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Effects of Next Enhance[®] Concentrations in Finishing Diets on Performance and Carcass Characteristics of Yearling Feedlot Cattle

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Summary

A feedlot study evaluated the effects of NEXT ENHANCE[®] 300 (NEXT) essential oil concentration in finishing diets containing Rumensin[®] and Tylan[®] on yearling steer performance and carcass characteristics. Treatments consisted of 0, 15, 30, or 45 gram per ton of NEXT. Increasing NEXT concentration in the diet had no effect on DMI, ADG, or F:G. These data suggest that feeding increasing concentrations of NEXT had little impact on feedlot performance of large yearling steers.

Introduction

Feed additives, such as Rumensin and Tylan, are commonly fed in feedlot diets today to improve feed conversions. Previous research has shown that natural plant extracts have exhibited similar antimicrobial activity as antimicrobial feed additives (*Clinical Microbiology Reviews*, 12:564-582). Providing these products in combination with ionophores may produce a synergistic effect that enhances animal performance. NEXT ENHANCE[®] is a natural plant extract composed of garlic oil and cinnamaldehyde. Previous research utilizing calf-fed steers suggests that feeding NEXT at 225 and 300 mg per steer daily improves feed conversions by 4.0 and 3.8%, respectively, compared to steers fed 0 NEXT (2014 Nebraska Beef Cattle Report, pp. 90-91). Improvements in feed conversions in this study were due to the reductions in DMI

that were observed when NEXT was included in the finishing diet. Greater improvements in animal performance may be observed when large yearling steers are utilized; however, no data exist. Therefore, the objective of this experiment was to evaluate the effects of NEXT essential oil concentration in finishing diets with Rumensin and Tylan on yearling steer performance and carcass characteristics.

Procedure

Crossbred yearling steers (n = 288; BW = 983 ± 51 lb) were utilized in a randomized block design experiment at the University of Nebraska–Lincoln Panhandle Research and Extension Center feedlot near Scottsbluff, Neb. Upon arrival to the feedlot, yearling steers were vaccinated with Express[®] 5, poured with Ivomec[®], and given a visual identification tag. Prior to initiation of trial, steers were limit-fed a 40% corn silage, 30% wet distillers grains plus solubles (WDGS), and 30% wheat straw (DM basis) diet at 2% BW for five days to minimize variation in gut fill. Steers were weighed two consecutive days (day 0 and 1) to establish initial BW. Steers were blocked by day 0 BW, stratified by BW within blocks (light, medium, heavy), and assigned randomly to 36 pens. Pens were assigned randomly to one of four treatments with nine replications (i.e., pen) per treatment and eight steers per pen. Light, medium, and heavy blocks consisted of three, four, and two replications, respectively.

A common basal diet was used for all four treatments (Table 1) consisting of 54% DRC, 25% WDGS, 15% corn silage, and 6% supplement (DM basis). Only one basal supplement was used and feed additives were included via micro-machine. Treatments

Table 1. Composition of dietary treatments.

Ingredient	% of diet DM
DRC ¹	54
WDGS ¹	25
Corn silage	15
Supplement	6
Nutrient Composition, %	
CP	13.4
Ca	0.61
P	0.39
K	0.95
Ether extract	3.84
NDF	18.0
Starch	45.0

¹DRC = dry-rolled corn; WDGS = wet distillers grains plus solubles.

consisted of feeding NEXT at concentrations of 0, 15, 30, and 45 g/ton of diet DM. The liquid supplement contained vitamins and minerals to meet animal requirements. Rumensin and Tylan were provided in all treatments via micro-machine at 360 and 90 mg per steer daily, respectively.

Steers were implanted on day 0 with Revalor[®]-XS. Steers in the medium and heavy blocks were fed for 98 days, while steers in the light block were fed for 118 days. On day of shipping, cattle were weighed and transported to a commercial abattoir (Cargill Meat Solutions, Fort Morgan, Colo.). Hot carcass weight and liver scores were recorded on day of harvest. After a 48 hour chill, LM area, marbling score, and 12th rib fat thickness were recorded. Yield grade was calculated from the following formula: 2.5 + (2.5 x 12th rib fat) – (0.32 x LM area) + (0.2 x 2.5 [KPH]) + (0.0038 x HCW). Final BW, ADG, and F:G were calculated from HCW adjusted to a common dressing percentage (63%).

