BEEF CATTLE RESEARCH UPDATE

Britt Hicks, Ph.D., PAS
Area Extension Livestock Specialist
Oklahoma Panhandle Research & Extension Center

May 2017

Effects of Intermittent Feeding of Tylan on Feedlot Performance, Carcass Characteristics, and Incidence of Liver Abscesses in Steers

Liver abscesses in feedlot cattle are a cause of decreased performance and reduced carcass value. Loss in carcass value is due to not only to the abscessed liver being condemned, but also due to trim loss associated with the condemned liver. According to the most recent National Beef Quality Audit Report (2011), 20.9% of livers were condemned at slaughter, and liver abscesses accounted for approximately two-thirds of liver condemnations.[1] Tylosin phosphate (Tylan, Elanco Animal Health) is commonly fed to feedlot cattle to decrease the incidence of liver abscesses. As of January 2017, the use of Tylan requires a veterinary feed directive (VFD). The objective of the VFD program is to decrease the use of medically important antibiotics in animal production. Kansa State University research evaluated intermittent feeding of Tylan as a strategy to decrease antibiotic usage without adversely affecting cattle or incidence and severity of liver abscesses.[2,3]

In this study, 312 crossbred steers (908 lb) were randomly assigned to the following three treatments (8 pens per treatment): 1) No Tylan, 2) Tylan fed continuously, and 3) Tylan fed on an intermittent basis. In the intermittent treatment, steers were fed Tylan during the step-up period (21 days) and thereafter received Tylan for 1 week after a 2-week period without Tylan. This 1-week on, 2-week off pattern was repeated until the end of the feeding period. This feeding strategy also allowed for a 2-week withdrawal period of Tylan prior to the harvest date. Finishing diets contained 57.7% steam-flaked corn, 30% wet corn gluten feed, 8% corn silage, and 2.3% supplement and supplied 30 g/ton monensin and either 0 or 9 g/ton Tylan (all on a dry matter basis). The steers were harvested after 119 days on feed. Feces were collected from 8 randomly selected animals in each pen on days 0, 20 and 118 to assess the impact of treatment on the amount of antimicrobial resistant *enterococci* bacteria.

The effects of Tylan feeding strategy on feedlot performance and carcass characteristics are shown in Table 1. These researchers reported that that feedlot performance did not differ between treatments ($P \geq 0.207$; final body weight, average daily gain, dry matter intake, and feed efficiency). Similarly, there were no differences ($P \geq 0.257$) between the treatments with respect to hot carcass weight, dressed yield, ribeye area, backfat thickness, or quality and yield grades. However, the incidence of total liver abscesses ($P = 0.012$) was greater for the negative control treatment (no Tylan) when compared to the continuous, and intermittent Tylan treatments (21.4, 7.8, 9.6%, respectively). They also reported that *enterococcus* spp. bacterial counts did not differ by treatment group over time ($P > 0.05$). However, there was a strong period effect for antimicrobial resistance among all groups ($P < 0.01$; resistance increased dramatically from day 0 to day 118).

These authors concluded that intermittent feeding of Tylan decreases overall use of antibiotics in feedlot cattle without compromising cattle performance and incidence of liver abscesses. The use of Tylan was reduced by 60% in the intermittent treatment. These data also suggest that the development of antimicrobial resistance is not necessarily driven by exposure to antibiotics included in the diet, as resistance increased in all treatments. They concluded that resistance is more likely acquired through exposure to resistance elements that have accumulated within the feeding environment over an extended period of time. However, accumulation within the feedlot environment may result from chronic antibiotic use at a location.

Table 1. Effect of Tylan feeding strategy on feedlot performance and carcass characteristics.

Item	No Tylan	Continuous Tylan	Intermittent Tylan	P-value
Feedlot Performance:				
Initial body weight, lb	904	908	908	0.401
Final body weight, lb	1383	1397	1379	0.229
Average daily gain, lb	4.04	4.12	3.97	0.207
Dry matter intake, lb/day	23.99	24.69	23.92	0.278
Feed:Gain	5.32	5.38	5.38	0.752
Carcass Characteristics:				
Hot carcass weight, lb	837	844	837	0.512
Dressed yield, %	60.5	60.3	60.7	0.257
Backfat thickness, in.	0.49	0.50	0.49	0.860
Ribeye area, sq. in.	13.75	13.84	13.81	0.921
USDA Choice + Prime, %	76.0	73.4	78.7	0.671
USDA Yield Grade	2.56	2.60	2.54	0.847
Total liver abscesses, %	21.4	7.8	9.6	0.012

Adapted from Muller et al., 2017

[1] McKeith, R. O., G. D. Gray, D. S. Hale, C. R. Kerth, D. B. Griffin, J. W. Savell, C. R. Raines, K. E. Belk, D. R. Woerner, J. D. Tatum, J. L. Igo, D. L. VanOverbeke, G. G. Mafi, T. E. Lawrence, R. J. Delmore, L. M. Christensen, S. D. Shackelford, D. A. King, T. L. Wheeler, L. R. Meadows, and M. E. O'Connor. 2012. National Beef Quality Audit-2011: Harvest-floor assessments of targeted characteristics that affect quality and value of cattle, carcasses, and byproducts. J. Anim. Sci. 90: 5135-5142.

[2] Muller, H. C., C. L. V. Bibber-Krueger, O. J. Ogunrinu, R. G. Amachawadi, H. M. Scott, and J. S. Drouillard. 2017. Effects of intermittent feeding of tylosin phosphate on feedlot performance, carcass characteristics, antimicrobial resistance and incidence of liver abscesses in steers. In: 2017 Plains Nutrition Council Spring Conference, San Antonio, TX. p. 98-99 (Abstr.).

[3] Muller, H. C,; R.G. Amachawad, H.M. Scott, and J.S. Drouillard. 2017. Intermittent feeding of tylan reduces use of in-feed antibiotics while still controlling incidence of liver abscesses in finishing steers. Kansas Agricultural Experiment Station Research Reports Cattlemen's Day Beef Cattle Research Vol. 3: Iss. 1: 20-28. Available: https://dx.doi.org/10.4148/2378-5977.1340.