HAY SAVINGS WITH MONENSIN

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In earlier studies conducted at Squaw Butte, monensin (trade name Rumensin) increased the feed efficiency of spring-calving cows being maintained over the winter on a full feed of meadow hay plus enough barley to get monensin into the animal. Daily gains were doubled from about ½ pound on the controls to 1 pound on those receiving 200 mg of monensin. This additional gain was accomplished on slightly less hay intake, so feed efficiency was substantially improved.

Research at other locations has shown that monensin has reduced feed intake without a reduction in daily gain of feedlot cattle and increased gains on pasture fed cattle. Monensin improves feed efficiency by increasing the production of propionic acid, with total volatile fatty acids remaining the same. This is a more efficient energy pathway and increases energy available to the animal.

The study reported here was conducted to determine if the increased feed efficiency as a result of monensin feeding will allow cows to be wintered on less hay and to determine the most effective level of monensin. The cows in the previously discussed trial were all in better condition than they needed to be, which suggests that hay could be limited. If similar results with monensin can be obtained with cows on limited hay intake, this would result in a substantial savings of hay.

EXPERIMENTAL PROCEDURE

Ninety-six pregnant spring-calving Hereford cows were selected for this trial and stratified by age, breeding date and weight of cow for allotment to treatment. Pregnancy was determined by rectal palpation. Cows had been artificially inseminated to a single Angus sire over a period of 42 days and bred to Hereford clean up bulls for 21 days. Cows are bred to calve in March and April.

The experimental design consisted of 4 treatments with 3 replications. Cows were replicated by expected calving dates into early, middle and late. Treatments included a control group receiving no monensin and groups receiving 50, 200 or 300 mg of monensin daily. Each replication or pen consisted of 8 head. Cows received monensin plus 1 pound of barley (barley alone in the case of the control group) to assure intake of monensin each morning. One replication received their supplement in a barn on an individual basis, with the other 2 replications being group fed in outside pens. Free access to water, salt and a 50-50 mix of bonemeal and salt was provided.

Meadow hay was weighed in daily and refusals were weighed back weekly. Initially the control cows were fed hay free choice with the 50 mg group receiving 95% of this amount and the 200 and 300 mg groups getting 90%.

Cows were weighed every 28 days. Cow weight gains were higher than desired during the first 28 days, and feed levels for all treatments were adjusted downward. Throughout the study all cows were kept in a thrifty condition with hay levels being adjusted to maintain equal weight gain between treatments. In early March, feed levels were increased to insure adequate nutrition for lactation and rebreeding.

The trial was initiated on November 16, 1977 and the confinement feeding portion terminated on May 9, 1977. This period was terminated about 3 weeks early due to a lead toxicity problem. Calves were chewing the corral fences and obtaining enough lead from a lead base paint cover put on some 16 years earlier to kill them. Eleven calves were lost to lead poisoning before the problem was diagnosed and this phase of the study terminated. Cows and claves were then turned out and fed meadow hay free choice through breeding and to weaning on August 29, 1977. Monensin was not fed during this period.

At calving, birth weights were taken, bull calves castrated and all calves identified with ear tags. First estrus postpartum was obtained by utilizing vasectomized bulls equiped with chin ball markers. Visual observations were also made at least 3 times daily. When the oldest calf in a pen reached seven days of age a bull was turned in for two hours in the morning and evening for heat detection. Bulls were randomly assigned to pens each day. Heat detection was continued on a group basis when cows were removed from the pens. Cows were bred as described before and in mid October pregnancy was determined by rectal palpation. Fetus age was estimated by breeding dates and palpation estimations.

Monensin is used as an anti-coccidial in poultry so prior to the initiation of the study fecal samples were analyzed for coccidiosis. Tests were negative. Rumen samples were obtained during the trial to determine individual volatile fatty acid concentrations.

RESULTS AND DISCUSSION

Cow weight gains and hay intake prior to calving are shown in Table 1. Cattle on monensin treatments gained more on 7 to 10% less hay than the controls. Cows on the 200 mg level of monensin were the most efficient, gaining 0.10 lb. more per day on 10% less hay than the control treatment.

Table 1. Pre-partum cow gain and hay intake (11/16 to 3/1).

					Hay intake	
Treatment	No.	Initial wt.	Gain	ADG	Per day	Percent of control
		lb	lb	lb	lb	%
Control	24	1002	77	0.74	25.8	100
50	24	986	87	0.84	24.1	93
200	24	1005	87	0.84	23.1	90
300	24	1007	84	0.81	23.5	91

Table 2 presents the weight loss and hay intake of these cattle during the calving period. The 200 mg level cows lost about the same weight as the controls on 13% less hay and the 50 mg group on about 10% less hay. The cows on the 300 mg level consumed 11% less hay but lost more weight, indicating they should have received more hay during this period.

