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Effect of Feeding Deoiled *Sal* Seed Meal (DSSM) with Urea-molasses Diet to Milch Cows on Quantity and Quality of Milk and Blood Metabolites

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ABSTRACT

This experiment was conducted to study the effect of feeding DSSM at different levels with urea-molasses ration on quantity and quality of milk and blood metabolites using lactating Kankrej cows as experimental animals. The results obtained on milk production revealed that treatment T_2 showed superiority over T_1 and T_3. Similar results were also observed in FCM production. The differences showed no significant effect thereby suggesting no adverse effect on milk and FCM production during short term use of DSSM with urea. Similarly composition of milk e.g. protein, total solids, lactose and minerals have not been significantly affected due to treatments. Economics of feeding revealed that Rs. 70·40 and 140·80/tonne of feed cost could be reduced by inclusion of 10 and 20% level of DSSM in concentrate mixtures respectively, as compared to conventional type of concentrate mixture. The results for blood plasma revealed that effect of treatments did not show much variations in the total-N and NPN but slightly increasing trend was observed in the content of total-N under treated groups. Plasma urea-N values were found to be reduced significantly with higher levels of DSSM. The average data of post prandial hourly changes in plasma also revealed that practically no treatments effect were seen on the constituents of plasma studied.

Practically there was no difference amongst various characters of urine from one treatment to another. The white precipitates (protein like substances) were observed specially under treatment T_3 where 20% DSSM was incorporated in the concentrate mixture.

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INTRODUCTION

The exploitation of the deoiled *sal* seed meal as a cattle feed can contribute tremendously to the national economy.

Various ways have been suggested to decrease the ruminal degredation of protein to increase its biological value for ruminants. Recently tannins have been used to increase the biological value of proteins in ruminants by reducing protein degradation [(Leroy, Zelter and Francois (1964), Bhargava, Ranjhan and Singh (1973) and Tripathi, (1975)] Thus, the tannic acid content of DSSM may help to slow down NPN hydrolysis in ruminants. Keeping this point in view an attempt has been made to study the effect of feeding DSSM with urea-molasses diet on quantity and quality of milk and blood metabolites.

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MATERIALS AND METHODS

The present investigation was conducted on the lactating Kankrej cows. Taking into consideration the lactation number, previous lactation yield and the order of calving, three cows were selected. A 3×3 latin square design with six weeks period was followed and treatments were randomly allotted.

The three treatments consisted of 0 (control), 10 and 20% of DSSM in concentrate mixtures and were designated as treatment T_1, T_2 and T_3 respectively. Urea was supplemented at the rate of 1% of concentrate mixture in all the three treatments. The requirements of DCP and TDN were met as suggested by NRC (1971). Furthermore, 2 kg of green hybrid napier was fed in order to fulfil the vitamin A requirement of milch cows.

Daily, during morning and evening time, milk yield were recorded by adding the milk suckled by the calf to the milk received in pail. The composite samples of morning and evening milk were analysed for fat at weekly interval and proximate constituents of milk in the last two weeks of each period. Total N and phosphorus content of milk were determined by AOAC (1970) method. The value for crude protein was obtained by multiplying total N with 6·38. Lactose, ash and calcium content of milk were estimated by ISI (1962) method. Cost of milk and FCM was worked out by dividing total cost of feeds by milk and FCM yields. Jugular blood samples were collected before feeding and watering from all the experimental cows. Samples were drawn twice before and after conducting metabolism trial in the last week of each period. Post prandial hourly changes in the metabolites of blood plasma like total-N, NPN and urea-N were also estimated at the end of experiment (after P_3). Blood samples were drawn at 0 hour (before feeding), 1, 2, 3, 4, 5, 6, 7 and 8 hours post feeding from the cows. Total-N was estimated by Kjeldahl method as per AOAC (1970), NPN by the method of Varley (1963) and urea-N by the procedure of Natelson (1967).

About 100 ml of urine samples were collected daily from all cows during the course of metabolism trials for estimations of various characters of urine.

TABLE 1

Effect on milk and FCM production (kg/day).

Period	*Treatments*			*'F'*	*Treatments*			*'F'*
	T_1	T_2	T_3		T_1	T_2	T_3	
		Milk				*FCM*		
P_1	8·57	9·80	8·79		9·29	10·90	9·10	
P_2	7·69	7·76	8·42		8·35	8·62	9·11	
P_3	7·72	6·96	6·81		8·24	7·83	7·47	
AV.	7·99	8·24	8·01	2·00 N.S.	8·63	9·12	8·56	4·67 N.S.

N.S. = Non significant.

TABLE 2

Effect on average chemical composition of milk (%).

