# IMPROVED EFFICIENCY FOR WINTERING COWS BY FEEDING RUMENSIN

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The cow-calf industry in the Western United States is very dependent on roughages for maintaining brood cows. A large portion of the roughage is harvested forage fed to cattle during the winter months. Over one million acres of native meadow hay is produced in the West along with sizable acreages of dryland rye hay, cereal straws and alfalfa for maintaining cow herds.

Previous research by the Lilly Research Laboratories has shown that monensin (trade name Rumensin), a biologically active compound produced by streptomyces cinnamonensis, has reduced feed intake without a reduction in daily gain of feedlot cattle and increased gains on pasture fed cattle. Rumensin improves feed efficiency by increasing the production of propionic acid, with total volatile fatty acids remaining the same. This apparently is a more efficient energy pathway and increases energy available to the animal for productive purposes.

If similar results with Rumensin can be obtained with cows on a maintenance ration, the net result would be a savings of higher quality roughages. This may provide a means to increase the size of an individual cow herd or at least reduce the total hay requirement. With low quality roughages that do not meet the maintenance requirements, an increased energy value would, in some cases, allow them to be fed alone or at least create a substantial savings in supplemental feed required.

The study reported here was conducted to test the effect of Rumensin on feed efficiency for maintaining cows on meadow hay and to determine if winter feeding of Rumensin has any subsequent effect on reproductive or productive performance.

## EXPERIMENTAL PROCEDURE

Forty-eight spring-calving cows were stratified by age and weight of cow to two treatments with three replications. Treatments included a control group receiving no Rumensin and a group on 200 mg of Rumensin per head per day. One pound of barley per head per day was used to assure intake of the Rumensin, the palatability of which is not well documented. Control animals also received a pound of barley.

The individual feeding facilities in the barn and adjacent lots at Section 5 were utilized for this trial. Each lot or replication consisted of eight head. Cows were brought into the barn each morning to receive their supplement on an individual basis. The remainder of the day the cows were turned out in the adjacent lots where they had free access to water, salt, a 50-50 mix of bonemeal and salt and hay free choice. Hay intake was measured by weighing hay in daily with refusals weighed back weekly. Hay was sampled for chemical analysis.

Cows were weighed every 28 days after an overnight shrink from feed and water. Fecal samples were taken prior to the initiation of the trial to check for coccidiosis. Monensin is widely used as an anticoccidial and in order not to confound the experiment it was necessary to insure that the cows used in this trial were free of coccidial agents. Rumen samples were taken to determine total volatile fatty acids and the relative proportions of these.

Calving dates and birth weights were recorded so adjustments could be made for differences in weight change due to pregnancy, if needed. Subsequent conception rate was determined by rectal palpation and calving interval will be recorded when these cows calve again. Interval to first estrus was also obtained.

RESULTS AND DISCUSSION

Gain data and hay intake results over a 98 day period beginning on November 21 and ending on February 27 are presented in Table 1. Initial weights were 1015 and 1022 pounds for controls and Rumensin supplemented cows, respectively, with final weight being 1064 and 1115 pounds. Control cows gained 49 pounds or 0.50 pound per day over the trial period and Rumensin fed cows gained 93 pounds or 0.95 pound per day. Control cows consumed 25.1 pounds of hay per day and Rumensin supplemented cows 24.1 pounds.

These results show that Rumensin did increase feed efficiency substantially. Daily gain was almost doubled by feeding 200 mg of Rumensin and hay intake was slightly less. There was only a six day difference in stage of gestation between the two treatments with control cows being the furthest along. Differences in gain due to pregnancy between treatments were small and accounted for slightly more (0.04 pound per day) of the control cows' gain than those on Rumensin. The actual gain difference between treatments would be slightly greater in favor of Rumensin fed cows if this adjustment were made, however, the effect is quite small.

There were no differences in conception, with all cows in both treatments being found pregnant by rectal palpation after a 60-day breeding season. However, cows on Rumensin were found in first estrus after calving 13 days earlier than control cows. Estrus checks were taken with marker bulls for

about 120 days after calving and all cows from the Rumensin treatment were found in heat and averaged 30 days to first estrus, whereas six control cows were not found in heat during this time and those that were averaged 43 days. Calving dates will be recorded this year and the calving interval calculated. This could be very important with a marginal maintenance ration.

Table 1. Gain data and hay intake over the 98 day trial period

| Treatment Lot number | Initial weight | Final weight | Hay intake | Average daily gain |
|---|---|---|---|---|
| | lb | lb | lb | lb |
| Control | | | | |
| 1 | 1038 | 1060 | 25.1 | 0.22 |
| 3 | 992 | 1062 | 24.9 | 0.73 |
| 5 | 1016 | 1070 | 25.2 | 0.55 |
| Average | 1015 | 1064 | 25.1 | 0.50 |
| Rumensin | | | | |
| 2 | 1039 | 1133 | 24.4 | 0.97 |
| 4 | 1032 | 1130 | 24.4 | 1.00 |
| 6 | 996 | 1083 | 23.3 | 0.88 |
| Average | 1022 | 1115 | 24.1 | 0.95 |

Table 2 shows the total volatile fatty acids in the rumen fluid and proportions of propionic, acetic and butyric. Rumensin increased propionate by about 5 1/2% and decreased acetic by about 4% and butyric by 1 1/2%. Increasing propionate at the expense of acetic and butyric improves the efficiency of energy conversion in ruminants. In this study the improved energy utilization gave us increased gains on slightly less feed.

In this study these cows were carrying excess flesh at the end of the winter period. This trial is being repeated this year and the results are similar at this point. In future trials we would like to see just how much hay could be saved by limit feeding hay with Rumensin and still get these cows through the winter in good enough condition as to not adversely affect their productive or reproductive performance. Results with Rumensin for brood cows at this point would indicate that the greatest return would be using it for maintaining cows. These cows were continued on Rumensin on through lactation to study long term effects and preliminary results indicate that weaning weights

may have been adversely affected. We hope to run trials to see if this is true and if so if milk composition or quantity of milk is being affected. Weaning weights from this years trial will be tabulated to determine if treatments imposed during the winter had any affect on subsequent productive performance. These cows will not be fed Rumensin during lactation.

Table 2. Volatile fatty acid data[1/]

| Treatment Lot number | Total mM/L | Molar % Acetate | Propionate | Butyrate |
|---|---|---|---|---|
| Control | | | | |
| 1 | 72.0 | 76.3 | 17.0 | 6.7 |
| 3 | 65.4 | 76.8 | 17.0 | 6.2 |
| 5 | 67.1 | 75.6 | 17.7 | 6.7 |
| Average | 68.2 | 76.2 | 17.2 | 6.5 |
| Rumensin | | | | |
| 2 | 73.4 | 70.7 | 24.4 | 4.9 |
| 4 | 78.4 | 72.8 | 22.2 | 5.1 |
| 6 | 64.7 | 73.8 | 21.3 | 5.0 |
| Average | 72.2 | 72.4 | 22.6 | 5.0 |

1/ Rumen samples taken from three animals per lot.

This is an exciting new product which has just recently been cleared for feeding cattle in confinement for slaughter. Hopefully Rumensin will eventually be cleared for use as described in this paper.