

Evaluation of Vivalto® on Growth Performance and Carcass Characteristics in Growing and Finishing Beef Steers

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Summary with Implications

A finishing trial conducted at the Panhandle Research, Extension, and Education Center (PREEC) near Scottsbluff, NE evaluated the effect of Vivalto®, a B-vitamin complex, on the feeding performance and carcass characteristics of feedlot steers. The design of the study was a completely randomized block design with three treatments, control without Vivalto®, 1g Vivalto®/steer/day, and 2g Vivalto®/steer/day. Cattle fed the diets that included Vivalto® feed had lower intakes during the first 56 days than cattle that received no Vivalto® in the diet. No significant differences were observed for ADG, intake, feed efficiency and carcass characteristics of the entire feeding period. No significant differences in prevalence of liver abscesses were found between treatments and prevalence of A+ abscesses was also insignificant.

Introduction

B-vitamins are water-soluble vitamins necessary in most multicellular species to contribute to functions involving DNA methylation, co-enzymes for metabolic functions, and the conversion of consumed nutrients to usable forms of energy in the body. In ruminant species the microbiome contains species of bacteria that are capable of synthesizing B-vitamins such that supplementation may not be required. Previous research indicates that a version of these vitamins that escape rumen degradation and are readily available in the small intestine will increase milk production in dairy breeds. Few studies have been conducted to evaluate the effect of supplement-

Table 1. Diet composition (% DM basis) fed to steers to evaluated different Vivalto® inclusion levels

Ingredient	Treatments ¹		
	Control	1g Vivalto®	2g Vivalto®
Corn Silage	20	20	20
Dry-rolled corn	54	54	54
WDGS	20	20	20
Supplement ²	6	6	6
Vivalto®	0	1g/hd/day	2g/hd/day

¹Hay was added to step up diets starting at 30% after original formulation due to lack on intake by cattle due unfamiliarity with corn silage.

²Supplement (Midwest PMS LLC.) was formulated to provide vitamins, minerals, and 0.92% urea on a DM basis.

tal B-vitamins on beef cattle. B-vitamins deficiencies can occur with physiological and environmental stressors that may limit intakes that would affect the ability of the microbes to synthesize adequate amounts of these vitamins. The objective of this study was to evaluate the effect of Vivalto® (Trouw Nutrition, Isola Vicentina, Italy), a rumen-protected B-vitamin complex on “receiving/starting” (first 56 days on feed), finishing performance, carcass characteristics, and liver abscess on cattle not previously acclimated to the Upper Midwest region of the U.S.

Procedure

Crossbred steers (n=300, initial BW 647 ± 51lb) procured from the southeast region of the United States were used in a completely randomized block design experiment. Treatments were diets with no Vivalto® (control), 1 g of Vivalto® / head / day and 2 g of Vivalto® / head / day. Cattle were fed a corn silage diet at 2.2% of body weight to equalize gut fill for five days immediately before the start of the experiment. Thirty pens were used with 10 pens per treatment and 10 steers per pen. Cattle were weighed on 2 consecutive days and those two weights were averaged to get the initial body weight. Using weights from day 0, steers were stratified and blocked by body weight into light or heavy blocks, and

randomly allocated cattle to pens within blocks. Treatments were assigned to pens randomly within block. The heavy block (initial BW 700lb ± 1.6) included 4 repetitions and the light block (initial BW 612lb ± 1.6) included 6 repetitions per treatment, respectively. The steers received a Revalor-IS (Merck Animal Health) implant on the second weigh day. All cattle received a similar diet (Table 1) of corn silage, dry-rolled corn, wet distiller’s grains, and a liquid supplement. Alfalfa hay was added to the diet 2 days post-trial initiation at 30% with decreasing inclusion over 28 days due to low intakes and unfamiliarity with corn silage. The Vivalto® (none, 1g/hd/d, 2g/hd/d) was delivered to the feedtruck through a micro-machine (Animal Health International) to be mixed and delivered to the respective pen. Monensin (Rumensin, Elanco Animal Health) was delivered at 30g/ton and tylosin (Tylan, Elanco Animal Health) was delivered at 8.8 g/ton. For the final 28 days on feed, cattle were fed 300mg/steer/day of ractopamine (Optaflexx®, Elanco Animal Health). Individual animal weights were taken on day 28 and day 56 to track individual animal performance, pen weights we taken every 28 days thereafter. A terminal implant (Revalor-200, Merck Animal Health) was given on day 56, and cattle were fed for 239 days before being delivered to a commercial abattoir for harvest. Following harvest, hot carcass

