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MIN-AD

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Feedlot Field Trials with MIN-AD®

Two feedlot field trials that were carried out with MIN-AD at commercial feedlots are described: one with dry rolled corn and one with barley. Bulletin B-1 discusses the effect of MIN-AD with steam flaked wheat and steam flaked corn rations.

It is well known that grain type and processing are factors that influence cattle performance and acidosis. One of the principal reasons is that ruminal degradation of starch can vary from 40% to over 90%, depending on the grain, processing, and other factors.

Whole corn has a slow rate of ruminal starch digestion relative to other grains and processed corn because the starch granules are embedded in a protein matrix. Rolling can both reduce the particle size and disrupt the matrix which makes the starch more accessible to microbial digestion and enzymatic break down in the small intestine.

Feeding barley can be more problematic than corn, despite the fact that it typically has less starch (~60% vs ~75%, although there can be large variations). This is because it degrades faster and more completely in the rumen.

In the dry rolled corn trial, dry matter intake (DMI) was unaffected by treatment, but both average daily gain (ADG) and dry matter conversion (DMC) were increased by about 5% with the addition of MIN-AD. The inclusion of MIN-AD to barley rations increased DMI by 2.4%, ADG by 9.4%, and DMC by 6%. In both trials, the cost of gain for the cattle on the MIN-AD™ treatment, using ingredient costs only, was reduced by 5.6%.

	Barley		*Dry Rolled Corn*	
	Control	MIN-AD	Control	MIN-AD
DMI	19.89	20.36	18.40	18.35
ADG	2.73	3.00	2.90	3.04
DMC	7.27	6.81	6.35	6.03
COG/cwt	C$37.66	C$35.55	$47.50	$44.85

Barley Feedlot Trial

Trial Procedure

This trial was conducted at a southern Alberta feedlot and ran for 212 days from June, 1994 through February, 1995. Six hundred and six head of Holstein steers were randomly allotted into three pens of 202 head. Receiving weights varied from 672 lbs to 710 lbs. Cattle were processed upon arrival with Ivomec, IBR, P13 somegin, 8 way, vitamins A, D, and E, and were implanted with Implus.

The cattle were fed a growing ration which was gradually stepped up to a finishing ration. Finishing diets contained Rumensin at a level of 26.4 g per tonne Tylan at a level of 11 g per tonne. There were three dietary treatments:

(1) a control with barley grain and silage,
(2) MIN-AD fed at a rate of 3.3 ounces per head per day (~ 1% of DM),
(3) MIN-AD fed at 3.3 ounces per head per day + 2% tallow.

The finishing rations are given in Table 1. Millrun replaced the MIN-AD in the control supplement. The rations were not balanced in Ca or Mg.

Table 1. Ration Analysis as a % of DM

	Control	MIN-AD	MIN-AD+ tallow
Barley	76.5%	76.5%	74.5%
Barley Silage	20.0%	20.0%	20.0%
Supplement	3.5%	3.5%	3.5%
Tallow	-	-	2.0%

Results and Discussion

The trial results are summarized in Table 2.

Table 2. Feedlot Performance by Treatment

	Control	MIN-AD	MIN-AD+Tallow
Days 1-212			
ADG lbs	2.73	3.00	3.01
DMI lbs/day	19.89	20.36	20.13
DMC	7.27	6.81	6.72

The addition of MIN-AD tended to improve or maintain intake averaged over the entire trial. Cattle on the MIN-AD treatment consumed 2.4% more DM than cattle on the control ration. ADG, however, was increased by 9.4% with the addition of MIN-AD. Consequently, DMC improved by over 6%.

Cost of gain (ingredient costs only) was reduced from C$37.66/cwt to C$35.55/cwt, or 5.6%, with the inclusion of MIN-AD. Feed ingredient costs were (1995) C$128/tonne for barley grain and C$41.87/tonne for barley silage.

