2013

Including NEXT ENHANCE® Essential Oils in Finishing Diets on Performance With or Without Rumensin® and Tylan®

Curtis J. Bittner
University of Nebraska-Lincoln, curt_bittner@hotmail.com

Galen E. Erickson
University of Nebraska-Lincoln, gerickson4@unl.edu

Karla Jenkins Jenkins
University of Nebraska - Lincoln, kjenkins2@unl.edu

Matt K. Luebbe
University of Nebraska - Lincoln, mluebbe2@unl.edu

Troy Wistuba
University of Nebraska-Lincoln

Including NEXT ENHANCE® Essential Oils in Finishing Diets on Performance With or Without Rumensin® and Tylan®

Curtis J. Bittner
Galen E. Erickson
Karla H. Jenkins
Matt K. Luebbe
Troy Wistuba[1]

Summary

Finishing cattle performance was evaluated using NEXT ENHANCE essential oils in finishing diets. Treatments consisted of 1) control (CON), 2) NEXT ENHANCE at 300 mg/day (NE), 3) Rumensin and Tylan at 360 and 90 mg/day, respectively (RT), or 4) NEXT ENHANCE plus Rumensin and Tylan (NERT). No NEXT ENHANCE by Rumensin/Tylan interaction was observed. Steers fed Rumensin/Tylan had decreased F:G and increased live final BW and marbling score. The prevalence of liver abscesses decreased 46% when steers were fed Rumensin/Tylan. Including NEXT ENHANCE in finishing diets did not impact performance or carcass characteristics.

Introduction

Increasing feed costs is a major driver in determining profitability for producers. Today, feed additives are included in rations to improve production efficiency (i.e., feed efficiency); therefore, increasing the likelihood of economic returns. NEXT ENHANCE is a nature plant extract composed of garlic oil and cinnamaldehyde that previously has been shown to alter rumen fermentation and improve ADG and feed efficiency. Therefore, the objective of this study was to evaluate the effects of NEXT ENHANCE essential oils on performance and carcass characteristics of cattle fed finishing diets with or without Rumensin and Tylan.

Procedure

Calf fed steers (n = 400; BW = 642 ± 64 lb) were utilized in an experiment at the Panhandle Research Feedlot. Calves were processed within 24 hours of arrival with Bovi-Shield® Gold, Vision® 7, Somnubac®, Ivomec, were branded, and given an electronic and visual identification tag. Prior to initiation of trial and approximately six days from receiving, calves were limit fed a 50% alfalfa, 35% corn silage, and 15% wet distillers grains solubles (WDGS; DM basis) diet at 2% BW for seven days to eliminate gut fill variation. Steers were weighed consecutively on days 0 and 1 to establish initial BW, blocked by day 0 BW, stratified within blocks (light, medium, heavy), and assigned randomly to 40 pens (10 steers/pen). Treatments (n=4) were assigned randomly to pens. On day 9, all steers were re-vaccinated with Bovi-Shield® Gold and Somnubac and implanted with Component® TE-IS. Steers were re-implanted on day 80 with Component TE-S.

A common basal diet was used for all four treatments (Table 1) consisting of 53% dry rolled corn, 25% WDGS, 16% corn silage, and 6% supplement (DM basis). Only one basal supplement was used and feed additives were included via micromachine. Treatments consisted of a control containing no additives (CON), NEXT ENHANCE formulated at 300 mg/d (NE), Rumensin and Tylan formulated at 360 and 90 mg/day, respectively (RT), or NEXT ENHANCE formulated at 300 mg/day plus Rumensin (360 mg/day) and Tylan (90 mg/day; NERT). The experiment was a randomized block design with a 2x2 factorial arrangement of treatments. One factor was the presence or absence of NE and the other factor was presence or absence of RT.

Table 1. Composition of dietary treatments.

Ingredient	% of diet DM
DRC[1]	53
WDGS[1]	25
Corn Silage	16
Supplement	6
Nutrient Composition, %	
CP	13.9
Ca	0.52
P	0.40
K	0.92
Ether Extract	4.84
NDF	22.3
Starch	42.4

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

Cattle from the medium and heavy blocks were harvested on day 141 and the light block on day 161 at Cargill Meat Solutions (Fort Morgan, Colo.). Data collected were HCW, LM area, marbling score, 12th rib fat depth, and liver scores. 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 using a common dressing percentage of 63%.

