

Impact of methyl salicylate on storage quality, ethylene action, and protein profiling of 'Zaosu' pear (*Pyrus bretschneideri*)

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Abstract

'Zaosu' pear, an early-maturing cultivar harvested in summer in China, readily exhibits quality deterioration and senescence owing to the lack of refrigeration and effective postharvest technology. To explore possible molecular mechanisms of methyl salicylate (MeSA) in delaying senescence, 'Zaosu' pear was treated with 0.05 mmol L⁻¹ MeSA and stored at 25 ± 2 °C. The effects on quality, ethylene synthesis and signaling elements, and protein profiling were evaluated. MeSA maintained fruit postharvest quality. In the treated fruit, the yellowing index, weight loss, and color L* value retained lower levels, and the yellowing index was 69 % of that of the control after 20 days, whereas the hue angle and texture properties (fracturability, firmness, and chewiness) had increased levels. The respiration rate and ethylene content, and ethylene biosynthesis and signaling components *ACS4*, *ACO1*, *ACO4*, *ETR1*, *ETR2*, *ERS2*, *CTR1*, *EIN2*, and *EIL1*, were inhibited and downregulated by MeSA, respectively, while *ERS1* was upregulated. Thirty-eight different expression proteins were identified by 2-DE and MALDI-TOF/TOF MS analysis in the treated and untreated fruits. Among them, related ripening and senescence proteins 2-methylene-furan-3-one reductase, abscisic stress-ripening protein, annexin RJ4, and mitochondrial outer membrane protein porin were down-accumulated during storage, while electron transfer flavoprotein was up-accumulated later in the storage period. These results indicated that MeSA postponed the ripening and senescence of postharvest 'Zaosu' pear.