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Table 2. Linear and quadratic effects of finishing diets with or without Vivalto^a at two rates of inclusion

Item	Treatments			SEM	Linear	Quadratic
	Control	Vivalto ^a 1g	Vivalto ^a 2g			
<i>56-day Performance</i>						
Initial BW, lbs	656	646	655	5.0	0.90	0.12
Ending BW, lb ¹	949	935	934	9.6	0.27	0.64
DMI, lbs/d	17.1	16.2	15.3	0.46	<0.01	1.00
ADG, lbs	2.68	2.48	2.38	0.129	0.12	0.76
F:G	6.36	6.51	6.36	—	1.00	0.65
<i>Carcass Adj. Performance</i>						
Initial BW	656	646	655	5.0	0.90	0.12
Final BW, lb ²	1465	1500	1484	23.4	0.59	0.39
DMI, lbs/d	23.4	23.9	23.5	0.49	0.89	0.45
ADG, lbs	3.39	3.50	3.46	0.100	0.64	0.54
F:G	6.77	6.72	6.73	—	0.89	0.92
<i>Carcass Characteristics</i>						
HCW	923	945	935	14.8	0.59	0.39
LM Area, in ²	14.9	15.0	14.8	0.25	0.69	0.58
Marbling ^{Score} ³	543	547	544	13.9	0.98	0.82
12 th rib fat, in	0.57	0.63	0.59	0.025	0.64	0.13
Calculated YG ⁵	3.07	3.26	3.20	0.118	0.44	0.39
Liver Abscess, % ⁶	20	22	18	—	0.76	0.63
A+ Liver, %	9	5	9	—	0.94	0.29

¹Weights used were individual animal weights averaged by treatment on day 56

²Final BW is HCW adjusted to a common dressing percentage of 63%

³Marbling scored as 400+ = slight, 500+ = modest, 600+ = moderate etc.

⁴Calculated yield grade = 2.5 + (2.5*fat thickness) - (0.32*LM area) + (0.2*2.5) + (0.0038*HCW)

⁵Liver abscess data was analyzed as a binomial distribution

weights (HCW) were recorded, and livers were scored, with “0” indicating no abscess presence “A-” indicating 1–2 small abscesses, “A” indicating 2–4 small active abscesses, and “A+” indicating 1 or more large active abscesses. After a 48-hour chill, *Longissimus* muscle area, 12th rib fat thickness, and USDA marbling scores were recorded.

Results

Performance and carcass characteristics were run as linear and quadratic functions using the MIXED procedure of SAS (Cary, NC) and liver data was evaluated as binomial distribution using the GLIMMIX procedure of SAS. P-values of ($P \leq 0.05$) were viewed as significant while P-values of ($P \leq 0.15$) were considered tendencies. Statistical analyses of cattle performance of during the

initial 56 days on feed showed a significant difference ($P < 0.01$) for DMI. The control treatment had the greatest intakes (17.1 lb), with intakes decreasing linearly as Vivalto^a increased in the diet. A tendency ($P = 0.12$) was present for a linear decrease in ADG also during the first 56 days on feed. The control cattle had the greatest daily gain (2.68 lb) with linear decrease as Vivalto^a inclusion increased. However, when evaluating cattle feeding performance for the entire finishing period, no significant differences ($P \geq 0.45$) were observed between treatments. A quadratic tendency was present when evaluating carcass characteristics for 12th rib fat thickness ($P = 0.12$). The steers that were fed 1g of Vivalto^a daily had greater fat thickness at the 12th rib than the control or the 2g Vivalto^a groups. Analyses of liver abscess prevalence ($P \geq 0.63$) and severity

($P \geq 0.29$) showed no significant differences between treatment groups.

Conclusion

Supplementation with the B-vitamin complex Vivalto^a did not significantly affect ADG, DMI, or feed efficiency throughout the finishing period. However, cattle fed Vivalto^a during the “receiving/starting” phase experienced lower intakes when compared to cattle that received no Vivalto^a in the diet. Carcass characteristics were not significantly different including percent animals with livers containing an abscess, and prevalence of livers containing A+ livers was also not statistically significant.

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Micronutrients USA, Trouw Nutritional, Isola Vicentina, Italy