# ETHYLENE SYNTHESIS INHIBITOR AFFECTS POSTHARVEST KIWIFRUIT QUALITY

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of the requirements for the degree of
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*to*

***Anna Luisa,***

*my precious little 'kiwi' girl,*

*and her mother, great little woman,*

***Cris***

# ABSTRACT

Firmness is a key quality criteria of kiwifruit and changes significantly during fruit ripening, with premature softening being a serious commercial problem for the industry. Ethylene is involved in regulation of fruit ripening and influences a number of processes, including ethylene production, respiration rate and changes in firmness. Kiwifruit is very sensitive to ethylene, which increases fruit softening rate and reduces storage potential. Aminoethoxyvinylglycine (AVG), an inhibitor of ACC synthase, a key enzyme in the pathway for ethylene biosynthesis, has been applied to horticultural crops, especially apples, in an attempt to regulate ethylene synthesis and its mediated processes, with a number of positive effects including reduced fruit ethylene production, reduced respiration rate, and slower softening rate.

The effects of AVG (500 and 1000 $mg.l^{-1}$ a.i., or 200 and 400 $g.acre^{-1}$ a.i.) applied to 'Hayward' kiwifruit vines (6 and 4 weeks before commercial harvest) on ethylene production, respiration rate, firmness and soluble solids content of fruit at harvest and after coolstorage were investigated. Kiwifruit treated with either 500 or 1000 $mg.l^{-1}$ AVG 4 weeks before commercial harvest and maintained at 20 °C over 15 days, had a lower respiration rate, reduced ethylene production, a slower softening rate, and lower SSC than control fruit immediately after harvest and following 14 days at 0 °C, with the differences generally becoming significant after 6 days at 20 °C. These attributes are generally stimulated by ethylene, indicating that the endogenously produced ethylene was inhibited by the applied AVG, resulting in a slower fruit ripening rate at 20 °C.

However, AVG effects were transitory. There were generally no differences in the above fruit variables between AVG-treated and control fruit at 20 °C up to 20 days following 30, 52, and 80 days at 0 °C. After 110 and 180 days at 0 °C, kiwifruit treated with either 500 or 1000 $mg.l^{-1}$ AVG 4 weeks before commercial harvest and maintained at 20 °C up to 10 days, had a higher respiration rate, increased ethylene production, and accelerated softening compared with control fruit. There were basically no differences in any of the

above fruit variables between the treatments 500-AVG-6 and control, either immediately after harvest or following storage at 0 °C up to 180 days.

The short term effect of AVG in kiwifruit during and after coolstorage and the questionable efficiency of AVG uptake in kiwifruit are issues to be further addressed before any practical application can be recommended.

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