

Title            The effect of an ethanol dip of table grapes on populations of *Escherichia coli*  
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Citation       Postharvest Biology and Technology, Volume 39, Issue 3 , March 2006, Pages 308-313  
Keyword       Grapes; Crimson Seedless; *E. coli*; Ethanol; Safety; Pathogen

### Abstract

Table grapes are one of the most important components of the fruit diet in many countries. Grapes are consumed raw with minimal washing, and lately have also been introduced into several ready-to-eat fruit salads. Similar to other fresh produce and salads, grapes might be vulnerable to contamination in the field or during harvest by food borne pathogens. Recently, an ethanol dipping treatment was suggested as a means to prevent *Botrytis* decay during storage and to extend the shelf life of stored table grapes. In the present study we examined the capacity of this treatment to eradicate *Escherichia coli* from ‘Crimson Seedless’ grapes. Artificially contaminated grapes were exposed to increasing concentrations of ethanol by dipping bunches of grapes for 1–10 min. *E. coli* populations were typically reduced 1–3 log 10 cfu/g on grapes by treatment with 50% ethanol or more, although the results were highly variable. Nevertheless, examination of GFP-tagged *E. coli* by confocal microscopy revealed live bacteria only in water, but not in 50% ethanol-washed grapes. Staining with propidium iodide demonstrated complete killing of attached bacteria following treatment with 50% ethanol for 3 min. When high *E. coli* inoculum was applied to peeled skin sections, a few live bacteria were still observed following an ethanol dip. These results suggest that ethanol is capable of killing *E. coli* cells which are attached to the skin, yet bacterial elimination is variable perhaps due to anatomical variations among the samples, which limits contact between ethanol and the attached bacteria. Ethanol treatment, beside its effect on shelf-life extension, can also contribute to minimize *E. coli* populations on grapes and thus enhance their safety.