

Title Expression of ethylene-related expansin genes in cool-stored ripening banana fruit
Author Yong Wang, Wangjin Lu, Yueming Jiang, Yunbo Luo, Weibo Jiang and Daryl Joyce
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Abstract

Expansins are cellular proteins expressed in the course of cell wall loosening during fruit ripening. There is no information about the relationship between expansins and ripening of chilling injury (CI)-affected banana fruit. Banana fruit were pre-treated with 0 or 1000 $\mu\text{L/L}$ propylene (functional ethylene analogue) for 16 h and then stored at 7 °C. CI symptoms of untreated control fruit appeared after 4 days, while propylene pre-treated fruit showed CI symptoms after 7 days. Thus, stimulation of ripening with propylene applied prior to storage at low temperature tended to alleviate CI. The fruit were stored for 8 days at 7 °C and then transferred to 22 °C, followed by treatment with 1000 $\mu\text{L/L}$ propylene to initiate ripening. The propylene treatment accelerated color change, increased ethylene production rate and caused a more rapid decrease in peel and pulp firmness. Two banana expansins, AY083168 and AF539540 (GeneBank), were chosen as the target genes *MaExp1* and *MaExp2*, respectively. RNA blotting analysis showed no accumulation of either *MaExp1* or *MaExp2* transcripts in banana fruit during low temperature storage. Expansin genes were expressed more intensively in propylene pre-treated fruit than in control fruit upon removal from cold storage for propylene-initiated ripening. The results suggest that increased tolerance of banana fruit pre-treated with propylene to low temperature-induced chilling was related to higher post-storage ethylene production rates and enhanced expression of *MaExp1* and *MaExp2*.