Performance and carcass characteristics were analyzed using the MIXED procedure of SAS (SAS

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Institute, Inc., Cary, N.C.). Pen was the experimental unit and block was treated as a fixed effect. Orthogonal contrasts were constructed to determine the response curve (linear, quadratic, and cubic) for NEXT concentration in the diet. Occurrences of liver abscesses were analyzed using the GLIMMIX procedure of SAS.

Results

Increasing NEXT concentration in the diet did not affect DMI ($P > 0.59$; linear or quadratic; Table 2) with intakes of 31.4, 31.4, 31.1, and 31.5 lb for 0, 15, 30, and 45 g/ton NEXT, respectively. Using the observed intakes, the calculated rate of NEXT provided was 0, 236, 467, and 709 mg per steer daily for treatments 0, 15, 30, and 45 g/ton NEXT, respectively. For comparison (2014 Nebraska Beef Cattle Report, pp. 90-91), NEXT feeding rates were 0, 75, 150, 225, and 300 mg per steer daily along with Rumensin and Tylan being provided in all treatments at 360 and 90 mg per steer daily. Steers fed NEXT at 225 and 300 resulted in a 4.2% and 2.9% reduction in DMI compared to cattle fed 0 NEXT. In the current study, as NEXT concentration increased, no differences ($P > 0.71$; linear or quadratic) in ADG or F:G were observed. These findings are in contrast to previous research, which utilized calf-fed steers, where improvements in feed conversions were observed when feeding increasing rates of NEXT (2014 Nebraska Beef Cattle Report, pp. 90-91). Feeding increasing concentrations of NEXT had

Table 2. Effects of NEXT ENHANCE concentrations in finishing diets on steer performance.

Item	NEXT ENHANCE, g/ton				SEM	P-value	
	0	15	30	45		Lin. ¹	Quad. ²
Performance							
Initial BW, lb	989	989	990	990	1	0.53	0.64
Final BW, lb ³	1440	1447	1440	1446	8	0.76	0.99
DMI, lb/day	31.4	31.4	31.1	31.5	0.3	0.96	0.60
ADG, lb ³	4.31	4.36	4.29	4.34	0.07	0.99	0.98
Feed:Gain ⁴	7.25	7.19	7.25	7.25	—	0.96	0.72
Carcass Characteristics							
HCW, lb	907	911	907	911	5	0.76	1.00
Marbling ⁵	484	494	490	510	9	0.06	0.60
LM area, in ²	12.7	12.5	12.3	12.6	0.1	0.57	0.06
12 th rib fat, in	0.51	0.53	0.52	0.53	0.01	0.31	0.76
Calculated YG	3.7	3.8	3.8	3.7	0.06	0.31	0.22
Liver Abscess,%	1.4	6.9	9.7	4.2	—	0.29	0.05

¹Lin. = P-value for the linear response to NEXT ENHANCE concentration.

²Quad. = P-value for the quadratic response to NEXT ENHANCE concentration.

³Calculated from carcass weight, adjusted to 63% common dressing percent.

⁴Analyzed as G:F, the reciprocal of F:G.

⁵Marbling Score: 400 = Small, 500 = Modest, etc.

no effect ($P > 0.75$; linear or quadratic) on final BW. Hot carcass weight, 12th rib fat depth, and calculated yield grade were not affected ($P > 0.21$; linear or quadratic) by NEXT concentration. Marbling score tended ($P = 0.06$) to increase linearly as concentration of NEXT increased. As NEXT concentration increased, LM area tended ($P = 0.06$) to decrease quadratically. Yearling steers fed 0 or 45 NEXT had the greatest LM area, while feeding 30 NEXT produced the smallest LM area. The occurrence of liver abscesses increased quadratically ($P = 0.05$) as the concentration of NEXT increased in the diet. Occurrence of liver abscesses increased by 8.3 and 2.8% when feeding 30 and 45 NEXT (respectively) compared to steers fed 0 NEXT. How-

ever, poorer feed conversions were not observed due to the higher prevalence of liver abscesses. These data suggest that feeding increasing concentrations of NEXT had little impact on animal performance or carcass characteristics of large yearlings steers in feedlot finishing diets containing Rumensin and Tylan.

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