Title Jasmonate-induced ripening delay is associated with up-regulation of polyamine levels in peach fruit

Author Vanina Ziosi, Anna Maria Bregoli, Fabio Fregola, Guglielmo Costa and Patrizia Torrigiani

Citation Journal of Plant Physiology, Volume 166, Issue 9, 1 June 2009, Pages 938-946

Keywords Arginine decarboxylase; ERS1; Fruit ripening; *n*-Propyl dihydrojasmonate; Polyamines

Abstract

Methyl jasmonate (MJ, 0.20 mM) and its synthetic analog *n*-propyl dihydrojasmonate (PDJ, 0.22 mM) were applied to peach fruit (*Prunus persica* L. Batsch) at a late developmental stage under field conditions (in planta). On the basis of a previously demonstrated jasmonate (JA)-induced ripening delay in peach, the effects of JAs on the time course of the endogenous polyamine (PA) accumulation and expression of their biosynthetic genes arginine decarboxylase (ADC), ornithine decarboxylase (ODC), spermidine synthase (SPDS) and *S*-adenosylmethionine decarboxylase (SAMDC) were evaluated in control and JA-treated fruit during the 21-d trial period. In parallel, the main ripening-related parameters (ethylene production, flesh firmness and soluble solids contents) were measured, and transcription profiles of aminocyclopropane-1-carboxylic acid oxidase (PpACO1) and of two ethylene perception genes were evaluated. PDJ, but not MJ, reduced ethylene production and fruit softening, impaired PpACO1 transcription and altered the expression of PpERS1 (ethylene sensor 1), but not the expression of PpETR1 (ethylene receptor 1). In the epicarp and mesocarp, the pattern of PA accumulation was altered in a biphasic manner leading to a higher overall PA level in PDJ-treated fruit. Short and long term increases in putrescine, spermidine and/or spermine, the latter only in the epicarp, were observed in PDJ-treated fruit. MJ induced this behavior only with putrescine in the mesocarp. PpADC transcription was also enhanced soon after the PDJ treatment. Since PDJ-treated fruit were less ripe, their higher PA concentrations in treated fruit are discussed in light of the dual role of these molecules as stress/defense protective compounds and rejuvenating effectors.