Title Ethylene and fruit softening in the stony hard mutation in peach

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Abstract

The *stony hard* (*hd*) peach is characterized by a lack of ethylene production and a firm flesh in mature fruit; exogenous ethylene induces a loss of fruit firmness. The mutation is inherited independently of the *M* (melting/non-melting) trait that is controlled by a ripening-related endopolygalacturonase (endoPG) gene. We studied the process of fruit softening and the activities of the three pectolytic enzymes: endoPG, exopolygalacturonase (exoPG), and pectin methylesterase (PME), in the *stony hard* cv. Manami with and without ethylene treatment. Exogenous ethylene rapidly reduced the flesh firmness of the *stony hard* fruit which neatly correlated with increases of endo- and exoPG activity. The increased levels of endo- and exoPG activity resembled those detected in fruit of the normal cv. Akatsuki, which served as a control. In contrast to PGs, PME activity was not affected by ethylene and did not correlate with flesh firmness. Thus, the *stony hard* mutation does not seem related to fruit softening enzymes, but to the control of ethylene levels in the ripening fruit. Our results underline the crucial role of ethylene in the induction of fruit softening in peach.