**Title** Factors affecting growth of foodborne pathogens on minimally processed apples

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**Abstract**

*Escherichia coli* O157:H7, *Salmonella* and *Listeria innocua* increased by more than 2 $\log_{10}$ units over a 24 h period on fresh-cut 'Golden Delicious' apple plugs stored at 25 and 20 °C. *L. innocua* reached the same final population level at 10 °C meanwhile *E. coli* and *Salmonella* only increased 1.3 $\log_{10}$ units after 6 days. Only *L. innocua* was able to grow at 5 °C. No significant differences were observed between the growth of foodborne pathogens on fresh-cut 'Golden Delicious', 'Granny Smith' and 'Shampion' apples stored at 25 and 5 °C. The treatment of 'Golden Delicious' and 'Granny Smith' apple plugs with the antioxidants, ascorbic acid (2%) and NatureSeal® (6%), did not affect pathogen growth. The effect of passive modified atmosphere packaging (MAP) on the growth of *E. coli*, *Salmonella* and *L. innocua* on 'Golden Delicious' apple slices was also tested. There were no significant differences in growth of pathogens in MAP conditions compared with air packaging of 'Golden Delicious' apple plugs, but the growth of mesophilic and psychrotrophic microorganisms was inhibited. These results highlight the importance of avoiding contamination of fresh-cut fruit with foodborne pathogens and the maintenance of the cold chain during storage until consumption.