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Utilization of Sunflower (*Helianthus annuus* L.) as green fodder by bullocks

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ABSTRACT

The nutritive value of sunflower fodder (green) was studied using four mature Kankrej bullocks. Sunflower forms a palatable and useful feeding stuff for dairy cattle. The body weight and per cent dry matter intake (2·1 kg) of animals were satisfactory during experimental period. It was further observed that supplementation of mature pasture hay still increased the dry matter intake (2·4 kg) of animal. The mean values of digestibility coefficients were 70·53, 82·80, 51·50 and 74·16 for crude protein, ether extract, crude fibre and NFE respectively. The digestible crude protein (DCP) and total digestible nutrients (TDN) were 7·15 and 64·37 per cent which can favourably be compared with any good quality cereal fodder. The results of balance studies showed positive balances in all cases for N, P and Ca. The average values were + 42·95, + 3·67 and + 6·88 g day/animal for N, P and Ca respectively. At this level of intake it forms a good maintenance ration for bullocks.

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INTRODUCTION

SUNFLOWER is an excellent green fodder and has an advantage over some other fodder crops of being cultivated throughout the year by successive sowing and does well both in north and south India. Sunflower is recently introduced as oil seed crop in India. As such very little work has been done so far on various nutritional aspects of the crop especially towards the nutritive value and balances of N, P and Ca for different categories of dairy cattle. Therefore, an attempt was made to study the utilization of sunflower as green fodder using four Kankrej bullocks.

MATERIALS AND METHODS

The present study was conducted on four mature Kankrej bullocks to assess the palatability, dry matter consumption, body weight, nutrients metabolism and balances of nitrogen (N), phosphorus (P) and calcium (Ca). Unchaffed Winter sunflower fodder (Variety EC-68415) used during the course of study was at the flowering stage (77 days). Out of four bullocks one was supplemented with mature pasture hay @ 2 kg/day in order to meet the dry matter requirement of animal throughout the experimental period. Seven days period of collection for fodders, feces and urine under metabolism trial was kept after a preliminary period of 17 days feeding. All the samples and fodders for their different constituents were analysed by AOAC (1970) methods. The chemical composition of fodders used during experimental period are presented in Table 1:

TABLE 1

Chemical composition of fodders used (on % DM basis).

Fodder	*Crude Protein*	*Ether Extract*	*Crude Fibre*	*NEF*	*Ash*	*Silica*	*Phosphorus*	*C[illegible]*
Sunflower	10·14	5·48	25·65	45·57	13·16	0·99	0·23	[illegible]
Mature Pasture Hay	1·84	1·67	40·56	47·24	8·69	6·44	0·03	[illegible]

RESULTS AND DISCUSSION

Effect on Palatability and Dry Matter Consumption: Sunflower green fodder was offered *ad libitum* to experimental animals and they consumed about 55 kg green fodder. Thus, it was observed that animal could consume sufficient quantity of sunflower green fodder and was found to be quite palatable. The per cent dry matter intakes were worked out for the experimental period for each animal. The data are presented in Table 2. The results indicated that the dry matter consumption per 100 kg live weight ranged from 1·94 to 2·16 kg. Practically there was no difference in the per cent dry matter intake from one animal to another. However, it was further observed that supplementation of mature pasture hay still enhanced the per cent dry matter consumption (2·43 kg) of animal.

TABLE 2

Effect of feeding Sunflower on dry matter intake per day per animal (kg).

Bullock No.	*Sunflower*	*Mature Pasture Hay*	*DMI/100 kg Body Weight*
1.	7·69	—	2·08
2.	7·68	—	2·16
3.	7·86	—	2·06
4.	7·44	1·88	1·94 (2·43)*

[illegible] dry matter

Effect on Body Weight: The data [illegible] body weights are given in Table 3 fr[illegible] which it can be concluded that ex[illegible] animals can be maintained very [illegible] without any deleterious effect on [illegible] body weights.

TABLE 3

Effect of feeding sunflower on gain or loss [illegible] body weights (kg) of the bullocks.

