

DELAYED RIPENING OF 'BARTLETT' PEARS USING POSTHARVEST DIPS OF AMINOETHOXYVINYLGLYCINE (AVG)

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ABSTRACT

A large acreage of uniform trees with a full crop of ripe fruit is an appealing sight, both from the standpoint of the hungry passer-by and of those who have meticulously nurtured it for the past six months. This scenario, however, may elicit concern from those charged with managing the harvest. Concerns about sufficient labor as well as rate of fruit development and conditions affecting maturity may weigh heavily on those responsible for ensuring the crop is harvested in a manner commensurate with market demands—both immediate and long-term (up to 12 months).

For these reasons, fruit maturity must often be managed on a rather large scale. Bioregulation of fruit ripening with aminoethoxyvinylglycine (AVG, ReTain™) allows more flexibility in harvesting and marketing, often with improved uniformity and retention of quality. Efficacy of pre-harvest foliar applications of AVG has been inconsistent because of 1) differences in climatic conditions between seasons and among orchards, 2) the long interval (3-5 weeks) between treatment and time of intended or anticipated harvest, 3) inadequate crop coverage because of interference due to canopy density, and 4) effects of protracted bloom on uniformity of fruit development. With optimum treatment timing, postharvest dipping or drenching of fruit could increase efficacy, improve coverage uniformity, and reduce environmental residue and therefore offer an additional tool for managing postharvest ripening.

'Bartlett' pears similar in size and color were harvested from among 10 mature trees on August 16, 2003 and taken to the laboratory for treatment. Fruit were randomly assigned to 1 of 5 treatments: 1) untreated, 2) 0 mg•l⁻¹ AVG (dip), 3) 66 mg•l⁻¹ AVG (dip), 4) 132 mg•l⁻¹ AVG (dip) and 5) 264 mg•l⁻¹ AVG (dip). Dip treatments contained technical AVG without surfactant. Fruit (100 per treatment) were submerged for 2 min. and placed on fiber trays for 30 min. to dry. Fruit were transferred to dry trays and placed in cardboard boxes with liners at -1°C. Immediately following treatment, and every 30 days for four months, 20 fruit per treatment were removed from regular storage and held at 23°C for 24 h. after which internal ethylene content was measured by inserting an 18 gauge needle equipped with a rubber septum through the fruit calyx into the central cavity and withdrawing 1 ml of gas. Ethylene was analyzed with a GC-FID according to standard methods.

After five months at -1°C, all pears treated with AVG produced less ethylene out of storage than those dipped in water alone. Cumulative ethylene production decreased linearly with increasing AVG dosage ($R^2 = 0.91$). At a concentration similar to that used as a preharvest spray application, dipping fruit extended storage life by 4 weeks.

Preharvest application of AVG to 'Bartlett' pears is a useful tool for harvest management. The addition of postharvest dipping or drenching with AVG reduces ethylene, delays firmness loss and extends storage life.

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