

Studies on Certain Biochemical Constituents of Buffalo Calves Fed Two Levels of Digestible Crude Protein and Urea*

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ABSTRACT

An experiment on male Surti buffalo calves was conducted for 10 months to know the effect of two levels of digestible crude protein and urea on serum protein-N, NPN and urea-N.

The serum protein-N was not significantly affected by the different treatments, however, the values were higher in 100 per cent DCP fed group (T_1) as compared to lower level of DCP feeding (T_2). Urea-N was significantly higher in urea fed group (T_3) as compared to lower level of DCP feeding. NPN was also significantly affected due to different treatments imposed. (Received on May 1, '78)

INTRODUCTION

Different nutrients after getting digested are absorbed in the blood. Therefore, the analysis of blood samples for different biochemical constituents gives an idea regarding nutritional adequacy or harmful effect of these constituents.

MATERIALS AND METHODS

The study was carried out on male Surti buffalo calves between the age group of 6-9 months and 48-68 kg body weight for 10 months. In all 18 calves were divided in to three groups of 6 each (3 castrated and 3 un-castrated). The three treatments allotted were, T_1 -100 per cent digestible crude protein (DCP), T_2 -80 per cent DCP and T_3 -100 per cent DCP but 20 per cent replaced by urea. Sen and Ray (1971) feeding

standard was followed. Daily DCP requirement was met through concentrate. Urea was daily weighed and mixed in concentrate mixture. Wheat straw was used as basal roughage.

Blood samples from jugular vein of each calf were collected at monthly interval before feeding and watering. Serum samples were analysed for protein-nitrogen (N) by difference by Kjeldahl method (Total nitrogen-NPN), Non protein nitrogen (NPN) by the method of Varley (1963) and urea-N by the methods of Natelson (1957). Data were analysed statistically as suggested by Snedecor and Cochran (1968).

RESULTS AND DISCUSSION

Serum protein nitrogen

The results of the average serum

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Average[@] serum protein-N content (mg %) of calves under different treatments.

Ani.	Type of calves	Treatments			F Value	
No.		T_1	T_2	T_3	Treat.	C. vs Unc.
1.	Castrated	1041.80	935.55	922.21	2.46 ns.	4.01 ns.
2.		973.91	987.21	968.29		
3.		953.03	957.16	968.13		
Av.		989.58	959.97	952.88		
4.	Uncastrated	968.39	891.59	961.12		
5.		937.84	926.41	981.34		
6.		955.65	916.24	929.31		
Av.		953.96	911.41	957.26		
Treat. Av.		971.77	935.69	955.07		

ns = non significant.

(T₃) at similar level of DCP feeding (T₁) resulted in lower serum protein nitrogen but was higher than T₂. However, these differences were non significant.

The present finding that levels of DCP feeding had no significant effect on protein-nitrogen is in agreement with those reported by Anaokar (1970); Boling, Young and Bradley (1972), Patel, Shukla and Pande (1972) and Puntambekar (1973). However, Hussain, Sharma, Khirwar and Rao (1975) in Murrah buffalo calves observed significantly lower protein nitrogen by feeding 25 per cent lower DCP.

The urea feeding has been reported to cause reduction in the serum protein levels. (Singh and Sawhney 1967; Anaokar 1970; Sharma, Patel and Shukla 1973; Puntambekar, 1973; and Verma, Johri and Ranjhan. 1975). In the present results also the serum protein nitrogen concentration was

The comparison of DCP at two levels revealed higher serum protein nitrogen in 100 per cent DCP fed group (T_1) as compared to lower level of DCP feeding (T_2). However, the difference was non significant. Urea incorporation

TABLE 2

Average[@] serum non-ptorein-N content (mg %) of calves under different treatments.

Ani. No.	Type of calves	Treatments			F value	
		T ₁	T ₂	T ₃	Treat.	C. vs Unc.
1.	Castrated	74.80	82.25	68.29	17.00**	0.44 ns
2.		73.99	73.99	71.21		
3.		77.37	77.34	78.37		
Av.		75.39	77.86	72.62		
4.	uncastrated	74.61	75.11	69.78		
5.		73.66	77.39	72.76		
6.		75.45	80.56	73.79		
Av.		74.57	77.69	72.11		
Treat. Av.		74.98	77.78	72.37		

@ Average of 10 observations. ** Significant at 1% level. ns = non significant.

lowered down. However, Musial and Rys (1962) could not find the lowering effect of serum protein level with urea feeding while Dabadghao, Des Raj and Mudgal (1971) observed significantly higher serum total protein in urea fed groups as compared to non urea fed group.

From the results it is concluded that neither the level of DCP feeding nor urea inclusion in the concentrate ration had any significant effect on serum protein nitrogen of calves.

