

Alternative feed additive strategies to reduce antimicrobial use in finishing cattle

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Introduction

With the onset of the Veterinary Feed Directive, there is a need to evaluate the current strategies used for the control of liver abscesses as well as coccidia species (*Eimeria bovis* & *Eimeria zuernii*) in the feedlot cattle. Additionally, removing coccidiostats and other antimicrobials from the feed will decrease costs of beef production. A study conducted in the summer of 2018 (unpublished) showed no difference in the prevalence of liver abscesses at slaughter nor *Eimeria* spp in feedlot cattle. The primary objectives of this study are to evaluate the effects of different feeding strategies on the prevalence of liver abscesses and coccidia in feedlot cattle. Secondary objectives of this study are to evaluate the effects of antimicrobials on average daily gain and feed conversion in feedlot cattle.

Materials and Methods

Crossbred steers (n= 4,849, average weight 1300 ± 43.3 lb; 589 ± 19.5 kg) were placed in 52 pens (13 replicates) and used in a randomized incomplete block design throughout the summer and fall of 2019. All cattle had been on feed for a minimum of 60 days prior to study initiation. Before the trial start, all cattle received the same diet containing monensin at 15g/ton and tylosin at 75 mg/hd/day. At time of reimplant, cattle were randomly sorted from two 200-hd pens into four 100-hd pens (1 replicate), and randomly assigned to treatment. Pens of cattle were all fed the same base finishing diet and randomly allocated to 1 of 4 treatments fed during the last 60 days on feed:

1. Positive control - 75mg/hd/day tylosin (Tylan; Elanco Animal Health, Greenfield, IN) with 15 g/ton monensin (Rumensin; Elanco Animal Health, Greenfield, IN)
2. Negative control - no monensin, no tylosin
3. Decoquinate - (Deccox; Zoetis, Parsippany, NJ) 275mg/hd/day, no tylosin
4. Yucca schidigera extract (Micro-Aid; DPI Global, Porterville, CA) 3g/hd/day, no tylosin

After the 60-day feeding period, cattle were shipped to an abattoir. Twenty freshly voided, pen floor fecal samples were taken the week of cattle going to slaughter and analyzed

for total starch digestibility and qualitative fecal floats to assess presence of *Eimeria* spp via the modified Wisconsin technique. Diet samples were taken periodically from the bunk to measure inclusion rate of test products. Liver abscess scores and carcass data were collected on individual animals at the abattoir. Performance data was obtained from feedlot closeouts and were evaluated for dry matter intake, average daily gain, and feed conversion. Preliminary statistical analysis was performed using SAS 9.4 (SAS Inst. Inc., Cary, NC). Continuous variables were analyzed using PROC Glimmix with a fixed effect of treatment and random effects of treatment and block. Fischer's exact test was used to analyze qualitative data via the PROC FREQ function.

Results

Preliminary analysis showed no significant difference between any treatment groups in the total prevalence of liver abscesses at slaughter (P=0.75). The negative control (no monensin, no tylosin) had the highest prevalence of A+ abscesses (23%, P=0.01) compared to the positive control (monensin + tylosin) (16.2%, P=0.01). The highest prevalence of *Eimeria* spp positive samples was in the decoquinate treatment group (0.05%), but there was no significant difference between treatment groups in the prevalence of *Eimeria* spp (P=0.80). The highest average dry matter intake and average daily gain was seen in the yucca extract group (26.8, 3.36, respectively) and lowest for the monensin + tylosin group (26.2, 3.16, respectively). However, comparisons of least squares means showed no significant difference between treatment groups for dry matter intake (P=0.13-0.95), average daily gain (P = 0.67-0.96), or feed conversion (P =0.19-0.95).

Significance

The results of this study suggest that antimicrobial, or other feed additive products may not be needed during the last 60 days of the feeding period to control liver abscesses, *Eimeria* spp, intake regulation, average daily gain, or feed conversion in feedlot cattle.