1-Methylcyclopropene and extreme ULO inhibit superficial scald in a different way highlighting the physiological basis of this disorder in pear

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Abstract

Despite years of research on the biochemical basis of superficial scald in apples, relatively little is known about the specific regulatory processes involved in pears. To gain further knowledge on these processes, different storage scenarios, controlled atmosphere (CA), 1-methylcyclopropene treatment (1-MCP) and storage under very low O_2 concentration (xULO) were used in the scald susceptible 'Blanquilla' pears. Ethylene production, α-farnesene (AF), conjugated trienols (CTols) content and changes in ethanol levels were evaluated during storage and further related to superficial scald development and changes in fruit quality upon removal.

While 1-MCP completely inhibited ethylene production and fruit softening, only a partial and transient inhibition of these parameters was found for xULO-treated fruit. Both 1-MCP and xULO treatments completely controlled scald disorder, yet in different ways. The reduction in disorder incidence in 1-MCP treated fruit was the result of ethylene inhibition and reduced levels of α-farnesene and CTols. In contrast, xULO treatment only partially inhibited ethylene production and the levels of α-farnesene metabolites but led to increased ethanol levels that were directly related to the scald incidence inhibition. Collectively, these results highlight that superficial scald in pear is not strictly related to ethylene and α-farnesene metabolism and that other compounds, such as the weak antioxidant ethanol, play a determining role in 'Blanquilla' pear.