FURTHER DEVELOPMENT OF A MONENSIN-CONTAINING, SELF-LIMITED ENERGY SUPPLEMENT FOR WHEAT PASTURE STOCKER CATTLE

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Story in Brief

A 98-day grazing trial using 66 fall-weaned beef calves and seven clean-tilled wheat pastures was conducted to determine the effect of type of energy feedstuffs on intake of a self-limited monensin-containing supplement for wheat pasture stocker cattle. One supplement consisted predominantly of ground milo. The other was a wheat middlings and soybean hulls-based supplement. Both supplements contained (as-fed) 4% salt and 60 mg monensin/lb. Intake of the two types of supplements was measured weekly and paralleled each other throughout the trial. Mean consumption of the milo- and wheat middling/soybean hulls-based supplements was 2.06 ± 1.02 and 2.33 ± 1.15 lb/day and did not differ. Results of this study indicate that intake of this self-limited supplement by growing cattle on wheat pasture is not influenced by type of energy feedstuffs such as high-starch grains versus high-fiber by-product feeds.

(Key Words: Growing Cattle, Wheat Pasture, Supplementation, Monensin.)

Introduction

In initial studies that were conducted as part of the Expanded Wheat Pasture Research Program, one of our research objectives was to develop a small-package, self-limited monensin-containing energy supplement for wheat pasture stocker cattle. The supplement was designed to be consumed at a level of 2 to 3 lb/hd/d and to: 1) help balance the energy:crude protein ratio of wheat forage, 2) provide monensin to improve the economics of the supplementation program and decrease bloat, 3) provide additional calcium for growth of stocker cattle, and 4) provide a means from a management standpoint of getting other feed additives into the cattle when needed [i.e., Bloat Guard (poloxalene) in cases of severe or protracted bloat outbreaks].

Because of the low targeted level of intake of the supplement, stocking densities were not changed where this supplement was fed. That is, the supplement was designed to supplement wheat forage not to substitute for wheat forage. Over four different wheat pasture years (Fall 1989 to Spring 1993) the supplement consistently increased weight gains by about .5 lb/day. These studies have been reported by Horn et al. (1990), Horn et al. (1992), and Beck et al. (1993). At feed costs of $80, 110, and 140/ton, per-head profits were increased by $15 to $31 (1990 dollars) depending on profit potential that existed during the 10-year period, 1980-89. These increased per-head returns do not include additional profits as a result of decreased death loss due to bloat as a result of feeding the monensin-containing energy supplement. Each 1% decrease in death loss would be worth another $5 to $7/hd depending on cost of the cattle and when they died. While this supplement was designed to be self-limited, it has not been approved by the Food and Drug Administration (FDA) for free-choice feeding. The objective of this study was to compare two formulations of the supplement. One was the "original" formula and contained about 60% ground milo and 20% wheat middlings. The second supplement contained

primarily wheat middlings and soybean hulls (i.e., two high-fiber, low-starch byproduct feeds). The monensin concentration of both supplements was decreased from 75 mg/lb ("original" formula) to 60 mg/lb in order to provide a greater margin in relation to the FDA approved level of monensin intake.

Materials and Methods

Sixty-six fall-weaned beef calves and seven clean-tilled wheat pastures were used. The study was conducted at the Wheat Pasture Research Unit near Marshall, OK from December 7, 1995 through March 13, 1996 (98 days). Pastures were either 18 or 24 acres in size. Seven to 13 steers were allotted to each pasture and treatments were randomly assigned to pastures. Cattle were allotted to pastures to achieve equal standing crops of about 1800 lb wheat forage DM/steer at the start of the study. Treatments were the control (2 pastures) and free-choice access to a milo-based (3 pastures) or a wheat middling/soybean hull-based (2 pastures) supplement. The supplements were fed in covered feeders, with 16 feet of total bunk space. Feeders were located near the water source of each pasture. Water was piped rural water and was available to the cattle in automatic waterers. Ingredient composition of the two supplements is shown in Table 1. The two energy supplements consisted primarily of ground milo (milo-based) or about 40% each of wheat middlings and soybean hulls (wheat middling/soybean hull-based) and contained 60 mg/lb of monensin. The calculated NE gain content (Mcal/cwt DM) of the supplements was 52 and 48 for the milo- and wheat middling/soybean hull-based supplements, respectively. In addition the supplements (11/64-inch pellets) contained:

A. 4% fine mixing salt

B. 4% magnesium-mica (Microlite) as a pellet binder

C. 2.25 to 2.50% calcium, DM basis

D. 1.0% phosphorus, DM basis

E. 0.75% magnesium, DM basis. Including the magnesium provided by Microlite, this resulted in 0.200 to 0.235% magnesium oxide in the formulas on an as-fed basis.

