

# DFMs may help reduce fecal *E. coli* shedding

**R**ESearchers at North Dakota State University (NDSU) recently examined the role of some direct-fed microbial (DFM) products as pre-harvest interventions for controlling *Escherichia coli* O157:H7 and salmonella in feedlot cattle.

Ebot S. Tabe of The Great Plains Institute of Food Safety; James Oloya, Dawn K. Doetkott, Penelope S. Gibbs and Margaret L. Khaita of the NDSU department of veterinary and microbiological sciences and Marc L. Bauer of the NDSU department of animal sciences reported the results of a clinical trial in the *Journal of Food Protection* (volume 71, number 3).

Following standard laboratory methods, fecal samples collected from 138 feedlot steers were evaluated for changes in the detectable levels of *E. coli* O157:H7 and salmonella shed in feces after DFM treatment. Sampling of steers was carried out every three weeks for 84 days.

Khaita and Bauer told *Feedstuffs* the steers were divided into three blocks, with the initial mean bodyweight as the blocking factor. The three blocks each comprised eight pens, with six steers per pen.

The allocation of treatments to pens was done randomly. Treatment 1 comprised steers fed DFM, and treatment 2 comprised steers that did not receive DFM (controls) throughout the finishing period. Within each block, two treatments were assigned randomly to eight blocks, making a total of 12 pens per treatment. In general, half of the pens in each block were placed on DFM-supplemented feed, whereas the other half was maintained on DFM-free feed only.

For a DFM, the researchers used *Lactobacillus acidophilus* strain BT1386. All other dietary parameters were the same for all cattle, and finishing diets did include monensin and tylosin.

Khaita and Bauer explained that they found a significant reduction (32%) in fecal shedding of *E. coli* O157:H7 ( $P < 0.001$ ), but not salmonella ( $P = 0.24$ ), among the treatment steers compared with the control group. The probability of recovery of *E. coli* O157:H7 from the feces of treated and control steers was 34% and 66%, respectively, they pointed out.

Steers placed on DFM supplement were

## Research

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almost three times less likely to shed *E. coli* O157:H7 (odds ratio of 0.36; 95% confidence interval of 0.25-0.53;  $P < 0.001$ ) in their feces as opposed to their control counterparts, the researchers explained.

While the probability of salmonella recovery from the feces of the control (14.0%) and the treated (11.3%) steers was similar, feeding the DFM significantly reduced the probability of new infections with salmonella among DFM-treated cattle compared with controls, Khaita and Bauer said.

They concluded that DFMs, as applied in their study, are capable of significantly reducing fecal shedding of *E. coli* O157:H7 in naturally infected cattle, but not salmonella. However, they added, once infected, DFM did not improve the probability of recovery from *E. coli* O157:H7.

The factors responsible for the observed difference in the effects of DFM on *E. coli* O157:H7 and salmonella warrant further investigation, they said.

## Natural/organic switch

When Kansas State University graduate student Ben Wileman was a practicing veterinarian in Belle Fourche, S.D., natural and organic labels were a big focus for the beef producers he saw.

"They tended to be terms that were thrown around a lot, but few people really seemed to know what they truly meant," Wileman said.

"Organic" is defined by the U.S. Department of Agriculture. "Natural," however, can be defined differently depending on who's doing the labeling.

Both terms mean one thing: higher costs for producers.

That's why Wileman hopes his research will be another tool to help those in the beef industry who are pondering whether to abandon conventional methods and go natural or organic.

Wileman, a doctoral student in

diagnostic medicine and pathobiology at Kansas State, is examining the economics and logistics of conventionally raised beef versus organic and naturally raised beef. He is working with Dr. Dan Thomson, associate professor of clinical sciences at Kansas State.

The research was presented in February at the Western Veterinary Conference in Las Vegas, Nev., and will be presented again in July at the American Veterinary Medicine Assn. conference in New Orleans, La.

"The reason we're looking at this is because before anyone decides to go all natural or all organic, they need to be aware of what it's going to cost them and cost consumers," Wileman said. "We want producers to be knowledgeable about what to expect in terms of performance and economics."

Although the scientific facets of organic foods have been probed, Wileman said little research has been done on the economic impact. Using data from USDA, the researchers considered feed costs and availability, the number of organic grain producers, the supply and demand for such grains going to beef cattle and the effects on performance.

They found that a producer would have to make about \$120 more per head on naturally finished cattle to make the same profit as they would on conventionally finished ones. For organically finished cattle, that increases to about \$400 more per head.

The greatest contributing factor to the cost of going natural or organic is feed prices, Wileman said. In areas where there are relatively few certified organic grain producers, transporting and certifying grain adds a major expense.

What's more, Wileman said, is that research done at Kansas State shows that beef producers are competing for a mere 2% of consumer income.

He said another thing to keep in mind is research showing that most growth in organic and natural food items has come from the same shoppers buying more products, not from an increase in the numbers of like-minded consumers.

With this in mind, Wileman said there are a few things the beef industry should consider when contemplating going organic or natural.

Producers need to be aware that they won't be able to feed their cattle in the same way and may consider forming cooperatives to meet their needs.

Likewise, feedlots must be mindful of feed handling to prevent mixing organic grains with conventionally grown grains.

Finally, packagers and restaurants need to know that they will have to absorb the increased costs of going natural or organic — or be prepared to pass those costs on to their consumers.

The Kansas State researchers don't want to dissuade producers and others

in the beef industry from going natural or organic, but they do want to offer information that can help in making that decision.

"There's not a problem with going natural or organic, but there will be production and economic issues that (producers) will need to compensate for," Wileman said. "We want to be able to show what the implications of going organic or natural are before a producer or corporation makes that decision."

Because much of the scientific research on organic foods has centered on fruits

and vegetables, Wileman said there is plenty of room to study the performance aspects of organic and natural beef production.

For instance, he said some research already has shown that natural diets can increase the prevalence of liver abscesses in cattle. Little is known about how these diets might affect other diseases like foot rot, he said.

"There are a lot more questions that need to be answered," he said.