

**Title** Glucose inhibits ACC oxidase activity and ethylene biosynthesis in ripening tomato fruit  
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### **Abstract**

Experiments were carried out to evaluate the effect of glucose on ripening and ethylene biosynthesis in tomato fruit (*Lycopersicon esculentum* Mill.). Fruit at the light-red stage were vacuum infiltrated with glucose solutions post-harvest and changes in 1-aminocyclopropane-1-carboxylic acid (ACC) synthase, ACC, ACC oxidase, and ethylene production monitored over time. ACC oxidase activity was also measured in pericarp discs from the same fruits that were treated either with glucose, fructose, mannose, or galactose. While control fruit displayed a typical peak of ethylene production, fruit treated with glucose did not. Glucose appeared to exert its effect on ethylene biosynthesis by suppressing ACC oxidase activity. Fructose, mannose, and galactose did not inhibit ACC oxidase activity in tomato pericarp discs. Glucose treatment inhibited ripening-associated colour development in whole fruit. The extent of inhibition of colour development was dependent upon the concentration of glucose. These results indicate that glucose may play an important role in ethylene-associated regulation of fruit ripening.