F. One pound/ton each of a vitamin premix, trace-mineral premix and vitamin A30.

Table 1. Feedstuff composition (as-fed basis) of supplements[a].

	Milo-based	Wheat middlings/ Soybean hulls
Milo, ground %	59.34	—
Wheat middlings, %	21.00	40.425
Soybean hulls, %	—	40.00
Molasses, sugarcane, %	4.80	4.80
Fine mixing salt, %	4.00	4.00
Magnesium-Mica, %	4.00	4.00
Magnesium oxide, %	.235	.20
Calcium carbonate, %	3.80	4.00
Dicalcium phosphate, %	2.60	2.35
Rumensin 80 premix, %	.075	.075
Trace mineral premix, %	.05	.05
Vitamin premix, %	.05	.05
Vitamin A30 premix, %	.05	.05

[a]Milled (fed) as 11/64 - inch pellets.

Supplement intake by steers of each pasture was measured weekly throughout the study. Control cattle had free-choice access to a commercial mineral mixture throughout the study. The mineral mixture was fed in weather vane type mineral feeders located near the waterers of each pasture. Guaranteed analysis of the mineral mixture was: calcium, 15 to 17%; phosphorus, not less than 4%; salt, 18.5 to 21.5%; magnesium, not less than 5.5% and vitamin A, not less than 150,000 I. U./lb. Steers of all pastures were given free-choice access to large round bales of bermudagrass hay during periods of snow and(or) ice cover of wheat pasture. In general the winter was mild and open during the study.

All weights of cattle were measured after 16- to 18-hour shrinks without feed and water. Data were analyzed using the GLM procedure of SAS (1990). Sources of variation were supplementation treatment and pasture within treatment. Pasture within treatment was used as the error term for treatment.

Results and Discussion

Consumption of the two types of supplements is shown in Table 2. Mean daily consumption of the milo-based and midds/soybean hull-based supplements through March 13, 1996 was 2.06 and 2.33 lb/steer, respectively. There was no difference between intake of the two supplements. This will give greater flexibility in formulating this supplement depending on the availability and cost of energy feedstuffs.

Daily monensin consumption averaged 124 and 140 mg/steer for the milo- and midds/soybean hull-based supplements, and was lower than the desired level of 200 mg.

Least-squares means for initial and final weights and daily gain of the steers are shown in Table 3. Daily gain of the control steers and steers fed the milo- or wheat middling/soybean hull-based supplement during the 98-day trial were 2.28, 2.41, and 2.36 lb, respectively, and were not different (P > .15) among treatments. Use of initial weight of the steers as a covariable did not affect these results. The lack of a difference among treatments was primarily due to an extraordinarily large variation in performance of steers of the two control pastures. The response to this supplementation program was

Table 2. Daily consumption of self-limited monensin-containing energy supplements (mean ± std. dev.).

	Milo-based	Wheat middlings/ Soybean hulls	n[a]
Number of pastures:	3	2	
Supplement, lb/head	2.06 ± 1.02	2.33 ± 1.15	14
Monensin, mg/head	124 ± 61	140 ± 69	14

[a]Number of observations. Consumption of supplement was measured at 6- to 7- day intervals.

Table 3. Least-squares means for cattle weights and daily live weight gains.

	Supplement			
	Control	Milo-based	Wheat-middlings/ Soybean hulls	SE
Number of pastures	2	3	2	
Weights, lb				
Initial, 12/7	528	527	535	11.8
Final, 3/13	751	764	767	10.8
Daily gain, lb	2.28	2.41	2.36	.091

substantially less than that of our previous studies, and probably due to the lower mean intakes of supplement and monensin, particularly during the early part of the study. However, results of this study indicate that intake of this self-limited supplement by growing cattle on wheat pasture is not influenced by type of energy feedstuffs such as high-starch grains versus high-fiber by-product feeds.

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