Serum non-protein nitrogen (NPN)

The average serum NPN content under different treatments are given in Table 2 along with the statistical analysis.

The results showed that the mean serum NPN values for the treatments T₁, T₂ and T₃ were 74.98, 77.78 and 72.37 mg per cent respectively.

The serum NPN in castrated calves were 75.39, 77.86 and 72.62 and in un-

castrated calves 74.57, 77.69 and 72.11 mg per cent in T₁, T₂ and T₃ respectively. Thus the values were slightly higher in castrated calves as compared to uncastrated calves but the differences were non significant.

The comparison of levels of DCP feeding (two levels) showed higher serum NPN in lower level of DCP feeding (T₂) as compared to 100 per cent DCP feeding (T₁) and the difference was significant. Urea feeding resulted in significantly lower serum NPN as compared to 100 per cent DCP feeding (T₁) or lower level of DCP feeding (T₂). Higher or lower level of DCP feeding did not alter serum NPN as reported by Anaokar (1970); Puntambekar (1973) and Hussain *et al.* (1975). The present observations are not in agreement with the above workers.

Urea feeding is associated with elevated level of serum NPN is reported by Singh and Sawhney (1967); Mishra

TABLE 3

Average[@] serum urea-N content (mg %) of calves under different treatments.

Ani. No.	Type of calves	Treatments			F value	
		T ₁	T ₂	T ₃	Treat.	C. vs. Unc.
1.	Castrated	25.82	28.30	29.00	6.27*	1.19 ns
2.		31.24	28.03	30.04		
3.		30.79	23.88	34.86		
Av.		29.28	26.74	31.30		
4.	Uncastrated	29.11	25.82	28.76		
5.		32.67	26.62	34.58		
6.		34.02	27.35	35.91		
Av.		31.93	26.60	33.08		
Treat. Av.		30.61	26.67	32.19		

[@] Average of 10 observations. * Significant at 5% level. ns = non significant.

(1969); Dabadghao *et al.* (1971) and Sharma *et al.* (1973). The present finding is not in agreement with the above cited literature. However, the data of Singh and Sawhney (1967) can not be directly compared with the present data because their study was based on increasing levels of urea while the data comparing control with urea ration are not available for the comparison.

Serum urea nitrogen:

The average serum urea nitrogen content are given in Table 3 along with the statistical analysis.

The average serum urea nitrogen concentration in T₁ T₂ and T₃ were 30.61, 26.67 and 32.19 mg per cent respectively.

The comparison of urea-N in castrated and uncastrated calves showed 29.28, 26.74 and 31.10 in castrated and 31.93, 26.60 and 33.08 mg per cent in uncastrated calves under T₁, T₂ and

T₃ respectively. Thus the values are more or less the same in two categories of calves and did not differ significantly from each other.

Comparing the variations between the two levels of DCP feeding (T₁ and T₂) it is observed that 100 per cent level of DCP feeding (T₁) resulted in consistently higher concentration of serum urea as compared to T₂ and the difference is found to be significant.

The effect of urea feeding in the diet on the serum urea-N concentration at the similar level of DCP feeding (T₁ and T₃) showed consistently higher urea-N in urea fed group (T₃) as compared to non-urea (T₁) group except during a few periods. This difference was more marked during the initial periods. This might be due to the fact that the urea feeding resulted in rapid production of ammonia in the rumen which is absorbed in the blood and converted to urea in the liver. Hence,

the higher values of serum urea-N. However, subsequently calves must have adopted to the urea feeding and thus the effect was not much marked. This hypothesis is also supported by growth data in which the growth of urea fed calves during the initial periods was less than the later periods (Pande, 1978). This is also reported by Puntambekar (1973). However, the differences in urea-N of calves under T_1 and T_3 were non significant while urea-N in T_3 was significantly higher as compared to calves under T_2 .

The present results of higher concentration of serum urea-N with higher level of protein feeding are in agreement with those of Anaokar (1970), Puntambekar (1973), Manston, Russell, Dew and Payne (1975) and Mehra, Nath, Ranjhan and Chetal (1976).

Urea feeding resulted in significantly higher blood urea-N observed under the present study is in agreement with those reported by Mishra (1969), Dabadghao *et al.* (1971), and Verma *et al.* (1975). However, Anaokar (1970), Boling *et al.* (1972), Narang and Rao (1973), Puntambekar (1973) and Sharma *et al.* (1973) did not find significant variations in blood urea concentration due to NPN feeding.

Thus the results indicated that higher level of DCP feeding resulted in higher concentrations of serum urea-N and that urea feeding in the ration gives still higher concentrations of serum urea-N. This effect of urea feeding is more pro-

nounced during the early stages than that at later stages.

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