

Title Ethylene production and 1-aminocyclopropane-1-carboxylate (ACC) synthase and ACC oxidase gene expression in apple fruit are affected by 9,10-ketol-octadecadienoic acid (KODA)

Author S. Kondo, H. Tomiyama, M. Kittikorn, K. Okawa, H. Ohara, M. Yokoyama, O. Ifuku, T. Saito, Y. Ban, M. Tatsuki, T. Moriguchi, A. Murata and N. Watanabe

Citation Postharvest Biology and Technology. Volume 72, October 2012, Pages 20–26

Keywords Ethylene; α -Ketol linolenic acid; KODA; *Malus sylvestris*; *MdACS1*; *MdACO1*

Abstract

We investigated the effect of 9,10-ketol-octadecadienoic acid (KODA), which is synthesized from linolenic acid by 9-lipoxygenase, on 1-aminocyclopropane-1-carboxylate (ACC) synthase and ACC oxidase gene expression, their enzyme activities, and ethylene production in apple fruit [*Malus sylvestris* (L.) Mill. Var. *domestica* (Borkh.) Mansf.]. The fruit was treated with C-KODA, which is a derivative of KODA, at 63 or 119 d after full bloom (DAFB). Endogenous KODA in the skin of the fruit did not change significantly from 48 to 119 DAFB on the tree, and during storage after harvest at 119 DAFB. However, softening of the fruit treated with C-KODA at 63 DAFB was inhibited. ACC synthase and oxidase activities, ACC and MACC concentrations and ethylene production were lower in the C-KODA-treated fruit than in the untreated control at 119 DAFB. In general, mRNA transcript levels of *MdACS1* and *MdACO1* in the skin of the C-KODA-treated fruit were lower than those in the untreated control fruit. In contrast, softening was promoted in the fruit stored after C-KODA treatment at 119 DAFB. ACC synthase activity, ACC and MACC concentration, ethylene production and the mRNA transcript levels of *MdACS1* and *MdACO1* in the skin were also increased in the C-KODA-treated skin. These results suggest that C-KODA may influence ethylene production *via* the expression of *MdACS1* and *MdACO1* in apple fruit, but that the effect is different depending on the time of treatment.