Dry Rolled Corn Feedlot Trial

Trial Procedure

This trial was conducted in the early 1980's at the Miller Feedlot in LaSalle, Colorado. Four hundred and one Red Angus cross and Red Brangus cross steers from a California ranch were randomly allotted into four pens. Each pen was assigned to one of two treatments, so that there were two replicates per treatment. Receiving weights averaged 572 to 578 pounds. Cattle were ear tagged, wormed with Safe Guard wormer, dipped and vaccinated with five-way clostridial, IBR, BVD, and were implanted with Ralgro implants.

A growing ration was fed until day 50. Dry rolled corn was gradually increased from day 50 until day 62 by which time the cattle were on the finishing ration. The finishing diets contained Rumensin at 24 grams per ton. Ration analysis is shown in Tables 3 and 4.

The cattle on the MIN-AD treatment were fed MIN-AD in the pelleted supplement at 4 ounces per head per day (~1.8% of DM for the growing ration and ~1.3% of DM for the finishing ration). Protein, calcium, phosphorus, potassium and net energy values were held constant for both the MIN-AD and Control groups. Magnesium levels were not balanced between test and control groups.

The trial began in July and was completed in December. Cattle were weighed at 34, 87 and 158 days.

Table 3. Ration Analysis (as fed)

Ingredients	Growing Ration	Finishing Ration
Corn Silage %	19.0	25.8
Green Chop %	52.5	-
Rolled Wheat %	16.0	-
Rolled Corn %	9.0	67.8
Supplement %	3.5	6.4
Dry Matter %	43.5	70.0

Table 4. Ration Analysis (100% DM Basis)

Item	Growing Ration	Finishing Ration
Crude Protein %	14.2	12.3
Calcium %	0.63	0.59
Phosphorus %	0.30	0.33
Potassium %	0.91	0.60
NEm, Mcal/cwt	73.1	91.0
NEg, Mcal/cwt	46.2	61.9

Results and Discussion

Performance by period is shown in Table 5. DMI for cattle on the MIN-AD treatment was lower by about 3% during the first 34 days. Thereafter, there was no difference between the treatments.

ADG was increased during each weigh period by the inclusion of MIN-AD. The increase in ADG was over 6% in each of the first two weigh periods; the effect was less pronounced in the final weigh period where the increase was about 2.4%. Averaged over 158 days on feed, the inclusion of MIN-AD increased ADG by 4.8%.

As a consequence of increased ADG at the same level of DMI, conversions were improved by the addition of MIN-AD. There was a 5% improvement in feed utilization over the duration of the trial. This was particularly pronounced during the first weigh period when there was a 9% improvement in DMC. The cost of gain (ingredient costs only) was reduced from $47.50/cwt to $44.85/cwt, or 5.6%, with the inclusion of MIN-AD.

Table 5 Feedlot Performance by Period and Treatment

	Control	MIN-AD
Days 1-34		
Start weight lbs	578	572
ADG lbs	3.50	3.72
DMI lbs/day	14.35	13.90
DMC	4.10	3.72
Days 35-87		
Start weight lbs	697	699
ADG lbs	3.13	3.34
DMI lbs/day	20.09	20.22
DMC	6.42	6.05
Days 88-158		
Start weight lbs	863	876
ADG lbs	2.47	2.53
DMI lbs/day	19.35	19.37
DMC	7.83	7.66
Days 1-158		
Start weight lbs	578	572
End weight lbs	1036	1053
ADG lbs	2.90	3.04
DMI lbs/day	18.40	18.35
DMC	6.35	6.03

Summary Discussion

Considerable improvements in ADG, feed utilization, and cost of gain were realized through the inclusion of MIN-AD in both dry rolled corn and barley rations. DMI was increased by the addition on MIN-AD only with the barley rations; this is consistent with the hypothesis that MIN-AD acts as a rumen buffer as one would expect it to have more of an effect on DMI with a fast fermenting grain. These field trials, while not controlled research trials, nevertheless demonstrate the efficacy of MIN-AD in large pen commercial feedlot settings with very different cattle genetics and grain types.