

Strategies to Improve Beef

Reducing dietary levels of distillers' wet grains 56 days prior to harvest offered as a potential strategy.

Story & photos by

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An update on current research being done by scientists at the U.S. Meat Animal Research Center (USMARC) at Clay Center, Neb., to reduce the prevalence of *E. coli* O157:H7 was provided at Cattlemen's College in Nashville, Tenn., Feb. 1. The Cattlemen's College event is a series of educational seminars convened as a precursor to the kick-off of the 2012 Cattle Industry Convention Feb. 1-4.

USMARC researchers Elaine Berry, Terry Arthur and Jim Bono shared highlights of their research efforts with producers. The trio is part of a team of 10 scientists focused on food safety at USMARC. In addition to focusing on *E. coli* O157:H7, these individuals also shared that emerging research is being done to help better identify and understand the six strains of non-O157 Shiga toxin-producing *E. coli* that were proposed for regulation last fall.

In her remarks, Berry emphasized that reduction of pathogen transmission from manure and hide is critical to protect the food and water supply, and to minimize transmission to other animals in the production environment.

Present research that Berry is focused on is examining the prevalence of *E. coli* O157:H7 among animals fed a high percentage (40%) of distillers' wet grains (DWG). Berry explained that they've found that *E. coli* appears to persist longer in the manure of animals fed a high-DWG diet. She explained that because the ethanol production process removes starch from corn, the resulting manure has a lower pH, which is more hospitable to *E. coli*.

A study was conducted where cattle were fed 0% DWG and 40% DWG. Berry reported that high levels of DWG



Safety

(40%) in finishing diets did increase *E. coli* O157:H7 prevalence and the percentage of animals with enumerable high levels in feces and on hides.

Berry said this presents a new question: Can DWG be fed in diets initially, but removed from the diet prior to harvest to reduce the *E. coli* prevalence?

A second study to examine *E. coli* levels in DWG-fed cattle has been conducted. Cattle were fed varying levels of DWG (0%, 40% and 70%) during the finishing phase, and then at 56 days were shifted to diets with lower levels of DWG (0%, 15% and 40%).

Berry reported that the cumulative prevalence and percent enumerable for *E. coli* O157:H7 in feces was:

- highest for animals maintained on 40% DWG,
- lowest for animals maintained on 0%, and
- intermediate for animals shifted to lower DWG.

Similar results were found for the prevalence of *E. coli* on hides.

Berry and her colleagues concluded that reductions in DWG in the diet did not result in much reduction for *E. coli* O157:H7 in feces by Day 28, but did by Day 56. For hides, reductions in DWG in the diet resulted in reduction of *E. coli* O157:H7 prevalence by Day 28, and most treatments were still lower by Day 56. Thus, she said, some management changes could be implemented at the feeding phase to reduce *E. coli* risks.

Specifically, she said, "Reductions for *E. coli* O157:H7 in feces took 56 days and on hides took 28 days, so a period of 56 days for feeding the lower levels of DWG (15%) may be an acceptable strategy to reduce *E. coli* O157:H7 before harvest."

Berry also reported briefly on research work at USMARC using soil solarization of the feedlot pen surface to reduce all forms of *E. coli* populations.

While more research is needed, she said the initial results show that it can be an effective tool, as well.

Terry Arthur provided an overview on research being done during the postharvest phase. He noted that cattle hide is the major source of *E. coli* carcass contamination going into the processing plant — and a recent study he was involved with found that the cattle were primarily

being contaminated with *E. coli* in the facilities at the processing plant.

Arthur reported that if those carcasses went through a hide-washing cabinet prior to entering the plant, *E. coli* O157:H7 prevalence on the hide was about 4%. If the hides were not washed, the prevalence was about 38%. Thus, he emphasized for the industry that hide wash cabinets at plants could be a good intervention tool.

Jim Bono shared his work using genomic approaches for controlling foodborne pathogens. Bono is working to identify markers and sequence the genome for non-O157:H7 *E. coli*. While those solutions are still in development, once identified, they will be an asset in the efforts to reduce *E. coli* risks in the food chain.



AMERICAN ANGUS ASSOCIATION
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USMARC researchers (from left) Jim Bono, Elaine Berry and Terry Arthur shared highlights of their research efforts with producers during Wednesday's Cattlemen's College.