

Rose (Si) Lu, oral, Natural approaches to controlling *Salmonella* on Alfalfa Seeds and Sprouts. Major advisor- Mary Anne Amalaradjou.

Natural approaches to controlling *Salmonella* on Alfalfa Seeds and Sprouts

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Increase in consumption of fresh produce including raw sprouts have led to a concomitant increase in produce-related outbreaks. *Salmonella Enteritidis* (SE) has been linked to multistate outbreaks associated with contaminated alfalfa sprouts. Contaminated seeds were identified as the primary source of the pathogen in these outbreaks. Further, sprouting provides an ideal warm and humid environment for pathogen survival. Hence there is a need to develop effective interventions to control SE on seeds and sprouts. This study evaluated the efficacy of a natural, multi-hurdle approach to control SE on alfalfa seeds and sprouts using probiotics and organic acids. Alfalfa seeds were inoculated with SE cocktail (~5 logCFU/ml) before rinsed with 80ppm peracetic acid (PAA) and sprayed with probiotics. Probiotics used were *Lactococcus lactis* B-23802, *L. lactis* B-23804, *Lactobacillus acidophilus* La5 and *Hafnia Alvei* (~9 logCFU/ml). The seeds were then dried and stored under ambient condition (n=6, 10g). For the sprouting experiments, seeds inoculated with SE were rinsed with PAA and probiotic culture treatments were applied as a pre-germination soak. The seeds were set for sprouting in commercial sprouters for 7 days. On day 7, sprouts were rinsed in 2% lactic acid as a post-harvest wash. Surviving SE and probiotic populations on seeds or sprouts were enumerated at different intervals. Application of PAA and probiotics to seeds significantly reduced SE populations to below detection limits (1 logCFU/mL) by 21-day of storage ($P<0.05$). However, 1.37 logCFU/ml of SE was detected in the un-treated controls. Similarly, use of the multi-hurdle method reduced SE population on sprouts by 3 logCFU/mL at harvest. However, around 8logCFU/mL of SE was still recovered from the sprouts in the control group. The multi-hurdle approach could potentially be used to control *Salmonella* on alfalfa seeds and sprouts, thereby promoting its microbial safety.