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Restricting Intake and Increasing Energy Improves Efficiency in Newly Received Growing Cattle and Zelnate Has No Effect

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Abstract

Objectives: Study effects of two limit-fed diets formulated to provide two levels of dietary energy and offered at two different intake rates to target similar gains and analyze the efficacy of a novel DNA-immunostimulant administered on arrival.

Study Description: A 56-day pen study was conducted utilizing 370 Angus × Brahman heifers shipped from Florida (1,455 mi) to study the effects of limit-feeding at 2 intakes based on prior research conducted at the Kansas State University Beef Stocker Unit, Manhattan, KS, to achieve similar gains and effects of Zelnate under the dietary conditions.

The Bottom Line: Limit-feeding a higher-energy, lower-roughage diet at 2.2% of body weight daily is a more efficient feeding strategy than offering a higher-roughage, lower-energy diet at 2.4% of body weight daily to achieve similar gains, and Zelnate administered on arrival had no effect on performance or health.

Keywords

stocker cattle, limit-feeding, zelnate

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K-STATE Research and Extension

CATTLEMEN'S DAY 2018

Restricting Intake and Increasing Energy Improves Efficiency in Newly Received Growing Cattle and Zelnate Has No Effect

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Introduction

Limit-feeding high-energy diets based primarily on wet corn gluten feed has been shown to significantly increase efficiency in growing cattle. A trial conducted recently at the Beef Stocker Unit utilized a diet offered ad libitum to determine the amount of feed offered in the limit-fed diets. Results demonstrated significantly improved performance. However, in a production setting, the producer would not feed one diet to determine the level of feed offered for a separate diet. In order to utilize this programmed feeding strategy, specific levels of intake would need to be known without the use of a high-roughage, low-energy, control diet to achieve desired gains. In addition, Zelnate–a novel DNA-immunostimulant–had not been previously analyzed under these dietary conditions to determine its effects on cattle health and performance.

Experimental Procedures

A total of 370 Angus × Brahman heifers were assembled from a single source in central Florida and shipped to the Kansas State University Beef Stocker Unit, Manhattan, KS, (1,455 mi) over a 2-day period from August 11 to 12, 2016 (2 loads each day). The heifers were used to validate results observed in an earlier experiment conducted at the Beef Stocker Unit involving high-energy limit-fed receiving diets based primarily on wet corn gluten feed and the use of a novel DNA-immunostimulant technology injected intramuscularly at the time of arrival processing (Zelnate, Bayer Animal Health, Shawnee Mission, KS). The two experimental diets were formulated to provide 50 or 60 Mcal net energy for gain/100 lb dry matter offered at 2.2 and 2.4% of body weight daily, respectively (Table 1). In addition, 1 of 2 arrival management protocols were implemented where animals did or did not receive Zelnate on day 0 in a 2 × 2 factorial arrangement of treatments. Treatment diets were fed for 42 days, then all animals were switched to the 50 Mcal net energy for gain/100 lb dry matter fed for ad libitum intake for 2 weeks to equalize gastrointestinal tract fill. Individual animal weights were measured on days 0, 14, and on conclusion of the trial (day 56). A pen scale was used on days 28 and 42. Feed delivery was adjusted based on updated cattle weights measured at each weigh period on a pen basis.

[1] Corn Belt Livestock Services, Papillion, NE, 68046.

Results and Discussion

Despite extremely low intakes early in the receiving period, cattle were relatively healthy with 2 animals being pulled within the first two weeks after arrival for malnutrition. Of the animals pulled, both were from the high-energy/Zelnate treatment but most likely succumbed to issues not related to diet considering their lack of eating and overall stress endured by duration of transport.

Performance data can be found in Table 2. Neither the use of Zelnate on arrival nor the interaction of diet and Zelnate had an affect on the performance or health parameters measured in this trial. Dietary treatment affected dry matter intake throughout the trial by design, as intakes were limited to specific percentages of average body weight in the pen daily (P=0.01). Average daily gain was not affected by dietary treatment, validating the results from the prior experiment conducted at the Beef Stocker Unit where these prescribed intakes were extrapolated (P=0.75). Because similar gains were achieved while varying the amount of feed delivered, efficiency (gain to feed ratio) was affected by dietary treatment yielding the high-energy, most restricted diet as the more efficient feeding strategy (P=0.03).

Implications

Limit-feeding a diet formulated to supply 60 Mcal net energy for gain/100 lb dry matter at 2.2% of body weight to target similar average daily gain is a more efficient feeding strategy than offering a higher-roughage, lower-energy diet at 2.4% of body weight to achieve similar gain. The use of Zelnate did not have an effect on any of the parameters measured in this trial.

Table 1. Experimental diets

	Diet	
Ingredient, % dry matter	50 Mcal net energy for gain/100 lb dry matter offered at 2.4% of body weight daily	60 Mcal net energy for gain/100 lb dry matter offered at 2.2% of body weight daily
Alfalfa	17.00	6.50
Prairie hay	17.00	6.50
Dry-rolled corn	19.08	38.82
Wet corn gluten feed[1]	40.00	40.00
Supplement[2]	6.92	8.18

[1]Cargill Animal Nutrition, Blair, NE.
[2]Supplement pellet was formulated to contain (dry matter basis) 10% crude protein, 8.0% calcium, 0.24% phosphorus, 5.0% salt, 0.55% potassium, 0.25% magnesium, 1.67% fat, 8.03% acid detergent fiber, and as 367 mg/kg lasalocid (Bovatec; Zoetis, Parsippany, NJ).

Table 2. Effects of Zelnate[1] administered on arrival and energy level and intake on performance

	Diet							
	50 Mcal net energy for gain/100 lb dry matter offered at 2.4% of body weight daily		60 Mcal net energy for gain/100 lb dry matter offered at 2.2% of body weight daily		Standard error of the mean	P-value		
Item	No Zelnate	Zelnate	No Zelnate	Zelnate		Zelnate	Diet	Zelnate × diet
Number of pens	8	8	8	8				
Number of animals	93	93	91	93				
Initial body weight, lb	476	488	502	498	26	0.82	0.14	0.47
Final average daily gain, lb/day	2.3	2.3	2.4	2.2	0.07	0.41	0.75	0.26
Final dry matter intake, lb/day	13.2	13.8	12.6	12.5	0.57	0.50	0.01	0.36
Final dry matter intake, % of body weight	2.45	2.50	2.21	2.23	0.02	0.07	<0.01	0.46
Final gain:feed, lb:lb	0.17	0.17	0.19	0.18	0.01	0.24	0.03	0.80

[1]Bayer Animal Health, Shawnee Mission, KS.