

Title Changes in abscisic acid levels, ethylene biosynthesis, and protein patterns during fruit maturation of 'Granny Smith' apples.

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Abstract

Endogenous abscisic acid (ABA), free and conjugated 1-aminocyclopropane-1-carboxylic acid (ACC) concentrations, ethylene-forming capacity (EFC), and presence of ACC oxidase [1-aminocyclopropane-1-carboxylate oxidoreductase] (ACO) and ACC synthase [1-aminocyclopropane-1-carboxylate synthase] (ACS) proteins were monitored during the preharvest maturation period of cv. Granny Smith apple fruit. Total proteins from peel and pulp tissues were also extracted at different maturity stages and separated by sodium dodecyl sulphate polyacrylamide gel electrophoresis, providing evidence of differential protein accumulation during fruit development. Endogenous ABA concentration in the peel tissue was higher than in pulp, the highest level occurring approx equal to 2 months before commercial harvest. In the pulp tissue, concomitant increases in ACC and ABA concentrations were observed, preceded by a peak in EFC. However, no ACO or ripening-related ACS proteins were detectable throughout the period considered, suggesting that very low levels of both enzymes are present during the preclimacteric stage of Granny Smith apples. A hypothesis on the possible interaction between ABA and ethylene during maturation of Granny Smith apples is proposed.