Title Effect of ethylene treatment on expression of polyuronide-modifying genes and solubilization of polyuronides during ripening in two peach cultivars having different softening characteristics

Author Hideki Murayama, Michiko Arikawa, Yae Sasaki, Valeriano Dal Cin, Wataru Mitsuhashi and Tomonobu Toyomasu

Citation Postharvest Biology and Technology, Volume 52, Issue 2, May 2009, Pages 196-201

Keywords Pectate lyase; Pectin methylesterase; Polygalacturonase; Polyuronides; *Prunus persica*

Abstract

We focused on modification of polyuronides during ripening to clarify the mechanisms involved in peach fruit softening and textural changes. Fruit of the stony hard type peach 'Miharu Hakuto' softened during ripening in ethylene-free air, but did so more slowly than the melting type peach 'Kawanakajima Hakuto'. In addition, the stony hard type peach in ethylene-free air did not develop a melting texture, and solubilization of polyuronides did not occur during ripening, although the fruit gradually softened. Exposure of the stony hard type peach to continuous ethylene promoted fruit softening and development of a melting texture and induced the solubilization of polyuronides to the same levels as in the melting type peach. Expression of the polygalacturonase gene *PpPG2* was higher than that of *PpPG1* and *PpPG3*, during ripening in both cultivars. *PpPG2*-mRNA in the melting type peach showed a slight accumulation at harvest and markedly increased during ripening at 20 °C. Expression of *PpPG2* in the stony hard type peach in ethylene-free air was considerably lower than that in the melting type peach, and ethylene exposure of the stony hard type peach up-regulated the mRNA level of *PpPG2* to that of the melting type peach. The mRNAs of two pectin methylesterase genes, *PpPME1* and *PpPME2*, in stony hard type peach in ethylene-free air were reduced during ripening at 20 °C as compared with these genes in the melting type peach. Continuous ethylene exposure up-regulated *PpPME2* mRNA in the stony hard type peach. The mRNAs of two pectate lyase genes, *PpPL1* and *PpPL2*, were expressed constitutively throughout ripening in both cultivars. These results show that ethylene plays an important role in the solubilization of polyuronides and development of a melting texture in peach fruit. In addition, *PpPG2* and *PpPME2* might be involved in the solubilization of polyuronides in peach fruit.