

Researchers collaborate to find new vaccine technology decreases E. coli in beef cattle

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Despite millions of dollars spent on food safety research over the last 10 years, ground beef recalls due to E. coli O157:H7 were higher in 2007 than in 2006, according to researchers from Kansas State University and West Texas A&M University. E. coli O157:H7 has been linked to foodborne illnesses in humans after consuming contaminated beef and produce.

"We have been studying the effects of a novel vaccine technology to make beef safer," said Dr. Dan Thomson, an associate professor at Kansas State University.

Thomson worked with Dr. Guy Loneragan, West Texas A&M University, and Dr. T.G. Nagaraja, of K-State, to examine the effects of this vaccine on its ability to decrease E. coli shedding in beef cattle.

"We had a decrease in cattle shedding E. coli by 54 percent in our first field study," Thomson said. "However, we increased the amount of SRP exposure in the second field study and decreased the rate of cattle shedding E. coli by 85 percent."

Loneragan said, "This tells us that efficacious interventions that predictably reduce the burden of E. coli O157 on cattle entering packing plants are needed. Successful interventions will reduce the burden of E. coli O157 to a level that is within the capacity of in-plant interventions to handle. If this can be achieved, then tremendous progress toward preventing E. coli O157 from ever getting into ground beef has been

made. This vaccine appears to fit this purpose and has great promise."

The team's findings will be presented at the 2008 Beef Industry Safety Summit in Dallas March 5.

Thomson and his colleagues studied Siderophore receptor and porin -- SRP -- technology, which was developed by Epitopix, LLC in Willmar, Minn.

"Siderophore receptor and porin proteins are utilized by food borne pathogens like E. coli to acquire iron," Thomson said. "The SRP vaccine technology immunizes animals against these mechanisms and does not allow the bacteria to take up iron. Iron is to bacteria, as oxygen is to humans. Without iron consumption, the bacteria suffocate and can't grow or replicate."

"We conducted a challenge study, a natural infection study and two large pen field studies at commercial feedyards," Thomson said. "All studies showed positive results of this vaccine, making an impact on decreasing not only the number of the cattle shedding the bacteria but also decreasing the concentration of the bacteria being shed."

Super shedder cattle are cattle that shed E. coli in very high concentrations. "Our natural field study showed that the SRP technology vaccine reduces the number of super shedder cattle," Thomson said.

The two large pen feeding studies the team conducted utilized 20 pens and more than 1,200 head of cattle, Thomson said. The first study conducted in 2006 was funded in part by beef and veal producers and importers through their \$1-per-head checkoff and was produced for the Cattlemen's Beef Board and state beef councils by the National Cattlemen's Beef Association. The second study was sponsored by Epitopix, LLC in 2007.

Source: Kansas State University

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