Listeria monocytogenes in Retail Delis: Year 2
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Abstract

Listeria monocytogenes (LM) is a foodborne pathogen with a low rate of infections but high mortality rate (19%) (BRBB 2009). This pathogen is commonly found in the natural environment (e.g., soil, water) and has the ability to grow at low temperatures and high salt concentrations; consequently, it can contaminate foods such as ready-to-eat meats and (e.g., deli meats). LM prevalence in deli environments is concerning for the risk that it may contaminate food and enter humans. Last year, we tested deli samples for prevalence and persistence of LM. Based on these results, changes to daily sanitation practices were implemented to target trouble areas. Few data were available, however, so the main goal of this project was to see the effect of the proposed interventions to reduce LM prevalence.

After stores implemented the interventions for 1 month, environmental samples were taken in the retail deli monthly for 6 months. Biochemical testing of these samples identified LM. These samples were then confirmed by Polymerase Chain Reaction (PCR) and Pulsed-Field Gel Electrophoresis (PFGE). The new post-intervention data was compared to the historical data to assess efficacy of the interventions.

After comparing the new data with pre-intervention data the total amount of positive LM samples throughout all 20 stores increased slightly by 51.2%. Seven stores were found having lower rate of LM positive (the most being 73.7%) than having 100% after the interventions. Half of the stores (15%) increased in LM prevalence and one store remained constant (0%). The other 14 stores increased in number of positive LM samples with low LM contamination benefited from the interventions. Studies which included LM pre-intervention had started out with high occurrence of positive samples 25% or less. It is possible these stores which were previously lacking in sanitation systems or may have not used interventions correctly. We also hypothesize that the daily interventions wasn’t aggressive enough to completely eliminate the LM bacteria in stores with high contamination rates; instead, interventions may have broken and dispersed the bacteria throughout the area. Overall, the interventions were effective in reducing LM prevalence in low risk stores. Further work with more aggressive interventions needs to be done to address areas with high LM prevalence.

Listeria monocytogenes (LM) is a foodborne pathogen that transmits through food. Vulnerable people using LM contaminated food (pregnant women, the immunocompromised, the elderly) causes 1,800 illnesses (Listeria) and 237 deaths in the United States each year (Vachon et al., 2013). The salmonellas are caused by LM targeting the immune systems of these infections in order to keep LM out of food because its natural environment is soil and water in both urban and rural areas. It also has the ability to grow in low temperatures, like the refrigeration in which meat is stored. LM can grow at temperatures as low as 30°C to 10°C. This means any LM present. LM is non-spore forming, as it lacks the ability to form these spores, which are a great risk of causing infections.

According to the 2003 Food and Drug Administration United States Department of Agriculture, Food Safety and Inspection Service (FDA-USFSIS-FRD) Risk Assessment, deli meat has greater risk of infections per serving than any other food. Deli meats are at high risk due to handling practices – like high product volumes on limited equipment, exposure at refrigeration temperature, and eating without heating. The risk assessment identified that 85% of lesions cases caused by deli meats are from cross contamination in retail delis. Retailage practices, as well as retail groups and researchers, want to find ways to decrease LM contamination in retail delis to reduce the public health risk. In collaboration with the USDA and retail grocers, a previous study by our lab tested for LM in 10 retail delis over 6 months to quantify the amount of contamination and investigate individual stores showing prevalence. This study builds on those results to test the effectiveness of changes to current cleaning and sanitation practices in reducing the amount of LM positive in each deli.

Methods

Interventions (3 months)

- Cleaners
can be used to clean surfaces to reduce the risk of cross contamination.
- Disinfectants can be used to kill L. monocytogenes on surfaces.
- Multiple sanitization practices were implemented to target trouble areas.
- Few days were available, however, so the main goal of this project was to see the effect of the proposed interventions to reduce LM prevalence.

Results

- Overall positive LM rate increased from Phase I (44.45%) to Phase IV (66.40%), a total of 21.95%.
- Excluding the eight most prevalent overall positive, LM rate decreased 11.0%.
- Positive LM rate on food Contact Surfaces decreased from Phase II (4.50%) to Phase IV (13.50%), a total of 9.0%.
- Positive LM rate on Non-Food Contact Surfaces increased from Phase I (14.60%) to Phase IV (15.76%), a total of 1.16%.
- Positive LM rate on Transfer Points stayed the same from Phase II to Phase IV at 3.90%.