Bullocks No.	*Body Weight*		*Gain*
	Initial	*Final*	*Lo[illegible]*
1.	360·36	369·46	[illegible]
2.	354·90	357·81	[illegible]
3.	381·29	380·84	[illegible]
4.	380·38	384·02	[illegible]

Effect on Digestibility Coefficients: [illegible] results (Table 4) revealed that cr[illegible] protein digestibility coefficients varied [illegible] 65·88 to 73·02, whereas average value [illegible] 70·53 ± 1·58. Relatively higher dig[illegible]bility coefficient for ether extract [illegible] observed. The average value was [illegible] ± 1·40. Crude fibre digestibility co[illegible]cients varied from 45·73 to 58·09 wi[illegible] average value of 51·50 ± 2·45. Nitr[illegible] free extract digestibility followed a [illegible] trend as in case of ether extract [illegible] value was found to be 74·16 ± [illegible] Organic matter digestibility varied [illegible] 63·53 to 71·00 with an average of [illegible]

lower digestibility of crude protein, ether extract and NFE in hybrid napier while crude fibre digestibility was much higher as compared to present findings. They further reported little lower DCP and TDN content of hybrid napier. Thus, it was further observed that sunflower fodder can favourably be compared with a good quality of any green cereal fodder as it contains 7·15 and 64·37 per cent of DCP and TDN respectively. A similar DCP content of sunflower was reported by Schneider (1947) and Sen and Ray (1971), whereas they found lower values of TDN (48·9 and 52·50) respectively as compared to findings of present study. On the contrary Morrison (1956) observed much lower DCP of sunflower, where as TDN value remained similar as obtained in this study.

TABLE 4

Effect of feeding sunflower on digestibility coefficients and nutritive value.

Bullock No.	*Crude Protein*	*Ether Extract*	*Crude Fibre*	*NFE*	*Organic Matter*
		Digestibility coefficient			
1.	73·02	79·89	58·09	75·91	71·00
2.	71·46	86·54	45·73	70·27	63·53
3.	71·74	83·07	50·60	71·60	66·25
4.	65·88	81·69	51·58	78·86	69·74
Average	70·53	82·80	51·50	74·16	67·63
S.E. ±	1·58	1·40	2·45	1·90	1·69
C.V.%	4·00	3·00	10·00	5·00	5·00
		Average Digestible Nutrient			
					TDN
	7·15	10·21	13·20	33·80	64·37

Effect on Balances of N, P and Ca: The results (Table 5) indicated the positive retention for N, P and Ca in all the animals. The mean values were 42·95 ± 3·33, 3·67 ± 0·37 and 6·88 ± 2·19 g/day/animal for N, P and Ca balances respectively. Patel *et al* (1970) reported that hybrid napier imparted negative balance for N and positive balance for Ca in all the three seasons, while P balance was positive only in summer season. Higher retention for N under present investigation suggested a superiority over other fodders like hybrid napier.

TABLE 5

Effect of feeding sunflower on balances of N, P and Ca (g/day/animal).

Bullock No.	*Nitrogen*	*Phosphorus*	*Calcium*
1.	+ 47·49	+ 2·68	+ 5·48
2.	+ 47·82	+ 3·73	+ 11·50
3.	+ 42·97	+ 3·78	+ 1·44
4.	+ 33·51	+ 4·49	+ 9·11
Average	+ 42·95	+ 3·67	+ 6·88
S.E. ±	3·33	0·37	2·19
C.V.%	15·53	20·32	63·84

Effect on Available DCP and TDN: The average available DCP and TDN from sunflower (flowering stage) were found to be 536·90 ± 46·2 and 5073 ± 166·0 g/day/animal respectively. It indicated that sunflower green fodder served as a good ration for maintenance.

TABLE 6

Effect of feeding sunflower on available DCP and TDN (g/day/animal).

Bullocks No.	*DCP*	*TDN*
1.	634·41	5164·63
2.	485·95	4678·67
3.	592·49	4978·94
4.	434·73	5470·37
Average	536·90	5073·15
S.E. ±	46·20	166·00
C.V.%	17·22	6·54

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