

Title            Involvement of ethylene in development of chilling injury in fresh-cut tomato slices during cold storage.

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### **Abstract**

Experiments were conducted to determine if ethylene influences chilling injury, as measured by percentage of fresh-cut slices exhibiting water-soaked areas in tomato cultivars Mountain Pride and Sunbeam. Ethylene concentration in containers without ventilation significantly increased during storage at 5 deg C, whereas little or no accumulation of ethylene occurred in containers with one or six perforations. Chilling injury was greatest for slices in containers with six perforations, compared to slices in containers with one perforation, and was over 13-fold greater than that of slices in control containers with no perforations. An experiment was also performed to investigate the effectiveness of including an ethylene absorbent pad in containers on subsequent ethylene accumulation and chilling injury. While ethylene in the no-pad controls increased continually during storage of both Mountain Pride and Sunbeam tomatoes at 5 deg C under modified atmosphere conditions, no increase in accumulation of ethylene was observed in containers containing ethylene absorbent pads throughout storage. The ethylene absorbent pad treatment resulted in a significantly higher percentage of chilling injury compared with the no-pad control. In studies aimed at inhibiting ethylene production using 1-aminoethoxyvinylglycine (AVG) during storage of slices, the concentration of ethylene in control containers (no AVG) remained at elevated levels throughout storage, compared to containers with slices treated with AVG. Chilling injury in slices treated with AVG was 5-fold greater than that of controls. Further, we tested the effect of ethylene pretreatment of slices on subsequent slice shelf life and quality. In slices treated with ethylene (0, 0.1, 1, or 10 micro l L-1) immediately after slicing, ethylene production in non-treated controls was greater than that of all other ethylene pretreatments. However, pretreatment of slices 3 days after slicing resulted in a different pattern of ethylene production during storage. The rate of ethylene production by slices treated with 1 micro l L-1 ethylene 3 days after slicing was greater during storage than any of the other ethylene treatments. With slices pretreated with ethylene, both immediately and 3 days after slicing, the rate of ethylene production tended to show a negative correlation with chilling injury.