

Animate[®]

Anionic Mineral Supplement

Effect of ANIMATE, an Anionic Mineral Supplement, on Intake, Acid-Base and Calcium Status of Non-Lactating Dairy Cows

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MATERIALS AND METHODS

Six multiparous non-lactating Holstein cows, "four non-pregnant and two pregnant" were housed in tie stalls in the metabolism unit at the University of Idaho Dairy Research Center. The experimental design was a 2 x 2 Latin square with two week periods in succession. Treatments were diets with ANIMATE added versus control (Table 1). Blood and urine samples were taken approximately two hours post-feeding on the last day of each period. Urine was obtained by manual vulva stimulation. Urine pH and specific gravity were determined within two hours. Serum was harvested from 20 mls of whole blood drawn from the jugular vein and analyzed for total calcium, ionized calcium, pH, and normalized calcium. An additional 5 mls of blood were drawn into a heparinized syringe and analyzed for ionized and normalized calcium, pH and pCO₂ within two hours.

Feed was mixed every morning, with half fed at approximately 1000 hours and half at 2100 hours. Orts were weighed and recorded every morning.

Due to unpredicted shortage of grass silage, the diet was modified (Table 2) the last eight days of the trial. Tables 3, 4 and 5 show the concentrate mix and calculated analysis.

Table 1. **Period 1 TMR (% DM Basis)**

	Grass Silage	Alfalfa Hay	Concentrate Mix
Control	57.71	19.24	23.05
Treatment	56.08	18.69	25.23

Table 2. **Period 2 TMR (% DM Basis)**

	Alfalfa Silage	Alfalfa Hay	Wheat Straw	Concentrate Mix
Control	30.92	19.33	27.06	22.69
Treatment	30.23	18.90	26.46	24.41

Table 3. **Concentrate Mix for Periods 1 and 2 (% DM Basis)**

	Control	Treatment
ANIMATE	0.0	18.52
Dry Distillers Grains	83.47	74.07
Vitamin Premix	1.67	1.48
TM Premix	6.68	5.93
Magnesium Oxide	1.17	0.0
Limestone	1.17	0.0
Magnesium Sulfate	4.17	0.0
Urea	1.67	0.0

Table 4. **Calculated Analysis of Period 1 TMR**

	Control	Treatment
Dry Matter, %	37.10	37.80
Crude Protein, %	16.83	16.95
Net Energy-Lactation, Mcal/lb	0.67	0.65
ADF, %	34.54	33.65
Na, %	0.44	0.45
K, %	2.01	1.96
Cl, %	0.76	1.53
S, %	0.29	0.58
DCAD, meq ((Na+K)-(Cl+S)) /100g DM	31.10	-9.50



Table 5. Calculated Analysis of Period 2 TMR

	Control	Treatment
Dry Matter, %	60.40	61.00
Crude Protein, %	16.11	16.18
Net Energy-Lactation, Mcal/lb	0.62	0.60
ADF, %	35.19	34.40
Na, %	0.47	0.47
K, %	1.86	1.82
Cl, %	0.85	1.59
S, %	0.35	0.62
DCAD, meq ((Na+K)-(Cl+S))/100g DM	22.30	-16.40

RESULTS

Results are presented in Table 6. Dry matter intake was not affected ($P=.64$) by the addition of ANIMATE (12.8 kg vs. 12.0 kg). Urine pH dropped from 8.07 while on the control diet to 6.54 while on treatment diet ($P=.004$). Other acid-base indicators; pCO_2 , blood pH and HCO_3 , were all significantly lower ($P<.02$) on the treatment diet, indicating that ANIMATE was effective. Blood and serum ionized calcium were significantly higher ($P<.02$) which indicates that ANIMATE caused calcium to be more readily available for the cow.

Blood normalized calcium values were not different ($P=.16$) between treatments. Indicating that the alterations in ionized calcium were due primarily to pH since blood normalized calcium is ionized calcium adjusted to the same pH (7.4). The value of using ionized calcium vs. serum total calcium when evaluating anionic salts was evident in the study. Serum total calcium showed no difference ($P=1.0$) while ionized calcium was highly different ($P=.003$) between treatments.

Table 6. Effect of ANIMATE Supplement (Treatment) on Intake, Acid-Base and Calcium Status of Non-Lactating Cows

	Control	Treatment	SEM	P
DMI, kg/d	12.80	12.00	1.10	NS
Blood Ionized Ca, mg%	4.96	5.13	0.03	0.02
Blood Normalized Ca, mg%	5.15	5.23	0.03	NS
Serum Total Ca, mg%	9.50	9.50	0.06	NS
Serum Ionized Ca, mg%	5.05	5.20	0.02	0.003
Serum Normalized Ca, mg%	5.31	5.33	0.02	NS
Urine pH	8.07	6.54	0.18	0.004
Urine Specific Gravity	29.30	28.30	0.60	NS
pCO_2 , mm Hg	43.50	41.10	0.43	0.016
Blood Gas pH	7.41	7.37	0.01	0.008
HCO_3 , mmol/L	27.20	23.50	0.35	0.002

SUMMARY

ANIMATE supplement was observed to lower urine pH and increase blood ionized calcium. Addition of ANIMATE did not reduce dry matter intake. Therefore, this product appears to be palatable to the cow making it a viable anionic mineral supplement for the dairy industry.