

Effect of Supplementing Calcium Hydroxide in Deoiled *Sal* Seed Meal (DSSM) Ration on Rumen and Blood Metabolites

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ABSTRACT

The effect of supplementing calcium hydroxide in high DSSM ration on rumen and blood metabolites was studied by using 4×4 latin square design with six weeks period on Kankrej bullocks. The results revealed no significant effect on Ammonia-N, Total-N, Soluble-N, Non protein-N and Volatile fatty acids production. The serum calcium level was increased with increasing level of calcium hydroxide in the ration but the effect was non significant. The serum phosphorus level did not show any definite trend. Urea-N level was higher in calcium hydroxide supplemented groups but the trend was not definite. Thus the over all results indicated no beneficial effect of calcium hydroxide supplementation on rumen and blood metabolites.

(Received on Feb. 13, 1978)

INTRODUCTION

Deoiled *sal* seed meal a cheap cattle feed ingredient is available in plenty for feeding to cattle. It contains about 7 to 10 per cent tannin. It is believed that due to its tannin content the digestible protein available from DSSM is practically zero and therefore, it can not be used in a larger proportion in the concentrate mixture of various categories of cattle. Several attempts have been made to detoxify this untoward effect of toxic principle present in it. Therefore, an attempt was made to study the effect of supplementing calcium hydroxide in the high DSSM ration on the rumen and blood metabolites.

MATERIALS AND METHODS

For this study a 4×4 latin square design with six weeks period was followed.

In one such square 4 adult Kankrej bullocks were used as experimental animals. The four treatments T_1 , T_2 , T_3 and T_4 were 0, 1.0, 1.5 and 2.0 per cent of calcium hydroxide supplemented in concentrate mixture having 50 parts deoiled *sal* seed meal, 33 parts *guar bhardo*, 10 parts maize bran, 4 parts tapioca, 2 parts salt and 1 part bone meal. The hourly rumen samples at 0, 2, 4, 6 and 8 hour were collected with the help of stomach tube from each bullock at the end of each period. The rumen liquor was strained through four layers of cheese cloth and the strained rumen liquor (SRL) analysed for Ammonia-N (Conway, 1957). Total-N, Non-protein-N (after precipitation with trichloro acetic acid) and Soluble-N by Kjeldahl procedure and Total volatile fatty acids by Markham's distillation

TABLE 1

Effect of supplementing calcium hydroxide in DSSM ration on various nitrogen fractions and TVFA production (mg/100 ml.)

Constituents	Hours	Treatments				'F' value
		T ₁	T ₂	T ₃	T ₄	
Ammonia-N	0	7.60	6.30	8.14	7.16	1.20 n.s.
	2	11.10	10.68	11.64	10.31	0.26 n.s.
	4	9.10	9.15	9.36	9.61	0.10 n.s.
	6	7.33	6.90	7.61	6.83	0.31 n.s.
	8	9.29	8.12	7.96	7.44	1.21 n.s.
	Av.	8.88	8.23	8.94	8.27	
Total-N	0	63.00	67.20	64.75	67.97	0.31 n.s.
	2	68.02	77.42	78.75	73.68	0.88 n.s.
	4	61.29	63.53	71.93	71.23	2.03 n.s.
	6	67.73	73.33	72.98	65.70	0.64 n.s.
	8	76.72	74.13	79.80	75.28	0.36 n.s.
	Av.	67.35	71.12	73.64	70.77	
Soluble-N	0	31.33	32.45	34.37	33.15	0.22 n.s.
	2	34.55	35.60	41.65	36.47	0.72 n.s.
	4	37.00	34.20	35.84	31.82	1.01 n.s.
	6	38.36	32.10	35.25	33.31	0.86 n.s.
	8	37.45	35.67	37.17	37.87	0.16 n.s.
	Av.	35.74	34.00	36.86	34.52	
Non-protein-N	0	45.41	40.69	40.98	43.75	0.32 n.s.
	2	49.35	46.64	49.65	48.94	0.23 n.s.
	4	46.38	43.75	41.00	43.23	4.21 n.s.
	6	45.94	43.73	41.95	37.63	1.06 n.s.
	8	45.94	40.69	42.50	44.10	0.90 n.s.
	Av.	46.60	43.10	43.22	43.53	
TVFA	0	354.00	356.25	341.25	324.00	0.49 n.s.
	2	477.75	470.25	450.75	456.00	0.25 n.s.
	4	450.00	424.50	435.75	446.25	0.21 n.s.
	6	453.00	420.00	427.50	361.50	0.59 n.s.
	8	392.25	402.75	423.75	360.00	6.50 n.s.
	Av.	425.40	414.75	415.80	389.55	

n. s. = non significant.

