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Feeding a Novel Trace Mineral at Lower Levels to Grazing Stocker Cattle Does Not Impair Performance

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Abstract

When grazing stocker cattle on native Flint Hills pasture, optimizing growth rate is important in determining overall profitability. The correct selection of mineral supplements is an important decision that can be used to help promote overall productivity during a grazing season.

Keywords

trace minerals, stocker, grazing

Authors

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CATTLEMEN'S DAY 2017

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Introduction

When grazing stocker cattle on native Flint Hills pasture, optimizing growth rate is important in determining overall profitability. The correct selection of mineral supplements is an important decision that can be used to help promote overall productivity during a grazing season.

Key words: trace minerals, stocker, grazing

Experimental Procedures

A 90-day grazing study was conducted at the Kansas State University Beef Stocker Unit starting in May 2015 to determine the consumption and growth resulting from a trace mineral supplement that contained zinc, copper, and manganese either in a sulfate or a hydroxy form. All heifers used in this study (n = 276; 645 lb) were previously involved in a receiving study that focused on the source of trace mineral supplement from sulfate, organic (Availa 4) or hydroxy (IntelliBond) zinc, copper, and manganese. Heifers from the receiving treatments were equally assigned to the grazing treatments. Off-test weights collected at the conclusion of the receiving study were used to randomly assign animals to grazing treatments. Heifers were assigned to two grazing treatments with seven pasture replicates randomly allocated to treatment. All calves were tagged, dewormed with LongRange (Merial Limited, Duluth, GA) for control of internal and external parasites, and sorted to their pre-assigned paddock groups. All pastures were stocked at 230 lb of beef per acre.

The sulfate treatment consisted of a standard free-choice mineral formulated with sulfate forms of zinc, copper, and manganese. The hydroxy treatment consisted of a free-choice mineral formulated with the hydroxy forms of zinc, copper, and manganese at a 40% reduction in level (Table 1). Calf intake was targeted at 4 oz per head daily. The two treatments were provided throughout the duration of the trial.

On a weekly basis, mineral feeders were weighed to determine consumption. The collected data were used to calculate the previous week's intake of mineral. The mineral

[1] Micronutrients USA LLC, Indianapolis, IN.

in the feeder of each paddock was checked weekly for manure, water, or other foreign matter that could interfere with normal supplement consumption. Bull Master feeders (Mann Enterprises, Inc., Waterville, KS) were used for mineral delivery in all paddocks. When inclement weather was forecasted, rubber flap covers on all feeders were closed to minimize exposure to moisture. All flaps were reopened immediately after the threatening storm event. If mineral intake was beyond target, the feeder was moved further away from the primary water source. All calves were inspected multiple times throughout the week for pinkeye, lameness, and other ailments. If diagnosed with foot rot or pinkeye, cattle received Bio-Myocin 200. Data were analyzed using the MIXED procedure (SAS Inst. Inc., Cary, NC). Data were arranged in a randomized block design, with pen serving as the experimental unit for growth and health outcomes as impacted by treatment. In the model, the fixed effects were treatment and pasture while the random effects were pasture × treatment, pasture, and animal identification number.

Results and Discussion

Performance and health results are presented in Table 2. There were no significant differences in average daily gain or mineral intake during the 90-day grazing trial. Heifer daily gains based on previous years' research results were sub-par, which was likely the result of fleshiness obtained during the receiving phase and subsequent body size when introduced to pasture.

Implications

Providing a free-choice mineral using hydroxy form of trace minerals (copper, zinc, and manganese) provides comparable performance when formulated at 40% of a sulfate trace mineral based supplement.

Table 1. Nutrient composition of free-choice trace minerals

	Treatment[a]	
Item	Sulfate trace mineral	IntelliBond trace minerals[b]
Calcium, %	18.0	18.0
Phosphorus, %	3.5	3.5
Salt, %	21.8	21.8
Magnesium, %	1.0	1.0
Selenium, ppm	26.0	26.0
Copper, ppm	1400	840
Manganese, ppm	3000	1800
Zinc, ppm	4000	2400
Vitamin A, IU/lb	100,000	100,000
Vitamin D, IU/lb	10,000	10,000
Vitamin E, IU/lb	100	100
S-Methoprene, mg/lb	47.6	47.6
Chlortetracycline, g/ton	2800	2800

[a]Sulfate trace minerals supplied by copper, manganese, and zinc sulfate. IntelliBond trace minerals supplied by IntelliBond copper, manganese, and zinc. All other nutrients supplied by identical sources.
[b]Formulated at a 40% reduction of the sulfate form of copper, zinc, and manganese.

Table 2. Performance data for cattle supplemented with sulfate or hydroxy trace minerals while grazing Flint Hills pasture

Item	Sulfate	Hydroxy	Standard error	P-value
Pastures, number	7	7		
Animals on trial, number	119	121		
Grazing days, number	90	90		
Initial weight, lb	645	645	1.32	0.7755
Final weight, lb	736	740	5.33	0.6062
Grazing average daily gain, lb/day	1.03	1.06	0.053	0.6563
Mineral intake, oz/day	3.84	3.84	0.207	0.9779