During the study, four steers died on treatment NE due to BRD, urinary calculi, or brisket disease (2,1,1), respectively. BRD was the cause of one dead on both NERT and RT treatments. Two steers were removed due to lameness or BRD and one animal died from urinary calculi on CON treatment. Animal performance and carcass characteristics were analyzed using the MIXED procedure of SAS (SAS Inst. Inc., Cary, N.C) with pen being the experimental unit and animals removed from analysis. The model included the effects of additive, oil, and additive x oil interaction. Occurrences of liver abscesses were

Table 2. Effect of including feed additives on cattle performance and carcass characteristics.

Item	Treatment[1]				SEM	*P*-value		
	CON	NE	RT	NERT		NE[2]	RT[3]	NE x RT[4]
Performance								
Initial BW, lb	650	650	650	650	47	0.44	0.80	0.70
Final BW, lb[5]	1226	1232	1246	1243	41	0.81	0.07	0.59
DMI, lb/day	22.3	22.5	22.1	22.1	0.6	0.58	0.16	0.46
ADG, lb[5]	3.91	3.95	4.04	4.02	0.11	0.85	0.07	0.61
Feed:Gain[5]	5.68	5.68	5.46	5.46	0.03	0.87	<0.01	0.96
Carcass Characteristics								
HCW, lb	773	777	785	783	26	0.80	0.07	0.59
Dressing, %	62.7	62.8	62.6	62.4	0.2	0.98	0.27	0.53
Marbling[6]	522	530	557	554	11	0.76	<0.01	0.48
LM area, in^2	12.20	12.09	11.99	12.16	0.14	0.75	0.46	0.15
12th rib fat, in	0.58	0.60	0.61	0.59	0.02	0.90	0.55	0.17
Calculated YG	3.39	3.48	3.56	3.46	0.11	0.92	0.19	0.10
Liver abscess[7], %	24.7	29.2	13.1	16.2	—	0.37	<0.01	0.97
A, %	9.4	13.5	4.0	9.1	—	0.10	0.08	0.56
A+, %	14.6	15.6	9.1	7.1	—	0.77	0.03	0.59

[1]CON = Control, NE = NEXT ENHANCE, RUMT = Rumensin+Tylan, NERT = NEXT ENHANCE + Rumensin+Tylan
[2]NE = *P*-value for the main effect of NEXT ENHANCE inclusion.
[3]RT = *P*-value for the main effect of Rumensin/Tylan inclusion.
[4]NE x RT = *P*-value for the NEXT ENHANCE x Rumensin/Tylan interaction.
[5]Calculated from carcass weight, adjusted to 63% common dressing percent.
[6]Marbling Score: 400 = slight, 500 = small, 600 = modest, etc.
[7]Liver score: A = 3 or 4 abscesses; A+ = 4+ abscesses.

analyzed using the GLIMMIX procedure of SAS.

Results

No interactions were observed in this study (Table 2); therefore, only the main effects will be discussed. Feeding NE at 300 mg/day had no effect on DMI, ADG, or F:G ($P \geq 0.58$), suggesting the use of NE showed no statistical impact on animal performance. There was a tendency ($P = 0.07$) for increased final BW and ADG when including RT in the diet. A 3.9% decrease ($P < 0.01$) in F:G was observed with the use of RT. The main effect of NE had no impact ($P \geq 0.75$) on HCW, marbling score, LM area, or 12th rib fat. Cattle fed RT showed a tendency ($P = 0.07$) for a 9 lb increase in HCW and also a significant increase ($P < 0.01$) in marbling score. As expected, with the presence of RT, incidence of liver abscesses decreased 46% ($P < 0.01$).

In summary, feeding NE in finishing diets did not influence DMI, ADG, F:G, or carcass characteristics. When Rumensin and Tylan are included in the diet, data from this study shows that F:G was improved and prevalence of liver abscesses decreased.

[1] Curtis J. Bittner, graduate student; Galen E. Erickson, professor, University of Nebraska–Lincoln Department of Animal Science, Lincoln, Neb.; Karla H. Jenkins, assistant professor; Matt K. Luebbe, assistant professor, Panhandle Research and Extension Center, Scottsbluff, Neb.; Troy Wistuba, Novus International, Inc., St. Charles, Mo.