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Effect of Feeding Formaldehyde Treated and Urea Supplemented Guar on Sheep Rumen Liquor

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Feeding of formaldehyde treated protein with urea has been reported to enhance growth and feed utilization in Magra lambs (Mathur & Mathur 1989). Significant increase in wool growth has been observed by feeding formaldehyde treated *Zizyphus nummularia* leaves (Ghose *et al.* 1971). Formaldehyde treatment of dietary protein and feeding of urea for a long time are likely to influence the overall functioning of the rumen. An experiment was thus conducted to study the effect of long term feeding of formaldehyde treated guar with or without urea on certain rumen metabolites of sheep.

Twenty four weaned intact Magra ram lambs of about 4 months old were divided into 4 equal groups.The experimental feed were subjected to proximate analysis and for Ca and P (AOAC 1980). An adiabiatic parr oxygen bomb calorimeter was used to determine the energy contents. Guar (*Cyamopsis tetragonoloba*) meal (DM 92.20, N 7.00, EE 5.78, CF 6.83, Ash 9.13, NFE 33.51, Ca 0.30, P 0.50 g $100g^{-1}$ and GE 424 Kcal $100g^{-1}$) was used as the protein source. For effective protection against excessive ruminal degradation the guar meal equivalent to 100 g N with 1mL of 40% formaldehyde overnight and then dried in the sun. Urea (N 46.40% and GE 257 K cal 100 g^{-1}) was used as the non protein-N source to replace one third of the dietary-N. In addition, all the animals were offered 100g of Jaggery (GE : 397 K cal $100g^{-1}$) $head^{-1}$ day^{-1} as a source of readily available energy and were allowed to eat chopped sevan (*Lasiurus sindicus*) hay (DM 91.31, N 0.69, EE 3.64, CF 33.12, Ash 8.29, NFE 50. 58, Ca 1.44, P 0.04 g $100g^{-1}$ and GE 418 K cal $100g^{-1}$) *ad libitum*.

The experimental rations were computed on the basis of chemical composition, keeping the roughage to concentrate ratio at 55:45 ensuring to provide iso-nitrogenous and iso-caloric status to the feed. Individual groups of lambs of 4 months old were fed with untreated guar meal (T_1), formaldehyde treated guar meal (T_2), formaldehyde treated guar meal + urea (T_3) and untreated guar meal + urea (T_4). After feeding for a period of 360 days, the rumen liquor was collected through stomach tube from each animal at 0, 30, 60 and 90 minutes after feeding. pH was determined shortly after collection of the samples. The rumen liquor after filtering through four layers of muslin cloth was anlaysed for NH_4-N by Conway micro-diffusion technique, total volatile fatty acids by Markham technique and total bacterial count by standard plate count. The data were subjected to statistical analysis.

Two way analysis of variance showed highly significant effect of different treatments on all the parameters, while there was no difference in pH, NH_4–N, TVFA and total bacterial count of rumen liquor collected at different intervals (Table 1).

The pH values recorded before feeding, irrespective of treatment, were found to be close to neutrality and confirmed the earlier findings (Chou & Walker 1964). Amonical-N at different intervals after feeding was found to be significantly (p 0.01) higher in groups of lambs fed with urea (T_4) compared to control. This could be attributed to the N rich substrate and the enhanced urease and or deaminase activity of the rumen resulting in greater liberation of ammonia. The reduction of rumen NH_4-N levels as a result of feeding protected protein has been reported earlier also (Faichney 1971).

TVFA concentration irrespective of treatment steadily increased with time. By and large this increasing trend has been considered a normal phenomenon in ruminants (Rai & Pandey 1980).

Table 1 *Changes in rumen metabolites at different intervals*

Time (Minutes)	Treatments			
	T_1	T_2	T_3	T_4
		pH		
0	$^{A}6.1^{a}$	$^{B}6.1^{ab}$	$^{A}6.1^{ab}$	$^{C}6.2^{b}$
30	$^{A}6.0^{a}$	$^{A}6.1^{a}$	$^{A}6.1^{ab}$	$^{BC}6.2^{b}$
60	$^{A}5.1^{a}$	$^{A}6.0^{a}$	$^{A}6.1^{ab}$	$^{B}6.1^{b}$
90	$^{A}6.0^{a}$	$^{A}6.0^{a}$	$^{A}6.1^{a}$	$^{A}6.0^{a}$
		NH_4-N (mg 100 mL^{-1})		
0	$^{B}13.6^{b}$	$^{AB}11.4^{a}$	$^{A}15.3^{C}$	$^{B}20.65^{a}$
30	$^{A}0.6^{a}$	$^{A}10.3^{a}$	$^{A}14.1^{b}$	$^{A}16.4^{c}$
60	$^{A}10.5^{a}$	$^{AB}11.0^{a}$	$^{B}20.1^{b}$	$^{B}21.5^{b}$
90	$^{C}24.4^{b}$	$^{B}13.9^{a}$	$^{C}30.5^{c}$	$^{C}33.7^{d}$
		TVFA (meq L^{-1})		
0	$^{A}81.7^{c}$	$^{A}68.7^{a}$	$^{A}75.6^{b}$	$^{A}80.0^{d}$
30	$^{AB}84.6^{b}$	$^{AB}73.0^{a}$	$^{B}83.7^{b}$	$^{A}90.0^{b}$
60	$^{BC}89.3^{b}$	$^{B}78.3^{a}$	$^{C}95.9^{b}$	$^{AB}100.4^{b}$
		Total bacterial count (x 10^9 mL^{-1})		
0	$^{A}7.8^{a}$	$^{B}7.4^{a}$	$^{A}8.3^{a}$	$^{A}11.2^{b}$
30	$^{A}7.3^{a}$	$^{AB}7.1^{a}$	$^{A}7.8^{a}$	$^{A}11.1^{b}$
60	$^{A}7.2^{a}$	$^{A}6.8^{a}$	$^{A}7.5^{a}$	$^{A}10.7^{b}$
90	$^{A}7.2^{a}$	$^{A}6.8^{a}$	$^{A}7.2^{a}$	$^{A}10.6^{b}$

** Significant at 1 % level of significance

a'b'c'd' mean bearing different superscripts in a column differ significantly.

A'B'C'D' mean bearing different superscripts in a row differ significantly.

TVFA concentration was found to be the lowest in lambs fed with protected protein (T_2) and highest in lambs fed with urea (T_4). Total bacterial count was found to be slightly lower in lambs fed with protected protein (T_2) and significantly higher in lambs fed with urea (T_4).

References

AOAC 1980 *Official Methods of Analysis* (13th Ed) Association of Official Analytical Chemists, Washington, D.C

Chou & Walker DM 1964 The effect of rumen composition of feeding sheep diets supplying different starches. *Journal of Agricultural Science* **62** 15-25

Faichney GJ 1971 The effect of formaldehyde treated casein on the growth of ruminant lambs. *Australian Journal of Agricultrual Research* **22** 453-456

Ghose PK, Ram Ratan & Taneja GC 1971 Effect of chemically protecting dietary protein from microbial degradation in the rumen on wool growth. *Indian Journal of Experimental Biology* **9** 109-111

Mathur OP & Mathur CS 1989 Feeding of protected protein and urea supplementation for enhanced growth and feed utilization in magra lambs. *Indian Journal of Animal Nutrition* **6** 274-278

Rai GS & Pandey MD 1980 Effect of management on rumen function in goat 1. TVFA, pH, freezing point depression buffering capacity and *in vitro* TVFA production. *Indian Veterinary Journal* **57** 120-125

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