Table 2. Cow gain and hay intake through calving (3/1 to 5/9).

Treatment	No.[1/]	Initial wt.	Loss	ADG	Hay intake	
					Per day	Percent of control
		lb	lb	lb	lb	%
Control	21	1083	121	-1.75	28.4	100
50	23	1071	122	-1.77	25.5	90
200	19	1095	120	-1.74	24.7	87
300	21	1084	147	-2.13	25.3	89

1/ Missing values are due to 11 calves dying of lead poisoning and one cow getting sick and being removed from the trial.

In Table 3 the entire confinement period is summarized. Both the 50 mg group and 200 mg group lost less weight than the controls and received 8% less hay on the 50 mg level and 12% less on the 200 mg level. If this portion of the trial had not been terminated early both the 50 mg and 200 mg treatments would have had their hay further reduced in comparison to the controls to even out weight gains and losses. The 300 mg group would have received an increase from the 90% they were receiving.

Table 3. Cow gain and hay intake for the entire confinement period (11/15 to 5/9).

Treatment	No.	Initial wt.	Loss	ADG	Hay intake	
					Per day	Percent of control
		lb	lb	lb	lb	%
Control	21	1006	44	-0.25	26.8	100
50	23	984	20	-0.11	24.7	92
200	19	1012	37	-0.21	23.7	88
300	21	1002	65	-0.37	24.2	90

1/ Missing values are due to 11 calves dying of lead poisoning and one cow getting sick and being removed from the trial.

Monensin did improve feed efficiency throughout the duration of the treatment feeding portion of this trial. The 200 mg level appears to be the optimum and netted a savings of 12% in hay requirements. Over a 180 day wintering period this would save some 575 lb. of hay per cow. Also, if this study had continued it appeared hay intake on the 200 mg level could have been

reduced a little further. On a 500 head cow herd this savings would reduce hay needs by some 144 tons or make it possible to feed another 60 head on the same feed resource.

Cow data after the termination of the treatments and calf performance to weaning are presented in Table 4. Cow weight gains were similar between the cows from the controls and 300 mg treatments and those from the 50 and 200 mg levels a little higher. Cows on all treatments, except the 300 mg, were about the same weight at weaning as they were at the start of the trial. The 300 mg group was 30 lb. lighter.

Table 4. Calf gain data (birth to 8/29) and cow gain data (5/9 to 8/29).

Item	Treatment			
	Control	50	200	300
Number[1/]	19	23	19	21
Initial wt., lb	962	949	975	937
ADG of cows from 5/9 to 8/29, lb	0.37	0.47	0.44	0.36
Gain, lb	41	53	49	40
Birth wt., lb	75	77	78	77
ADG birth to 5/9, lb[2/]	1.80	1.98	1.78	1.89
ADG 5/9 to 8/29, lb	1.37	1.48	1.41	1.45
Adjusted weaning wts., lb[3/]	269	281	292	295

1/ Missing values are due to calves dying of lead poisoning, 2 dying of other causes and 1 cow getting sick and being removed from the trial.

2/ Calf gain data were adjusted for sex of calf.

3/ Weaning weights were adjusted for sex and age of calf.

During the period of confinement the calves from control and 200 mg cows were about the same, with the 50 and 300 mg groups performing a little better. However, in looking at the calves that were lost from lead poisoning, it shows that calves lost from the control and 200 mg groups were steers and from high production index cows, particularly those on the 200 mg level. So in reality these gains between the four groups were quite comparable.

The adjusted weaning weights were 269, 281, 292 and 295 lb., respectively, for calves from cows on the control, 50, 200, and 300 mg monensin treatments. These differences were not significantly different, although calves from the monensin fed cows were somewhat higher. Calves were weaned at an average age of 139 days.

Reproductive performance is presented in Table 5. Days to first estrus were essentially the same between treatments. Pregnancy rates on these small numbers have limited value, but do show that all monensin fed groups bred at least as well or better than the controls. Projected calving interval is similar on the control, 50 and 200 groups, but about 10 days longer on the 300 mg group. Remember this group lost more weight through the calving period and gained less to weaning. This may have caused them to breed back somewhat later.

Table 5. Reproductive performance.

Treatment	No.	Birth to first estrus	Pregnancy rate		Projected calving interval
		Days	No.	%	Days
Control	19[1/]	44[2/]	16	84	344
50	23	44	21	91	349
200	19	41	19	100	348
300	21	45	18	86	358

1/ Missing values are due to 11 calves dying of lead poisoning, 2 dying of other causes and one cow getting sick and being removed from the trial.

2/ One cow did not cycle and was not included in the first estrus data.

In summary, monensin continues to be very consistent in its response and looks like it has a real place in cow feeding. Feed efficiency is improved and increased gains on the same feed can be realized or a reduction in hay requirements on the same gain. Current trials are looking at the possibility of a supplement savings on poor quality roughage, such as straw.