

Ethylene, α -farnesene and conjugated trienols in ‘Abate Fetel’ pears in relation to storage, 1-MCP treatment and superficial scald development

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Superficial scald is one of the most common postharvest disorders which affect many pear and apple cultivars, resulting in high economic losses. The mechanisms that lead to scald are still unclear, but the sesquiterpene α -farnesene and its oxidation products, the conjugated trienols (CTs), are reported to be involved in superficial scald induction and development. In this work, α -farnesene, CTs, and ethylene production were analysed in scald-affected and sound pears to unravel the role of these compounds in scald induction. The same fruit were also analysed for firmness and peel color to study the influence of scald on pear quality. Pear fruit (cv Abate Fetel), treated or untreated with 1-MCP, were stored for six months at -1°C in air (NA) or in controlled atmosphere (CA, 8% O_2 , 1% CO_2). After 4, 5, and 6 months of storage plus 7 days at 20°C , scald incidence was examined and ethylene production rate, flesh firmness, index of absorbance difference (I_{AD}), α -farnesene (α -FAR), and CTs (CT258, CT269, CT281) contents were measured in sound and scald-affected fruit. Scald incidence was very high in untreated pears; NA fruit showed a higher scald percentage than CA ones after 4 and 5 months of storage, while 1-MCP fruit showed scald symptoms only at the end of storage. In general, the assessed quality parameters were not affected by scald development, except for 1-MCP sound pears stored for 6 months which were firmer than scald-affected fruit of the same treatment. Ethylene production was lower in 1-MCP pears, without differences between sound and scald-affected fruit, but this reduction did not induce a similar decrease in the α -farnesene production as expected. α -FAR showed similar values in sound and scald-affected pears, regardless of 1-MCP treatment, storage length, or atmosphere. CT269 and CT281 were lower in 1-MCP pears than in untreated ones without any difference between scalded and sound fruit. CT258 was lower in 1-MCP fruit affected by scald than in sound fruit, while it did not show significant differences in the remaining treatments. 1-MCP sound pears showed higher CT258/CT281 and CT269/281 ratios than 1-MCP scald-affected ones or untreated fruit (both sound and scald affected). In all the treatments, CT258/CT281 and CT269/281 ratios showed a good relationship with superficial scald symptoms and seemed to be more related to scald development than the concentration of the single compounds.

Keywords: *Pyrus communis*, 1-methylcyclopropene, I_{AD} , firmness, scald.