Effects of Feeding Next Enhance® in Finishing Diets on Performance and Carcass Characteristics

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Summary

Increasing NEXT ENHANCE (NEXT) essential oils in finishing diets containing Rumensin® and Tylan® were evaluated on performance and carcass characteristics. Treatments consisted of 0, 75, 150, 225, or 300 mg per steer daily of NEXT. Increasing NEXT linearly decreased DMI and F:G, but ADG was not different among treatments. Feed conversion (F:G) was improved by 4.0% and 3.8% when feeding NEXT at 225 and 300, respectively, compared to steers fed 0 NEXT. Therefore, results suggest that feeding NEXT at rates of 225 and 300 improves feed conversions in feedlot finishing diets containing Rumensin and Tylan.

Introduction

Feed additives, such as Rumensin and Tylan, are commonly fed in feedlot diets today because of the favorable response observed in feed efficiency. As new feed additives become commercially available, it is critical to evaluate the response in animal performance to ensure positive attributes for the feedlot industry. NEXT ENHANCE (NEXT) is a natural plant extract composed of garlic oil and cinnamaldehyde that may alter rumen fermentation and improve feed efficiency; however, the optimum rate of NEXT in feedlot diets has not been well established. Therefore, the objective of this study was to evaluate the optimum rate of NEXT with Rumensin and Tylan on performance and carcass characteristics of finishing cattle.

Procedure

Three hundred and sixty calf-fed steers (BW = 664 ± 61 lb) were utilized in a randomized block design experiment at the University of Nebraska–Lincoln Panhandle Research and Extension Center feedlot. Prior to the start of the experiment, calves were vaccinated with Express 5®, and given an electronic and visual identification tag. Calves were limit-fed a 32% alfalfa, 32% wet distillers grains plus solubles (WDGS), 32% dry-rolled corn (DRC) diet (DM basis) at 2% BW for seven days to minimize gut fill variation. Steers were weighed two consecutive days (day 0 and 1) to establish initial BW. Calves were blocked by day 0 BW, stratified by BW within blocks (light, medium, heavy), and assigned randomly to 45 pens. Pens were assigned randomly to one of five treatments with nine replications (i.e., pen) per treatment and eight steers per pen. Light, medium, and heavy blocks consisted of 2, 4, and 3 replications, respectively. On day 80, all steers were re-vaccinated with Bovi-Shield® Gold 5 and poured with Ivomec®.

A common basal diet was used for all five treatments (Table 1) consisting of 65% DRC, 25% WDGS, 5% wheat straw, and 5% supplement (DM basis). Only one basal supplement was used and feed additives were included via micro-machine. Treatments consisted of NEXT feeding rates of 0, 75, 150, 225, and 300 mg per steer daily. The liquid supplement contained vitamins and minerals to meet or exceed animal requirements. Rumensin and Tylan were provided via micro-machine at 360 and 90 mg per steer daily, respectively.

Steers were implanted on day 0 with Revalor®-XS. After 141, 169, or 174 days on feed, depending on BW block, 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). With the use of a common dressing percentage (63%), final BW, ADG, and F:G were calculated.

Performance and carcass characteristics were analyzed using the MIXED procedure of SAS (SAS Institute, Inc., Cary, N.C.) with dead or chronic animals removed from analysis. Animals removed from the experiment were removed due to common maladies and not treatment related. 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 in the diet. Occurrences of liver abscesses were analyzed using the GLIMMIX procedure of SAS.

Table 1. Composition of dietary treatments.

Ingredient	% of diet DM
DRC[1]	65
WDGS[1]	25
Wheat Straw	5
Supplement	5
Nutrient Composition, %	
CP	13.6
Ca	0.41
P	0.39
K	0.78
Ether Extract	4.97
NDF	20.3
Starch	46.4

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

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

	NEXT ENHANCE, mg per steer daily						*P*-value	
Item	0	75	150	225	300	SEM	Lin.[1]	Quad.[2]
Performance								
Initial BW, lb	655	656	655	655	656	1	1.00	0.55
Final BW, lb[3]	1263	1270	1267	1261	1271	8	0.75	0.94
DMI, lb/day	23.8	23.4	23.3	22.8	23.1	0.3	0.04	0.38
ADG, lb[3]	3.78	3.82	3.81	3.77	3.82	0.05	0.77	0.90
Feed:Gain[3,4]	6.29	6.13	6.11	6.04	6.05	—	0.02	0.34
Carcass Characteristics								
HCW, lb	796	800	799	795	801	5	0.76	0.96
Dressing,%	63.0	63.3	62.9	63.1	62.7	0.002	0.31	0.32
Marbling[5]	455	461	457	443	480	10	0.34	0.19
LM area, in^2	12.07	12.05	12.09	12.35	12.07	0.12	0.42	0.50
Calculated YG	3.57	3.69	3.60	3.44	3.55	0.06	0.11	0.75
12th rib fat, in	0.57	0.59	0.57	0.55	0.55	0.01	0.02	0.32
Liver abscess, %	5.5	5.9	11.3	11.3	11.4	—	0.11	0.62

[1]Lin. = *P*-value for the linear response to NEXT ENHANCE.
[2]Quad. = *P*-value for the quadratic response to NEXT ENHANCE.
[3]Calculated from carcass weight, adjusted to 63% common dressing percent.
[4]Analyzed as G:F, the reciprocal of F:G.
[5]Marbling Score: 400 = Small, 500 = Modest, etc.

Results

As rate of NEXT in the diet increased, DMI decreased linearly ($P = 0.04$; Table 2). Steers fed NEXT at 225 and 300 resulted in a 4.2% and 2.9% reduction in DMI compared to cattle fed 0 NEXT. Feeding increasing rates of NEXT had no effect on ADG ($P = 0.77$; linear) or final BW ($P = 0.75$; linear). Feed conversion (F:G) decreased linearly ($P < 0.02$) as rate of NEXT in the diet increased. Compared to the 0 treatment, feeding NEXT at 225 and 300 mg resulted in 4.0% and 3.8% improvement in F:G, respectively. Hot carcass weight, dressing percent, marbling score, and LM area were not different ($P > 0.18$; linear or quadratic) among treatments. However, calculated yield grade tended to decrease linearly ($P = 0.11$) as rate of NEXT increased. As rate of NEXT increased, 12th rib fat thickness decreased linearly ($P = 0.02$), but numerically steers in all treatments were finished to a similar endpoint. The occurrence of liver abscesses tended to increase linearly ($P = 0.11$) with increasing rates of NEXT, yet poorer feed conversions were not observed due to the higher prevalence of liver abscesses.

These data suggest that increasing rates of NEXT doesn't affect gain; however, DMI decreased, resulting in a favorable improvement in feed conversion. Including NEXT at 225 and 300 suggest an improvement in animal performance (i.e., feed conversion) in feedlot finishing diets containing Rumensin and Tylan.

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