

Effects of abscisic acid (ABA) on ethanol fermentation during postharvest ripening of Nanguo pear fruit (*Pyrus ussuriensis Maxim.*)

Jingyi Lv, Dongle Xu, Yingzhi Zhang, Siyang Ding, Mingyu Sun, Lin Bai, Yonghong Ge and Jianrong Li

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Abstract

The aim of this study was to explore the role of abscisic acid (ABA) in ethanol fermentation during postharvest ripening of Nanguo pear fruit (*Pyrus ussuriensis Maxim.*). Pears harvest at commercial maturity were treated with 100 $\mu\text{mol L}^{-1}$ ABA or its biosynthesis inhibitor nordihydroguaiaretic acid (NDGA). Our data indicated that ABA treatment promoted respiration rate and ethylene production during ripening compared with controls, while NDGA treatment had the opposite effects. During the early ripening stage, flesh firmness in ABA treatment group was lower than in controls; while in NDGA treatment group, it was higher than in controls. The contents of glucose, ethanol and acetaldehyde were increased by ABA treatment while reduced by NDGA treatment during ripening compared with the controls. ABA treatment promoted pyruvate and acetyl-CoA contents, whereas application of NDGA reduced pyruvate content and delayed the peak of acetyl-CoA content compared with the controls. The oxaloacetic acid (OA) and citric acid (CA) contents were reduced by ABA treatment while increased by NDGA treatment during ripening. ABA treatment promoted pyruvate decarboxylase (PDC) and alcohol dehydrogenase (ADH) activities, whereas NDGA treatment reduced their activities mainly at the early ripening stage. Quantitative real-time polymerase chain reaction (qPCR) showed that expression of *PDC1*, *ADH1* and *ADH2* was differentially up-regulated by ABA treatment during ripening while down-regulated by NDGA treatment compared with the controls. *PDC2* expression was enhanced after application of NDGA during ripening while reduced by ABA treatment at the early ripening stage. Our data indicated that ABA had a promoting effect on ethanol fermentation during ripening of Nanguo pear fruit.