Treatment	T_1	T_2	T_3	'F'
Constituents				
Total solids	13·45	13·85	13·40	2·85 N.S.
Solids-not-fat	8·92	9·19	8·93	3·67 N.S.
Fat	4·53	4·66	4·47	0·60 N.S.
Crude protein	3·24	3·07	3·07	0·50 N.S.
Lactose	4·57	4·54	4·48	0·07 N.S.
Ash	0·76	0·78	0·72	1·26 N.S.
Phosphorus	0·10	0·10	0·10	0·64 N.S.
Calcium	0·13	0·13	0·13	0·70 N.S.

N.S. = Nonsignificant.

Statistical analysis of all the data was carried out by the procedure of analysis of variance as per Snedecor and Cochran (1968).

RESULTS AND DISUSSION

Effect on milk and FCM production: Average data for milk and FCM yields are presented in Table 1.

From the results (Table 1) it is observed that highest milk production was found in treatment T_2, while similar milk production was observed between T_1 and T_3. Similar trend was observed in FCM production. The average values of FCM for treatments T_1, T_2 and T_3 were 8·63, 9·12 and 8·56 kg/day respectively. However, these differences between treatments were found to be statistically non significant.

Prasad (1971) found that incorporation of 15% DSSM in concentrate mixture did not affect the milk and FCM production of Murrah buffaloes. Jagadale (1974) observed that the incorporation of 10% level of DSSM in concentrate mixture resulted in higher production of milk, while 20% level gave significantly lowered milk yield as compared to control group which is contradictory with present findings.

Effect on chemical composition of milk: The average data for each constituents are presented in Table 2.

Practically no differences were observed (Table 2) due to treatments on chemical composition of milk. However, T_2 was found to be superior over T_1 and T_3 groups.

The results of present investigation are in agreement with those reported by Das and Mohanty (1970), Prasad (1971) and Jagadale (1974).

Effect on the cost of feeding: Data showing the cost of feed/kg milk and FCM production are given in Table 3.

The average data showed (Table 3) a decreasing trend with each higher level of DSSM for the cost of feeding milk. Similar trend was also observed in the FCM production. However, the differences among the treatments are not significant. It was further observed that by inclusion of 10 and 20% level of

TABLE 3

Effect on the feed cost (Rs/kg) of milk and FCM production.

Period	*Milk Treatments*			*'F'*	*FCM Treatments*			*'F'*
	T_1	T_2	T_3		T_1	T_2	T_3	
P_1	0·60	0·65	0·59		0·56	0·58	0·57	
P_2	0·72	0·60	0·64		0·66	0·55	0·59	
P_3	0·68	0·73	0·66		0·64	0·65	0·60	
AV.	0·67	0·66	0·63	0·54 N.S.	0·62	0·59	0·59	1·90 N.S.

N.S. = Non significant.

DSSM in concentrate mixtures, feed cost can be reduced by Rs. 70·40 and 140·80/ tonne respectively as against conventional type of concentrate mixture.

Blood metabolites studies:

Effect of utilizing DSSM with urea-molasses ration on plasma Total-N, NPN and urea-N level.

The data regarding periodical changes in plasma total-N, NPN and urea-N for last two weeks of each period and average values for each treatment together with statistical analysis are given in Table 4.

(A) *Plasma total-N:* Periodical changes in the total-N level (Table 4) showed wide fluctuations among the treatments. The minimum and maximum were found to be 1131·0 to 1210·8 mg/100 ml, whereas the over all mean values were 1173·90, 1186·15 and 1193·18 mg/100 ml for treatments T_1, T_2 and T_3 respectively. However, the differences were not statistically significant. Singh and Sawhney (1967) and Sharma (1973) reported that blood plasma total-N exhibited a decreasing trend with NPN feeding.

TABLE 4

Effect of utilizing DSSM with urea-molasses ration on blood plasma nitrogen fractions (mg/100 ml.)

Constituents @	*Period*	*Treatments*			*'F'*
		T_1	T_2	T_3	
Total nitrogen	P_1	1131·0	1187·9	1210·3	
	P_2	1199·8	1196·3	1158·5	
	P_3	1191·4	1174·3	1210·8	
	Av.	1173·90	1186·15	1193·18	0·014 N.S.
Non-protein nitrogen	P_1	105·00	107·10	96·60	
	P_2	108·78	129·78	85·68	
	P_3	105·00	107·10	113·40	
	Av.	106·26	114·66	98·56	1·647 N.S.
Urea nitrogen	P_1	42·65	31·19	25·46	
	P_2	23·36	32·28	22·95	
	P_3	27·80	20·30	32·58	
	Av.	31·27	27·92	26·99	63·17*

N.S. = Non significant; * = Significant ($P < 0·05$), C.D. = 1·72

@ Each value represents the mean of 4 observations under each treatment.