

Use of *Isabgul* (*Plantago ovata*, Forsk) *gola* in the Concentrate Mixture for Milch Cows

P. C. Shukla, M. C. Desai, L. P. Purohit, H. B. Desai and B. H. Patel

Animal Nutrition Department, Gujarat Agricultural University, Anand Campus, Anand-388 110

ABSTRACT

A 3 x 3 latin square design using 3 lactating Kankrej cows was followed for the study. Each period was of six weeks duration. The three treatments T₁, T₂ and T₃ were 0 (control), 25 and 50 per cent level of *Isabgul gola* in concentrate mixture. *Isabgul gola* had 18.78 C.protein, 5.08 E.Extract, 27.14 C.fibre, 46.92 N.F.E., 2.08 ash, 0.21 silica, 0.36 P and 0.37 percent Ca.

The daily dry matter intake kg/100 kg body weight and g/kg W^{0.75} was almost similar under three treatments (around 3.0 kg/100 kg body weight and 135-139 g/kg W^{0.75}). The treatment differences were also statistically non-significant. *Isabgul gola* feeding had no adverse effects on production and composition of milk. *Isabgul gola* feeding did not have any adverse effect on body weight and the differences were significant. The digestibility of proximate nutrients was not affected by different treatments and the differences were not significant. The balances of nitrogen (N), phosphorus (P) and Calcium (Ca) were positive under all the three treatments and the treatment differences were non-significant for all the three constituents. Over all results suggest that *Isabgul gola* can be fed upto 50 per cent level in concentrate mixture to milch cows.

(Received on 9th Octo. 1980)

INTRODUCTION

The byproduct of *isabgul* (*Plantago ovata*, Forsk) known as *isabgul gola* (hard husked kernel) is commonly used in northern Gujarat (Mehsana and Banaskantha Districts) for feeding animals. Desai *et al.* (1980) have studied its nutritive value and reported that this by-product is a promising cattle feed. Detailed, feeding studies have not been carried out. Therefore, an attempt is made to study the effect of inclusion of *gola* at different levels on body weight and nutrient utilization by milch cows.

MATERIALS AND METHODS

A 3 x 3 latin square design using three lactating Kankrej cows was fol-

lowed for the study. Each period was of six weeks duration. The three treatments were 0, 25 and 50 per cent level of *isabgul gola* in the concentrate mixture of T₁, T₂ and T₃ respectively. The DCP requirements of lactating cows was met by daily feeding of 3 kg green 'NB 21' and relevant concentrate mixture as per Sen and Ray (1971) standards. Mature pasture grass was fed *ad lib*. All the cows had free access to fresh clean water.

Daily feed consumption and milk production data were recorded for individual cows. Body weights were taken at weekly intervals for 3 consecutive days. The digestibility and metabolism trials were conducted during last week

of each period. The feeds, fodders, feces, urine and milk were analysed by A.O.-A.C. (1970) methods. Milk fat was determined by Gerber method. The statistical analysis of the data was carried out as per Snedecor and Cochran (1968). The proportion of different ingredients in concentrate mixtures is given in Table 1.

TABLE 1
Proportion of different ingredients in the concentrate mixture (%).

Ingredients	Concentrates		
	T ₁	T ₂	T ₃
Groundnut cake	4	4	4
Maize gluten	15	20	20
Wheat bran	39	17	0
Guar chuni	28	21	13
Isabgul gola	0	25	50
Molasses	11	10	10
Salt	2	2	2
Bone meal	1	1	1
Total	100	100	100
Chalk (g/kg)	19	10	2
Bone meal (g/kg)	—	8	18
Calculated DCP	15.31	15.50	15.09
Calculated TDN	66.53	67.45	68.05

RESULTS AND DISCUSSION

Chemical composition:

Crude protein content (per cent on dry matter basis) of three concentrate mixtures were more or less similar

TABLE 2

Average dry matter consumed (kg/100 kg body weight and g/kg W^{0.75}) by cows per day during isabgul gola feeding.

Treatment period	T ₁	T ₂	T ₃	Treat. 'F'	T ₁	T ₂	T ₃	Treat 'F'
	D.M. intake kg/100 kg B.wt.				D.M. intake g/kg W ^{0.75}			
P ₁	3.36	2.98	2.96		143.4	133.4	130.6	
P ₂	3.07	2.93	3.53		137.9	130.2	152.4	
P ₃	3.00	3.36	2.66		134.4	145.7	121.6	
Av.	3.14	3.09	3.05	0.23 NS	138.60	136.43	134.87	0.18 NS

NS = Non-significant.

(T₁-21.37, T₂-22.67 and T₃-22.30). The mixtures were balanced for phosphorus and calcium with the help of chalk and bone meal. The fodders used in the experiment had usual range of composition.

Dry matter intake:

The results of daily dry matter intake as kg/100 kg body weight and g/kg W^{0.75} are given in Table-2.

The average daily dry matter intake kg/100 kg body weight and g/kg W^{0.75} were almost similar under three treatments. The differences were also not significant. Thus gola is quite palatable to milch cows even upto 50 per cent level in concentrate mixture. Similar results were also reported with isabgul lali feeding by Shukla *et al.* (1981).

