

**Title** Involvement of phospholipase D and lipoxygenase in response to chilling stress in postharvest cucumber fruits

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#### **Abstract**

Harvested cucumber (*Cucumis sativus* L. cv. Jinyou-1) fruits were placed at 37 °C (pre-warming) or at 20 °C (control) for 24 h prior to be stored at 2 °C for 9 days. After storage, fruits were cut into three sections with equal length, namely top (calyx end), middle and bottom (stalk end), respectively. In order to determine the responses of phospholipase D (PLD) and lipoxygenase (LOX) to chilling stress, their activities and expression pattern of PLD gene in three sections of cucumber fruits were measured when the symptoms of chilling injury first appeared as numerous tiny pits. Chilling injury assessed as chilling injury index and electrolyte leakage occurred initially in the top area near calyx of fruits, and developed toward the bottom near stalk. This spatial development of chilling injury was in parallel with the gradients of PLD and LOX activities and PLD mRNA levels. Alleviation of chilling injury by pre-warming treatment was related with increased content of membrane-associated  $\text{Ca}^{2+}$ , suppressed expression of PLD mRNA, and reduced activities of PLD and LOX. We suggest that PLD and LOX are associated with the initiation of chilling injury by involving in membrane deterioration and signaling pathway in response to chilling stress.