Researchers create better methods to detect E. coli

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Lance Noll, Kansas State University master's student in veterinary biomedical science, presents his research poster at the Capitol Graduate Research Summit in Topeka. Noll is improving techniques for detecting pathogenic *E. coli*. Credit: Kansas State University

Kansas State University diagnosticians are helping the cattle industry save millions of dollars each year by developing earlier and accurate detection of *E. coli*.

Lance Noll, master's student in veterinary biomedical science, Greensburg; T.G. Nagaraja, university distinguished professor of diagnostic medicine and pathobiology; and Jianfa Bai, assistant professor in the Kansas State Veterinary Diagnostic Laboratory, are leading a project to improve techniques for detecting pathogenic Shiga toxin-producing *E. coli* O157:H7. A U.S. Department of Agriculture Coordinated Agriculture Project grant is funding the work.

The researchers are part of a College of Veterinary Medicine team studying preharvest food safety in beef cattle. Noll has developed and validated a molecular assay that can detect and quantify major genes specific for *E. coli* O157.

"Developing a method to detect *E. coli* before it can potentially contaminate the food supply benefits the beef industry by preventing costly recalls but also benefits the consumer by ensuring the safety of the beef supply," Noll said.

The newly developed test is a molecular assay, or polymerase chain reaction, that detects bacteria based on genetic sequences, which are the bacteria's "fingerprints," Nagaraja said. The test is rapid and less labor-intensive than existing detection methods. The method can be automated and test many samples in a short period of time.

The test can be used in a diagnostic or research laboratory to accurately detect *E. coli* and can help with quality control in cattle facilities.

"The novelty of this test is that it targets four genes," Nagaraja said. "We are constantly working on finding better and more sensitive ways to detect these pathogens of *E. coli* in cattle feces."

To develop the diagnostic test, Noll and Nagaraja worked with two Kansas State University molecular biologists: Xiaorong Shi, research

assistant of diagnostic medicine and pathobiology, and Bai.

"Beef cattle production is a major industry in Kansas and Kansas State University has a rich tradition in the research of beef cattle production and beef safety," Noll said. "As a graduate student in veterinary biomedical sciences, I am proud to be a member of a multidisciplinary team in the College of Veterinary Medicine that aims to make beef a safe product for the consumers."

Noll was a winner at the 11th annual Capitol Graduate Research Summit for his research project and poster, "A four-plex real-time PCR assay for the detection and quantification of *Escherichia coli* O157 in cattle feces."

Provided by Kansas State University

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