Each value represents the average of 4 Observations.

method. Blood samples at the end of each periods were collected and serum samples were analysed for calcium and phosphorus as suggested by Oser (1965) and Urea-N by the method of Natelson (1957). The statistical analysis of the data was carried out as suggested by Snedecor and Cochran (1968).

RESULTS AND DISCUSSION

The changes taking place in different nitrogen fractions and total volatile fatty acids (TVFA) of SRL are shown in Table-1.

Ammonia-N: The results showed that ammonia production was highest at

2 hours post feeding in all the treatments and then gradually lowers down up to six (6) hours after feeding and again increases at 8 hours. However, this increase did not reach up to the peak level. There seems to be no apparent effect of treatments on ammonia production. Rai (1975) observed the ammonia-N concentration in the range of 10.02 to 11.67 mg per cent which is in agreement with the present finding.

Total-N: The results revealed that on an average the Total-N concentration is higher in calcium hydroxide supplemented groups as compared to control group but the difference was non significant. The hourly changes in total nitrogen content showed non significant effect in different treatments.

Soluble-N: The soluble nitrogen

content is higher at 2 hours post feeding in treatments T_2 , T_3 and T_4 there by indicating that the calcium hydroxide supplementation resulted in more soluble protein at 2 hrs as compared to control group. In case of control group the peak is obtained at 6 hours post feeding. Further it is also observed that the Soluble-N content in control (T_1) group did not show any sharp change while in case of calcium hydroxide supplemented group, the level slowly decreased up to 6 hours post feeding and at 8 hours post feeding the level again increased.

Rai (1975) observed the peak level of Soluble-N at 1 to 5 hours in *sal* seed-urea-molasses fed groups.

Non protein-N: The results revealed that non-protein-N concentration was some what higher in control (T_1) as

TABLE 2

Effect of supplementing Calcium hydroxide in DSSM ration on blood serum calcium, phosphorus and Urea-N content.

Constituents	Period	Treatments				Treat. 'F' value
		T_1	T_2	T_3	T_4	
Calcium (mg %)	P_1	10.00	9.50	10.50	10.50	4.26 n.s.
	P_2	9.50	9.50	10.20	11.70	
	P_3	10.50	11.00	10.50	11.00	
	P_4	10.25	11.25	10.50	11.25	
	Av.	10.06	10.31	10.43	11.11	
Phosphorus (mg %)	P_1	7.52	8.00	7.20	7.88	1.35 n.s.
	P_2	7.88	7.76	6.88	6.40	
	P_3	8.00	7.40	7.97	7.14	
	P_4	6.20	6.47	6.04	6.00	
	Av.	7.40	7.41	7.02	6.86	
Urea-N (mg %)	P_1	16.91	23.67	15.93	19.31	0.18 n.s.
	P_2	22.80	20.19	30.00	27.25	
	P_3	19.85	22.41	16.05	15.21	
	P_4	20.19	17.79	27.26	24.58	
	Av.	19.94	21.02	22.31	21.59	

n.s. = non-significant.

compared to calcium hydroxide supplemented groups. But the differences were non-significant. The results further indicated that the concentration of non protein-N content is higher at 2 hours post feeding in all the groups.

Total volatile fatty acids: The TVFA concentration was higher in control group as compared to calcium hydroxide supplemented groups but the difference was non-significant. The results further indicated that the TVFA production was higher at 2 hours post feeding in all the treatments. Similar results are reported by Rai (1975).

The blood samples were collected at the end of each period and serum samples were analysed for calcium, phosphorus and urea nitrogen content. The results are given in Table-2.

Serum calcium: The results revealed that the serum calcium content of bullocks in different treatments varied from 9.50 to 11.70 mg per cent which is in normal range. The serum calcium level increased with increasing level of calcium hydroxide in the ration. However, the

differences are non-significant.

Serum phosphorus: The serum phosphorus content varied from 6.04 to 8.00 mg per cent in different treatments during different periods and the values are in normal range. There seems to be no treatment effect on serum phosphorus content.

Urea-N: The Urea-N content is higher in calcium hydroxide supplemented groups as compared to the control group but the effect is not consistent.

REFERENCES

- Conway, E. J. 1957. Microdiffusion Analysis and Volumetric Error 4th Edn. P. 327. Crossby lockwood, London.
- Natelson, S. 1957. Microtechniques of clinical chemistry for Routine Laboratory. E. E. Thomas, Spring field, Illinois.
- Oser, B. L. 1965. Hawk's physiological chemistry 14th Edn. Tata McGraw-Hill pub. Co. Ltd. Bombay-New Delhi.
- Rai, S. N. 1975. Effect of utilizing Deoiled *Sal* seed meal (DSSM) with urea molasses diet on lactating Kankrej Cows. M. V. Sc. Thesis. Gujarat Agricultural University.
- Snedecor, G. W. and W. G. Cochran. 1968. Statistical Methods. 6th Edn. P. 299-334. Oxford and IBH publishing Co., Bombay.