

Title Inactivation of *Salmonella* and *Escherichia coli* O157:H7 on artificially contaminated alfalfa seeds using high hydrostatic pressure

Author Hudaa Neetoo, Haiqiang Chen

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Abstract

Alfalfa sprouts contaminated with *Salmonella* and *Escherichia coli* O157:H7 have been implicated in several outbreaks of foodborne illnesses in recent years. The seed used for sprouting appears to be the primary source of pathogens. Seed decontamination prior to sprouting presents a unique challenge for the sprouting industry since cells of the pathogenic survivors although undetectable after sanitizing treatments, can potentially multiply back to hazardous levels. The focus of this study was to therefore test the efficacy of high hydrostatic pressure to eliminate a ~ 5 log CFU/g load of *Salmonella* and *E. coli* O157:H7 on alfalfa seeds. Pressure treatment of 600 MPa for up to 25 min at 20 °C could not result in complete inactivation of *Salmonella*. High-pressure treatment was then carried out either at sub-ambient (4 °C) or elevated (40, 45 and 50 °C) temperatures to test the ability of high pressure to eliminate *Salmonella*. Pressure treatment at 4 and 20 °C did not deliver any satisfactory inactivation of *Salmonella* while high pressure at elevated temperatures achieved complete kill. Pre-soaking seeds prior to high-pressure treatment also enhanced pressure inactivation of *Salmonella* but at the expense of seed viability. High-pressure treatment of 500 MPa for 2 min at 45 °C was able to eliminate wild-type *Salmonella* and *E. coli* O157:H7 strains without bringing about any appreciable decrease in the seed viability.