

**Title** Effect of in-orchard chilling stress on avocado fruit ripening and ethylene perception  
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### Abstract

Avocado fruit (*Persea Americana* Mill.) is subtropical tree, that is sensitive to cold climate, and during the winter of 2008, it suffered in some orchard plots from suboptimal temperatures (-6°C- -3°C for 3 nights). In this work, we compare the postharvest behavior of avocado cv. 'Acad' grown in central Israel that suffered or did not suffer from chilling stress. It was found that in orchard chilling stress induced ethylene production and stimulated the ripening processes. Ethylene production started already in chilling injured (CI) fruit attached to the tree and was quite high on day of harvest ( $80 \mu\text{l kg}^{-1} \text{h}^{-1}$ ), while control fruit did not exhibited any ethylene. CI fruit softened rapidly and were completely ripe within three days from harvest, whereas control fruit completed their ripening after one week at 20°C. The expression level of both *PaETR* and *PaERS1* mRNA in CI fruit on the tree was 25 fold higher compared to the control. In control fruit expression of ethylene receptor genes were very low at harvest and increased in parallel to the onset of climacteric ethylene peak. *PaCTRI* mRNA transcript level was less affected by chilling stress and small changes (less than 3-fold) were observed for this gene in CI fruit on day of harvest. Our study suggests that chilling stress in the orchard induced ethylene production and ethylene receptors build up leading to faster avocado fruit ripening. In conclusion, it seems that ethylene receptors are involved in regulation of ethylene responsiveness in response to the chilling stress.