Effect on production and composition of milk:

The average results of milk production and milk composition under different treatments are given in Table-3.

From the perusal of results given in Table 3 it is apparent that there is no adverse effect of isabgul gola feeding on milk production and on some of the milk constituents studied. The differences were also found to be non-significant.

Effect on body weight, digestibility and balances of nutrients:

The results on gain or loss in body weights, digestibility of proximate nu-

TABLE 3

Effect on *Isabgul gola* feeding on production and composition of milk (Average of 3 periods).

	T ₁	T ₂	T ₃	
Milk yield (kg/day)	7.16	7.40	7.44	NS
FCM yield (kg/day)	8.20	8.50	8.62	NS
Fat %	4.97	4.98	5.08	NS
Total solids %	14.90	15.41	15.13	NS
C. Protein %	3.70	3.66	3.62	NS
Phosphorus %	0.090	0.092	0.094	NS
Calcium %	0.15	0.15	0.15	NS

NS = Non-significant.

TABLE 4

Effect of feeding *Isabgul gola* on gain or loss of body weights, digestibility coefficients of proximate nutrients and balances of N, P and Ca (Average of 3 periods).

	T ₁	T ₂	T ₃	Treat 'F'	C.D.
Gain or loss (kg)	+3.33	+11.73	+21.5	20.55**	12.27
Digestible coefficient (%)					
C. Protein	58.61	55.07	58.89	9.39NS	
E. Extract	61.63	53.05	46.40	13.62NS	
C. Fibre	73.53	71.33	74.87	2.17NS	
N.F.E.	60.02	55.03	57.11	0.89NS	
O. Matter	63.24	59.39	62.01	3.01NS	
Balance* (g/day/cow)					
Nitrogen					
Total intake	183.91	193.75	180.93		
Voided in feces	75.88	87.15	74.42		
Voided in urine	41.31	40.69	44.03		
Voided in milk	39.45	40.30	28.20		
Total voided	156.64	168.14	146.65		
Balance	+27.27 ± 7.81	+25.61 ± 1.30	34.28 ± 4.77	7.56 N.S.	
Phosphorus					
Total intake	37.06	38.33	31.45		
Voided in feces	26.97	27.68	22.56		
Voided in urine	0.08	0.07	0.12		
Voided in milk	6.57	6.41	4.65		
Total voided	33.62	34.16	27.33		
Balance	+3.44 ± 1.57	+4.17 ± 0.51	+4.12 ± 1.23	2.63 N.S.	
Calcium					
Total intake	86.57	85.36	75.63		
Voided in feces	52.57	56.17	46.38		
Voided in urine	2.35	2.22	4.89		
Voided in milk	10.29	10.41	7.65		
Total voided	65.21	68.80	58.92		
Balance	± 21.36 ± 4.31	+16.56 ± 2.12	+16.71 ± 0.97	0.80 N.S.	

NS Non-significant.

*Based on whole ration.

**Significant at P < 0.01.

trients and balances of N, P and Ca are presented in Table-4.

The results suggest that 50 per cent *gola* feeding resulted in significant increase in body weight. However, differences between T₁ and T₂ were non-significant. Thus it can be concluded that *gola* feeding had no adverse effect on body weight.

There was no adverse effect of *gola* feeding on digestibility of c. protein, c.fibre, NFE and organic matter. Some reduction in digestibility of ether

extract was noted. However, the treatment differences were not significant for digestibility of nutrients.

Balance of N, P and Ca were positive for all the three treatments. The differences were also statistically not significant. Results of Desai *et al.* (1980) suggesting the use of *gola* with *lali* (another *isabgul* byproduct) feeding in order to avoid negative calcium balance with *lali* feeding are also in line with present studies.

Thus, overall results suggested that *gola* can be used up to 50 per cent level in concentrate mixture for lactating cows.

REFERENCES

A.O.A.C. 1970. Official methods of analysis of the Association of Official Analytical

Chemists, 11th Edn., Benjamin Franklin Station, Washington D.C. 20044.

Desai, M. C., H. B. Desai, B. M. Patel and P. C. Shukla. 1980. A note on nutritive value of *Isabgul* (*Plantago ovata*, Forsk) by-products (*Lali* and *gola*) *Indian J. Anim. Sci.* 50 (10): 890-891.

Sen, K. C. and S. N. Ray. 1971. Nutritive value of cattle feeds and the feeding of animals. 6th edn., Indian Council of Agricultural Research, New Delhi, 110 001.

Shukla, P. C., M. G. Desai, L. P. Purohit, H. B. Desai and B. H. Patel. 1981. Note on use of *Isabgul lali* (*Plantago ovata*, Forsk) in the concentrate mixture for lactating cows. *Indian J. Anim. Sci.* 51 (9) : 825-928

Snedecor, G. W. and W. G. Cochran. 1968. Statistical Methods. 6th edn., Oxford & IBH Publishing Co. Bombay.