Short Communications

Pak. j. sci. ind. res., vol. 37, no. 10, October 1994

Barseem (Egyptian Clover) As Ruminant Feed

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(Received February 11, 1992; revised May 16, 1994)

Barseem (Egyptian clover) is a forage which contains a fairly high amount of extractable protein-fat-vitamin rich food [1]. Production of protein rich food from barseem results in fibrous residues which contain up to 16% protein [2] and can be fed to ruminants which require only 9-16% [3] protein in their ration. The present investigations were planned to study the use of dried fibrous barseem residue as a substitute for conventional sources of protein for sheep.

Forty rams of nearly uniform size and of the same breed were procured. Four experimental rations were formulated (Table 1)and were designated as A, B, C and D. The composition and proximate analysis of these rations is shown in Table 2. The rams were divided into four groups of 10 animals each, having the replicates of 5 animals in each group, to be fed on four experimental rations. The pens and rations were assigned to each group at random and they were fed on lot feeding system. Each lot of the animals was housed separately in pens and given its respective ration twice daily for 77 days. Fresh and clean water and rock salt were made available all the time. In addition to the alloted rations each lot of the animals received 2.5 kg of green fodder to meet their carotene requirement and thereafter at weekly intervals till the end of experiment. Records of daily feed offered, refused, consumed, growth rate and health were maintained. The results obtained were subjected to statistical analysis according to the analysis of variance [4]. Duncan's multiple range tests [5] were also applied when the significant differences were obtained (Table 2).

Average growth rate, feed consumption and feed efficiency of rams fed on experimental rations A, B, C and D are given in Table 3. The statistical analysis of the data revealed a significant difference in weight gain of the rams fed on different experimental rations (Table 4). The animals fed on ration B containing 50% undecorticated cotton seed cake (UCSC) gained significantly ($P \leq 0.5\%$ level) more weight than those on rations A, C and D. This difference seems to be due to addition of un-DCSC [6] in the ration (Table 3). However, the rams fed on ration C, containing 50% barseem residue (BR) and 1.5% urea, gained more weight than rams offered

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TABLE 1. COMPOSITION OF EXPERIMENTAL RATION.

Ingredients	Rations			
	A	B	C	D
Barseem residue	68.0	–	50.0	–
Cotton seed cake (undecorticated)	–	50.0	–	30.5
Wheat straw molasses	–	18.0	16.5	36.0
(cane liquid)	30.0	30.0	30.0	30.0
Bone meal	1.5	1.5	1.5	1.5
Urea	–	–	1.5	1.5
Salt (common rock)	0.5	0.5	0.5	0.5
Total	100.0	100.0	100.0	100.0

TABLE 2. ANALYSED CHEMICAL COMPOSITION OF EXPERIMENTAL RATIONS (AS FED BASIS).

Nutrients (%)	Rations			
	A	B	C	D
Nitrogen	1.9	2.0	2.0	1.5
Protein (N x 6.25)	11.8	12.3	12.2	9.6
Ash	16.6	11.8	19.1	13.1
Ether extract (EE)	0.8	2.7	0.6	1.1
Fibre	28.3	21.1	44.5	25.6
N.F.E.	42.6	50.1	21.6	49.1

TABLE 3. SUMMARY OF GROWTH RATE, FEED CONSUMPTION AND FEED EFFICIENCY OF RAMS FED ON DIFFERENT EXPERIMENTAL RATIONS.

Particulars	Rations			
	A	B	C	D
No. of animal at the start of experiment	10	10	10	10
No. of animals at the end of experiment	10	9	9	9
Average initial live weight (kg)	27.49	28.72	28.64	27.73
Average final live weight (kg)	32.73	41.62	37.48	33.82
Average total weight gain (kg)	5.2	12.90	8.84	6.1
Days on feed	77	77	77	77
Total feed consumed(kg)	49.75	57.04	50.23	45.52
Average daily weight gain (g)	68.1	167.5	115.1	79.1
Average daily feed consumed (kg)	0.65	0.74	0.65	0.59
Feed required per kg gain in weight (kg)	9.69	4.42	5.68	7.47
Cost of ration per kg (Rs.)	0.73	1.45	0.73	1.01
Cost of 100 kg gain in weight (Rs.)	707.37	640.90	414.64	754.47

rations A and D (P≤0.1). Ration A, containing 68% BR, showed the poorest growth rate due to a higher amount of fibre (28.3%), and a reduction in the mineral content of feed due to elimination of solubles in the juice filtrate. Supplementation of the barseem residue with urea (1.5%) resulted in improvement in live weight gain. Addition of wheat straw in ration C raised the level of C.F. to 44.5% thereby decreasing the digestibility of the ration (Table 2). Hence, it can be concluded from the above experiment that BR is still a good quality feed for ruminants provided it is supplemented with non-protein nitrogen (NPN) sources.

Non significant statistical difference in feed consumption was observed by various groups fed on experimental rations (Table 5). This clearly indicated that palatability of the rations was not affected.

The cost of rations A, B, C and D was Rs. 0.73, 1.45, 0.73 and 1.01 per kg, respectively (Table 3). Considering the economics of meat production per 100 kg, the ration C containing 50% berseem residue and 1.5% urea proved to be more economical as compared to other rations.

TABLE 4. ANALYSIS OF VARIANCE OF AVERAGE DAILY WEIGHT GAIN OF RAM LAMBS FED ON DIFFERENT EXPERIMENTAL RATIONS.

Source of variance	Degree of freedom	Sum of squares	Means squares	F. ratio
Between ration	3	0.0460	0.0153	13.91*
Error	4	0.0046	0.0011	–
Total	7	0.0506	–	–

* Significant at 5% level (P≤0.05). S.E. = 0.023.

B	C	D	A
0.35	0.25	0.17	0.15

ANALYSIS OF VARIANCE OF DAILY FEED CONSUMPTION OF LAMBS FED ON DIFFERENT EXPERIMENTAL RATIONS.

Source of variance	Degree of freedom	Sum of squares	Means squares	F. ratio
Between rations	3	0.5287	0.1762	4.36^{NS}
Error	4	0.1615	0.04044	–
Total	7	0.6902	–	–

NS = Non-significant.

TABLE 5. ANALYSIS OF VARIANCE OF FEED EFFICIENCY VALUES OF DIFFERENT EXPERIMENTAL RATIONS.

Source of variance	Degree of freedom	Sum of squares	Means squares	F. ratio
Between rations	3	95.32	31.77	3.93^{NS}
Error	4	32.32	8.08	–
Total	7	127.64	–	–

NS = Non-significant.

These results are in line with the findings of many scientists [7-12] that pressing of green fodder reduced the nutritive value of fodders for animals due to leaching of soluble proteins, carbohydrates and minerals [13]. Addition of leached out nutrients was found to compensate the loss [14-16]. Fujihara and Oshima [13], Borhami and El-Shazy [17] and Borhami *et al.* [18] observed that addition of protein concentrate or urea to the pressed fodder have improved its nutritive value.

Hence, it can be concluded that barseem residue is a good source of protein and energy. It supports efficient growth, comparable to a good quality ruminant feed, i.e. undecorticated cotton seed cake, provided it is supplemented with urea (a non-protein-nitrogen source).

Key words: Barseem residue, Cotton seed cake, sheep fattening.

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