



## Colorado Dairy Studies

This bulletin is one of a series of technical bulletins that discusses the applications of MIN-AD<sup>®</sup> to feedlot and dairy cattle nutrition and health.

### Production Study

A production study conducted by a dairy Extension Service Scientist at a Colorado university compared a treatment group fed MIN-AD with a control group that was not fed any buffer. Milk production was increased by 4.96%, fat production by 5.97%, and there was an improvement in efficiency of feed conversion.

Forty Holstein and five Brown Swiss cows were equally divided by age and their last 305 day M.E. milk production into two balanced groups. The treatment group was started on MIN-AD at a level of 8 ounces per cow per day beginning 30 days before freshening. Following freshening, the treatment group received the same rations as the control group, except that MIN-AD replaced 2% of the milo in the control ration. Rations were balanced so that both groups received equal intakes of dry matter, TDN, and crude protein. The calcium:phosphorus ratio for high performance cows was 2.99 in the MIN-AD ration and 1.68 in the control ration.

Cows were divided into high producers (over 60 pounds of milk/day), medium producers (40 to 60 pounds of milk/day) and low producers (below 40 pounds of milk/day). All cows started their lactation in the high production lot and were moved to succeeding lots as their production dropped below a lot's minimum level. The high lot received MIN-AD at 9.28 oz, the medium lot at 6.40 oz, and the low lot at 4.16 oz per head per day. The Table below is a summary of production data showing an improvement in actual production in 265 days in milk of 730 pounds of milk, or 5%, and 29 pounds of fat, or 6%.

### Test Results

<u>Group</u>	<u>Number of cows</u>	<u>Days in milk</u>	<u>Milk per cow - lbs.</u>		<u>Fat per cow - lbs</u>	
			<u>Total</u>	<u>Per Day</u>	<u>Total</u>	<u>Per Day</u>
Treatment	23	265	15,457.4	58.33	514.5	1.94
Control	<u>22</u>	<u>265</u>	<u>14,726.8</u>	<u>55.57</u>	<u>485.5</u>	<u>1.83</u>
<b>Difference</b>	<b>+ 1</b>	<b>0</b>	<b>+ 730.6</b>	<b>+ 2.76</b>	<b>+ 29.0</b>	<b>+ .11</b>

The milk-feed ratio, which provides a measure of feed conversion to milk, was calculated by dividing the value of milk produced at the time of the trial to the feed costs (circa 1980). The addition of MIN-AD increased the milk-feed ratio from 3.12 to 3.21.

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## Metabolic Study

A companion study conducted at the university's metabolic laboratory analyzed rumen fluid samples that had been obtained by stomach tube. Samples were obtained from at least 10 cows in each of the two groups at each of three samplings. The first sampling was taken prior to calving and the second two were taken at approximately one and two months after calving. The first fluid obtained from each sample was discarded to minimize contamination from saliva and a second sample drawn for analysis. The pH was measured immediately after sampling.

There was considerable variation from animal to animal as is typical with stomach tube samples. The mean values and standard errors are shown in the table below. The overall means are significantly different ( $P < 0.01$ ). The increased rumen pH levels from those cows on the MIN-AD treatment may have contributed to the higher production and improved conversion observed in the production study.

**Rumen Fluid pH Levels of Dry and Lactating Cows**

<u>Period</u>	<u>Control</u>	<u>MIN-AD</u>
Pre-calving	6.53±0.15	7.00±0.10
1 months post-calving	6.70±0.08	6.92±0.08
2 months post-calving	6.46±0.11	6.88±0.10
<b>Overall Mean</b>	<b>6.57±0.07</b>	<b>6.94±0.05</b>

## Field Trial

During May and June of 1984, the same university conducted a back-to-back field trial with MIN-AD and a mixture of sodium bicarbonate and magnesium oxide. The protocol was established by the university dairy personnel. Data is based on 300 cows over a thirty day period for each of the treatments. The sodium bicarbonate/magnesium oxide was mixed in a ratio of 3:1 and was fed at 8 ounces/head/day. MIN-AD was fed at 10 ounces/head/day. The results are given in the Table below.

**Field Trial Results**

<u>Treatment</u>	<u>Days in milk</u>	<u>Milk per cow Lbs/Day</u>	<u>Percent Fat</u>
NaHCO <sub>3</sub> /MgO	30	55.76	3.74
MIN-AD™	30	57.12	3.58

MIN-AD successfully replaced the typical buffer combination of sodium bicarbonate and MgO in this field trial which resulted in considerable ingredient savings.

Technical Bulletin D-1, "MIN-AD Dairy Ration Fermentation Studies", discusses the benefits of MIN-AD in combination with sodium bicarbonate. Copies of the original research reports are available upon request.

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## RATION DETAILS – DRY MATTER BASIS

<u>GRAIN RATION</u>	<u>MIN-AD - %</u>	<u>CONTROL - %</u>
Corn	35	35
Barley	30	30
Milo	14	16
Dried brewers grain	9	9
R-W 34% supplement*	7.5	7.5
Molasses	2.5	2.5
MIN-AD	<u>2</u>	<u>0</u>
Total	100	100

### HIGH PRODUCTION LOT

Grain ration	42	42
Alfalfa hay	29	29
Corn Silage	29	29

### MEDIUM PRODUCTION LOT

Grain ration	33.3	33.3
Alfalfa hay	33.3	33.3
Corn Silage	33.3	33.3

### LOW PRODUCTION LOT

Grain ration	24.5	24.5
Alfalfa hay	37.75	37.75
Corn Silage	37.75	37.75

### LEVEL OF MIN-AD RECEIVED

High production lot	9.28 oz/cow/day
Medium production lot	6.40 oz/cow/day
Low production lot	4.16 oz/cow/day

### \*R-W 34% SUPPLEMENT

12.9%	NPN (not more than)
2%	fat
7.5%	fiber
1%	Ca (minimum)
2%	Ca (maximum)
0.0027%	iodine
2.0%	salt (minimum)
3.0%	salt (maximum)
30,000	IU vitamin A
30,000	IU vitamin D

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