Title Differential expression of allene oxide synthase (AOS), and jasmonate relationship with ethylene biosynthesis in seed and mesocarp of developing peach fruit

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Abstract

To better understand the physiological role of jasmonates (JAs) during fruit development and ripening, and relationships with ethylene, the time course of transcript accumulation of the key enzyme in JA biosynthesis, allene oxide synthase (AOS), was analyzed during S1–S4 fruit developmental stages, until ripening, in the mesocarp and seed of peach (*Prunus persica* var. *laevis* Gray), cv. 'Stark Red Gold'. In the mesocarp, transcript amounts of *PpAOS1* were the highest in S1–S2, then decreased to almost undetectable levels at the transition S3/S4, to rise slightly at harvest. In parallel, JA concentration was measured in the mesocarp during development; maximum jasmonic acid accumulation was observed in S1, the lowest levels in S2 and S3 and a new rise in S4. In the seed, an AOS1 transcript was detected whose accumulation differed in the embryo as compared to cotyledons during seed growth. The reciprocal JA/ethylene relationships were investigated in fruit at different physiological stages by exogenously supplying methyl jasmonate (MJ). The effects of treatments with 0.88 mM MJ on transcript levels of *PpAOS1* and ethylene biosynthetic genes *PpACS1*, *PpACO1* and *PpACO2* were evaluated in the mesocarp and seed of detached nectarines at an early (S1) and late (S4) developmental stage. Results show that JA biosynthesis appears to be developmentally regulated in seed and mesocarp of nectarine fruit and that the response to MJ depends upon the fruit physiological stage.