

An Investigation in to the Fecal Shedding of *E. Coli* O157:H7 from Steers on Rations Containing Corn Co-Products

A.S. Leaflet R2378

Kris Clothier, D.V.M., adjunct instructor,
Department of Veterinary Diagnostic and
Production Animal Medicine
Iowa State University College of Veterinary Medicine

Summary and Implications

Fecal shedding of *E. coli* O157:H7 was investigated in 140 feeder steers in a corn condensed distiller's soluble (CCDS) feeding trial at a university field station. Steers were fed diets for differing time periods in pasture and feedlot pen conditions. Individual-animal and composite fecal samples were cultured for *E. coli* O157:H7 using immunomagnetic bead concentration. None of the fecal samples from steers housed in pens were positive. One of the fecal samples collected from the pastured animals was positive. Inclusion of CCDS in steer diets did not result in higher fecal shedding of *E. coli* O157:H7 in animals being fed diets containing CCDS over those that were not.

Introduction

Corn co-products have become an important feed ingredient in livestock diets in the Midwest. Many feeding operations are including distillers' grains into cattle rations due to their high protein and fat content, high digestibility, and availability from an increasing number of ethanol plants. Recently, several studies have found that the addition of dried distillers' grains (DDG's) results in increasing levels of fecal *E. coli* O157:H7 shedding. Due to their close proximity to ethanol plants livestock producers in Iowa have access to many other corn co-products, particularly those with higher moisture contents such as CCDS. The objective of this study was to compare the prevalence of fecal *E. coli* O157:H7 in cattle groups that are being fed CCDS as part of their diets to those that are not, and to determine if collection of rectal fecal samples for *E. coli* O157:H7 analysis was more effective at detecting this bacteria than collection of composite samples from pen floors.

Materials and Methods

One hundred and forty black English crossbred feeder steers were randomly assigned to one of five feeding and housing groups at the ISU Western Iowa Research and Demonstration Farm at Castana. Steers were fed out for a total of eight to ten months (end date was based on body

weight of the animals) and treatment groups were 1) housed in feedlot pens for the entire feeding period and fed a hay/corn diet, 2) housed in feedlot pens for the entire feeding period and fed a hay/corn/CCDS diet, 3) pastured for 5 months then moved to feedlot pens until harvest and fed a hay/corn diet, 4) pastured for 5 months then moved to feedlot pens until harvest and fed a hay/corn/CCDS diet, and 5) pastured for the entire feeding period and fed a CCDS supplement. Fecal samples were collected rectally from steers at pre-harvest processing. Five samples from each pen (20/treatment group) were randomly selected and submitted for *E. coli* O157:H7 culture. In addition, samples were pooled for a pen-pool sample and results were compared to a compilation of freshly-voided feces from the pen floor called the grab-sample. Pool- and grab-samples were also submitted for culture.

Cultures were performed by incubating fecal samples in specialized media overnight, concentrating media aliquots with immunomagnetic beads specific for *E. coli* O157:H7, plating concentrated samples onto selective agar, and confirming identification with agglutination testing.

Results and Discussion

Culture results are reported in Table 1. None of the samples from the steers housed in feedlot pens were positive for *E. coli* O157:H7. Pen composite samples from these animals were also negative. One fecal sample from the animals housed on pasture was positive for *E. coli* O157:H7.

Due to the study design, no pasture-fed animals that were not consuming CCDS were tested, however, the feedlot-fed groups showed no increased incidence of fecal *E. coli* O157:H7 in animals in CCDS feed groups over those not in CCDS feed groups. Increased shedding of *E. coli* O157:H7 in late summer/early fall over shedding in other times of the year has been well-documented. Since this study was conducted in winter/early spring, further work should be conducted to determine if this lack of association is maintained under different environmental temperatures.

Acknowledgments

We gratefully acknowledge the work of staff at the ISU Western Iowa Research and Demonstration Farm at Castana, Dr. Pete Hoffman of the Iowa State University Department of Animal Science, and the Iowa Beef Center for help with this project.

Iowa State University Animal Industry Report 2009

Table 1. Results of *E. coli* O157:H7 fecal cultures on steers in CCDS feeding study.

Feeding Group	Positive Cultures
Pasture/Feedlot-No CCDS	0/20
Pasture/Feedlot-fed CCDS	0/20
Feedlot-No CCDS	0/20
Feedlot-fed CCDS	0/20
Pasture-fed CCDS	1/20
<u>Pooling Group</u>	
Pen-pool Samples	0/12
Grab-pool Samples	0/12