FUNDING DETAILS

Rapid Pathogen Detection

Food can be contaminated by very low numbers of bacteria, which presents a challenge for food safety surveillance. To detect contaminants, a long enrichment, often over 18-24 hours, is needed to allow cells to multiply to observable amounts. This can result in significant costs and delays for food processors and hamper trace-back investigations and food recalls. In recent work, the research team developed and validated a short enrichment procedure (5-8 hours) and a simplified sampling process for three major foodborne pathogens, *E. coli, Listeria and Campylobacter*. The current project is aimed at improving and applying the rapid enrichment and sample clean-up protocols to reduce the time necessary for detection of pathogens in food, feed and animal feces.

RECIPIENT:
University of Alberta
PI: Dr. Lynn McMullen

PARTNERS:
3M
RDAR

TOTAL BUDGET:
$393,856

AI FUNDING:
$149,000

PROJECT DATES:
[MAR 2021 - JAN 2023]

PROJECT TRL:
Start: 6
End: 7

APPLICATION

The project is targeted at commercial pathogen detection instruments and test kit manufacturers. The sample clean-up protocol resulting from this study will be applied to feed and fecal samples from cattle, swine and poultry. This will reduce total testing times, thereby ensuring quick identification of contaminated food products, faster release of food products to the market, reduced food storage costs and avoidance of costly recalls.

PROJECT GOALS

- Determine the impact of increased sample volume for the 3M Molecular Diagnostic System (MDS) on enrichment times needed for reliable detection of low numbers of Shiga Toxin producing *Escherichia coli* (STEC) in various food matrices.
- Apply the sample clean-up protocol to animal feed and fecal samples from cattle, swine, and poultry to determine efficacy for rapid pathogen detection.
- Determine the ability of the sample clean-up protocol to shorten enrichment times required for Polymerase Chain Reaction (PCR) detection of low numbers of *Campylobacter* spp.

BENEFITS TO ALBERTA

- Reduced economic loss for food processors through timely identification of contaminated food and faster release of food products to the market.
- Avoidance of outbreaks of foodborne diseases.
- Avoidance or minimizing of expensive food recalls and delays in shipping food products.
- Rapid pathogen detection also meets an important food industry need to rapidly test animals prior to slaughter, and grains immediately after harvest, reducing the risk of pathogens being carried into food processing facilities.
- Improvements in pathogen detection sensitivity will not result in additional cost to food processors and companies producing pathogen detection kits as it will be incorporated into existing assay tubes.

2 Publications

2 Students Trained

2 Patents

1 Project Job

CURRENT STATUS

April 2021

The project team is working with their industry partner to access instrumentation to assess the impact of increased sample volume for the 3M Molecular Diagnosis System on enrichment times needed for reliable detection of low numbers of pathogens in various food matrices.