Auxin induced carotenoid accumulation in GA and PDJ-treated citrus fruit after harvest

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Abstract

Combined spraying of gibberellin (GA) and prohydrojasmon (PDJ) was an effective method to prevent the physiological disorder of peel puffing in citrus fruit. However, the GA and PDJ combined treatment inhibited carotenoid biosynthesis during the fruit ripening process, which led to the mature fruit with poor color. In the present study, to improve the coloration of the GA and PDJ-treated fruit, the effects of postharvest treatments of two auxins, indole-3-acetic acid (IAA) and 1-naphthaleneacetic acid (NAA), on carotenoid accumulation were investigated in Satsuma mandarin 'Aoshima unshiu' (*Citrus unshiu* Marc.). The results showed that IAA and NAA treatments induced carotenoid biosynthesis in the GA and PDJ-treated fruit after harvest. With the treatments of IAA and NAA, the contents of β-carotene, β-cryptoxanthin, all-*trans*-violaxanthin, and 9-*cis*-violaxanthin were enhanced in both flavedos and juice sacs. The increase in the carotenoid accumulation was accompany with the up-regulation of carotenoid biosynthetic genes and down-regulation of carotenoid catabolic gene in the IAA and NAA treatments. In addition, ethylene production was induced after the IAA and NAA treatments, and the increase of the endogenous ethylene might stimulate carotenoid biosynthesis in citrus fruit. The results presented in this study suggested that the postharvest treatment of auxin was an effective method for improving the coloration of the GA and PDJ-treated fruit.