

DIRECT-FED Microbials and Pre-Harvest Risk Reduction of *E. COLI* O157

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Excessive *E. coli* O157 loads carried by incoming cattle may overwhelm abattoir intervention strategies and result in contamination of consumer-ready products. A priority for the beef industry, therefore, is to develop targeted and efficaciously pre-harvest intervention strategies that substantially decrease prevalence and numbers of *E. coli* O157 carried by cattle. One possible avenue is the use of beneficial bacteria inhibitory to *E. coli* O157. Extensive *in vitro* evaluation of lactic acid bacteria identified two candidate strains (NP51 and NP35) for use as a direct-fed microbial (DFM). These bacteria reduced both duration (3.5 versus 60 days) of shedding and concentration (5.1×10^5 versus 3.2×10^8 cfu/g) in an *in vivo* challenge model. Commercial feedlot steers housed in five-head pens and fed NP51 were 49% less likely to shed the organism than controls (OR=0.51; CI=0.3 to 0.8; $P<0.01$). The magnitude of effect of feeding NP35 was not as great as that for NP51. *E. coli* O157 was isolated at least once from 45.0, 60.0, and 65.0% of animals receiving NP51, NP35, or control diet, respectively. Cattle receiving NP51 and NP35 had fewer culture-positive hides than controls (0 and 1.66% versus 13.3%, respectively; $P<0.05$). In a follow-up study, steers fed NP51 had fewer culture-positive fecal samples (13.3 versus 27.6%, respectively; OR= 0.4; CI 0.2 to 1.0; $P=0.05$) and hides (5.0 versus 13.8%, respectively; OR=0.33; CI 0.1 to 1.5; $P=0.10$) on the day of harvest compared with controls. The use of these products did not result in any detectable detrimental effects on animal performance or carcass attributes. There were trends, however, for improved efficiency of production. Based on these results and those of others, specific strains of lactic acid bacteria can be used to reduce carriage of *E. coli* O157 in cattle. The use of these strains may ultimately decrease contamination of edible beef products with *E. coli* O157 resulting in fewer human illnesses. As an added benefit, dissemination of *E. coli* O157 into the environment will be reduced.