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RESEARCH FACTS
RESEARCH & TECHNOLOGY DEVELOPMENT FOR THE CANADIAN BEEF INDUSTRY

Chemical free sanitizers to prevent E. coli contamination and reduce food waste

Project Title:

Potential of novel "green" antimicrobial strategies for Escherichia coli biofilm inactivation on equipment surfaces

Project Code:	POC.09.19
Completed:	*In Progress. Results expected in 2020.*

Researchers:

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Project objectives and deliverables:

1) To evaluate the potential of atmospheric cold plasma (ACP) activated air, ACP activated water nano-mist, and light emitting diode (LED) technologies as alternative sanitizers for inactivating *E. coli* on surfaces and in biofilms.

Background:

Avoiding *E. coli* contamination in beef packing plants is essential not only from a food safety standpoint but also to prevent food waste. *E. coli* contamination can result in beef products being thrown out, massive recalls, decreased consumer confidence in the beef industry, and a lower demand for beef products. Although current food safety practices are highly effective at preventing *E. coli* contamination researchers have found that some bacteria can form biofilms that enable them to survive even the most rigorous cleaning procedures. Biofilms are a collection of bacteria that build up and bond together, making them harder to remove. Biofilms aren't just a problem in the beef industry; for example, dental plaque is a common biofilm.

What they will do:

Researchers will develop biofilms on food grade stainless steel and high density polystyrene to mimic commercial packing plant surfaces and conveyers and test 3 different technologies from other industries to determine how effective they are at removing biofilms. Atmospheric cold plasma is a gas (can be anything from helium to just regular air) that is ionized (activated) to give it antimicrobial properties and allows it to break up biofilms without the use of chemicals. Both ACP activated air and water will be tested. ACP activated air will be tested on dry surfaces and ACP activated water will be tested on stainless steel and polystyrene to

mimic plant surfaces. Since the ACP activated water is applied as a mist it has the potential to greatly reduce the amount of water plants use to clean surfaces. Researchers will also test using pulsing LED lights at wavelengths previously shown to break down biofilms.

Expected benefit and next steps:

This lab-scale study is the first step in seeing if ACP activated air, water or LED lights can effectively remove the type of biofilms found in a packing plant. If effective, further research would need to determine how to cost-effectively scale them up to plant level. If effective, these technologies could greatly reduce *E. coli* contamination in processing facilities, improve the food safety of beef, reduce food waste associated with recalls, and reduce water use in beef processing.

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