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The Effect of Tylosin Supplementation and Tylosin Alternatives on Liver Abscess Prevalence, Beef Trim Microbial Populations, and Carcass Characteristics from Feedlot Cattle

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Objectives

Tylosin phosphate is a macrolide commonly used for the reduction and prevention of liver abscesses in feedlot cattle. As pressures to reduce antimicrobial use in livestock production rise, pressures to remove Tylosin from cattle feeding strategies continue to increase. This potential removal of Tylosin from cattle feeding could result in significant economic and food safety impacts on the beef industry. In light of this, a blinded, randomized, controlled field trial was conducted to evaluate the effect of Tylosin alternatives on beef trim microbial populations and carcass characteristics from feedlot cattle.

Materials and Methods

Commercial steers and heifers ($n = 5481$ hd) were assigned to ten 4-pen blocks ($n = 40$ pens) at a commercial feedyard in Texas in the Spring of 2016. At placement, cattle were randomly assigned to 1 of 4 treatment groups including or excluding Tylosin. At the conclusion of the feeding period (Fall 2016), cattle were harvested at a commercial processing facility in Texas. At harvest, but prior to application of interventions, carcass swabs ($n = 15$ /pen) were taken from the plate, and livers abscess scores were recorded at evisceration. Individual carcasses were subjected to USDA yield and quality grading prior to fabrication. At fabrication, approximately 5kg of trim was collected from each pen directly from the trim belt at 3 points on the fabrication floor for a total of approximately 15kg. Trim was retrieved from the chuck, the loin, and the round of carcasses that graded USDA Choice. Trim samples were subjected to detec-

tion of generic *E.coli* and *Salmonella enterica* following the USDA Microbiology Laboratory Guidebook (MLG) guidelines. In addition, trim and carcass swab samples were analyzed using 16S rRNA gene sequencing to characterize their microbial communities.

Results

Cattle supplemented with Tylosin (Tyl) were 1.49 times less likely ($P < 0.0001$) to develop a liver abscess than cattle not supplemented with Tylosin (NTyl). Hot carcass weights (HCW), dressing percentage, ribeye area, and backfat thickness, did not differ among Tyl and NTyl treatment groups ($P > 0.05$). However, the percentage of cattle grading USDA Choice was greater for the Tyl group than the percentage grading choice from the NTyl feeding group ($P = 0.034$). *Salmonella enterica* was isolated from the trim collected from 10 pens. However, 8 of these 10 trim samples were collected during 1 sampling day (i.e., 2 blocks).

Conclusion

Although previous data and results from the current study highlight the utility of Tylosin inclusion on the reduction of liver abscesses, investigating alternatives is a necessity as pressure to remove antimicrobial compounds from livestock production increases. As alternatives are investigated, understanding their influence on the microbial ecology of trim will not only aid in improving their efficacy, but also assuring the safety of the beef food chain. This understanding will be imperative for the future implementation of strategies aimed to mitigate liver abscesses and maintain the safety and economical production of beef.