was also detected. Its relative amount vs α-farnesene was higher in scalded than in healthy fruits from commercial storage. The trienol was significantly higher in the early than in the late harvested fruits stored in 0.7% CO2, and it was practically absent in 5.0% CO2. Methyl and ethyl esters of long chain fatty acids C16 and C18 (palmitic, linoleic and linolenic) were present in a significantly higher amount in healthy than in scalded fruits from commercial storage, and in 0.7% CO2 than in 5.0% CO2. The composition of 'Conference' pear cuticle resulted similar to that of other pear varieties. High CO2 inhibited the biosynthesis of α-farnesene and of esters of long chain fatty acids, and the formation of their oxidation products, such as the conjugated trienol. This could be a reason for the scald preventing effect of high CO2. The appearance of scald in 'Conference' pears was related to a decrease of α-farnesene and of esters of long chain fatty acids and to a relative increase of the trienol. A role of esters of long chain fatty acids in scald appearance, parallel to that of α-farnesene, cannot be excluded.