Effects of dietary fiber and distillers grains on enterohemorrhagic *Escherichia coli* hide contamination prior to slaughter in feedlot steers

L.G. Schneider, *BS*[1]; **G.E. Erickson**, *MS, PhD*[2]; **R.A. Moxley**, *DVM, PhD*[3]; **D.R. Smith**, *DVM, PhD, DACVPM*[1]

[1]*College of Veterinary Medicine, Mississippi State University, Mississippi State, MS 39762*
[2]*Department of Animal Science, University of Nebraska-Lincoln, Lincoln, NE 68583*
[3]*School of Veterinary Medicine and Biomedical Sciences, University of Nebraska-Lincoln, Lincoln, NE 68583*

Introduction

Hides of cattle at slaughter serve as an important source for carcass contamination by enterohemorrhagic *Escherichia coli* (EHEC). The objective of this study was to determine whether the presence of distillers grains (DGS) or the level of neutral detergent fiber (NDF) affects hide contamination by EHEC prior to slaughter in feedlot steers.

Materials and Methods

The study was a 2 x 2 plus 1 factorial design with 2 levels of dietary DGS, 2 levels of dietary fiber, and a control corn diet. Eight hundred steers were stratified by body weight and assigned randomly to pens. There were 100 feedlot pens consisting of 8 steers per pen fed over the summer of 2015. Pens were started on feed in 4 blocks, separated by 1 week. Within a block, 25 feedlot pens at the University of Nebraska-Lincoln Agricultural Research and Development Center (ARDC) feedlot were assigned to each of the following diets: (1) 20% DGS as % of diet dry matter (DM) (2) 40% DGS diet, (3) corn fiber isolate added to match 20% diet, (4) corn fiber isolate to match 40% diet, and (5) control corn diet. Hide samples were collected at load out from the feedlot, 1 day before slaughter. Using a pre-moistened, sterile sponge, a 1,000 cm^2 area over the loin was swabbed. EHEC-7 testing was performed by the NeoSEEK™ STEC Detection and Identification test, a PCR/mass spectrometry-based analytical method (Neogen® Corp., Lansing, MI). To measure the effects of WDGS and dietary fiber level on hide contamination by EHEC-7, multilevel multivariable logistic regression in a generalized linear mixed model in PROC GLIMMIX SAS for Windows 9.4 (SAS Institute, Inc., Cary, NC) was utilized. Presence or absence of DGS was a binary measure. Random effects of pen within block and block were included in the model. Each EHEC serogroup of interest was modeled separately. In the interpretation of results, *P*-values ≤0.05 were considered significant.

Results

Hide samples were analyzed for blocks 2, 3, and 4 due to sampling error in block 1, for a total of 589 samples. EHEC O26 was found in 7 (1%) and EHEC O121 was found in 4 (0.7%) hide samples, which were all from block 4. EHEC O145 was not detected in any hide samples. EHEC O111 was found in 40 (7%) hide samples, but there were no significant explanatory factors associated with its detection. Similarly, EHEC O157 was detected in 14 (2%) hide samples, but there were no factors significantly associated with its detection. EHEC O45 was detected in 49 (8%) hide samples, and O103 was detected in 14 samples (2%). EHEC O45 and EHEC O103 were similarly affected by DGS, where feeding DGS decreased odds for finding O45 or O103 on the hides, (OR=0.3, *P*=0.02; OR=0.1, *P*=0.03), respectively.

Significance

Overall hide contamination prevalence was low at the time of loadout from the feedyard. EHEC O45 and EHEC O103 were less likely to be found on hides of steers fed DGS.