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Effect of Replacing Groundnut Cake with Guar Meal on Skeletal Growth and Blood Picture of Patanwadi Sheep

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ABSTRACT

Possibility of replacing the groundnut cake in the ration of growing Patanwadi sheep, with guar meal, was studied using 18 Patanwadi hoggets in a randomized block design. Baled pasture grass hay mainly *Dichanthium annulatum* stapf was the basal fodder fed *ad-libitum*. The proportion of the different ingradients of the three concentrates mixtures was such that 200 g of each of the mixtures would supply 50 g of calculated DCP. Mean height, body length and heart girth of Patanwadi animals at about 15 months of age measured 63.33 ± 0.447 cm, 68.92 ± 0.668 cm and 75.31 ± 0.942 cm respectively. The mean value of haemoglobin content, the total erythrocytes count and the total leucocytes count of blood of the Patanwadi sheep during twenty weeks study period was observed to be 10.38 ± 0.083 g/100 ml, 11.56 ± 0.141 millions/cu. mm., and 5.58 ± 0.094 thousands/cu.m.m. respectively. Treatments significantly affected the haemoglobin content ($P < 0.05$). Treatments were not different in their effect on total erythrocytes and leucocytes counts, but the period effect was highly significant ($P < 0.01$). Guar meal could thus completely replace the groundnut cake in the ration of sheep, without any adverse effect.

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INTRODUCTION

An experiment to study the feasibility of replacing fully or partially the groundnut cake by guar meal in the concentrate mixtures of growing Patanwadi hoggets was conducted at the Veterinary Science College, Anand from 14th January, 1977 to 9th June, 1977.

MATERIALS AND METHODS

Eighteen Patanwadi hoggets of about ten months of age were used as the experimental animals. Fifteen wethers and three ewe hoggets were allotted at random, to three different treatments according to their body weight. Each group consisted of five wethers and one ewe hogget, having similar average initial body weights.

Baled pasture grass hay, mainly *Dichanthium annulatum* stapf was the basal fodder fed *ad-libitum* to the hoggets of all the three groups. The chemical analysis was carried out as per A.O.A.C. (1970).

Daily once, 200 g of the concentrates mixture were offered to each hogget as a supplement according to treatment.

The hoggets were housed, fed hay and igven water as described by Pandya and Dave (1981).

Height at withers, body length and heart girth were measured every fourth Thursday with a measure tape between 9.00 to 10.00 a.m. Three observations were taken for each measurement and the mean of these three measurements was taken as the final observation.

The haemoglobin (g/100 ml) was examined by Sahli's method following procedure of Schalm *et al.* (1975), while the total erythrocytes count and total leucocytes count were estimated by using haemocytometer chamber after Kolmer *et al.* (1969) once every four weeks.

The data was analysed statistically as per Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

Skeletal Growth:

It is seen from Table 1 that at the age of about 10 months, the average initial height, body length and heart girth of the Patanwadi hoggets measured 55.58 ± 0.481, 57.95 ± 0.654 and 68.11 ± 0.64 cm respectively. In a period of nearly five months, on an average, the height, body length and heart girth, increased to 63.33 ± 0.447, 68.92 ± 0.668 and 75.31 ± 0.942 cm respectively.

The increase in height at withers, (8.193 ± 0.292 cm), body length (14.593 ± 0.939 cm), and heart girth (13.455 ± 1.144 cm) was maximum in case of hoggets under T_3 followed by that of T_1 and T_2 respectively (Table 1). The difference in increase in body length due to treatments was highly significant ($P < 0.01$), while that in height and heart girth was not significant ($P > 0.05$).

The hoggets had the maximum skeletal growth on ration containing concentrate mixture in which groundnut cake was completely replaced by guar meal. Thus, not only that there was no ill effect of replacing completely the

TABLE 1

Effect of treatments on skeletal growth.

Particulars	*Mean initial measurement*	*Mean final measurement*	*Mean increase due to treatments*			*Calculated 'F' value for treatments*
			T_1	T_2	T_3	
Height (cm)	55.58 ±0.481	63.33 ±0.447	7.998 ±0.670	7.055 ±0.348	8.193 ±0.292	1.4847 N.S.
C.V. %	—	—	20.54	12.11	8.75	
Body length (cm)	57.95 ±0.654	68.92 ±0.668	10.078 ±0.567	10.065 ±1.003	14.593 ±0.939	16.970**
C.V. %	—	—	13.78	24.42	15.76	
Hearth girth (cm)	68.11 ±0.64	75.31 ±0.942	11.928 ±0.931	10.951 ±0.980	13.455 ±1.144	1.14469 N.S.
C.V. %	—	—	19.12	21.93	20.82	

N.S. = Not significant.

** = Significant at ($P < 0.01$).

groundnut cake by guar meal but, there was a beneficial effect.

The height at withers and the heart girth of the Patanwadi hoggets in this study were similar to those of Gaddi, Bikaneri, Coimbatore, Nali, Lohi and Patanwadi sheep. (Basu Thakur *et al.* 1967, Bhasin *et al.* 1968, Basu Thakur and Singh, 1969 and Dave 1977). While the body length was found to be less (Basu Thakur *et al.* 1967, Basu Thakur and Singh 1969 and Juma *et al.* 1969).

Blood Parameters :

The average haemoglobin content, total erythrocytes count and total leucocytes count of blood during different periods of study are presented in Table 2.

The average haemoglobin content, total erythrocytes count and total leucocytes count in blood were 10.38 ± 0.083 g/100 ml, 11.56 ± 0.141 millions/cu. m.m. and 5.58 ± 0.094 thousands/cu.m.m. respectively. The haemoglobin content observed in the present study is in agreement with that of Soliman and EL Amrousi (1965) (10.2 g/100 ml), Taneja *et al.* (1971) (10.02 g/100 ml), Sharma *et al.* (1973) (9.82 g/100 ml) and Kaushish *et al* (1976) (10.22 g/100 ml) in case of Egyptian native, Marwari, Native and Nali breeds of sheep respectively. The average for the total erythrocytes count of blood is also in agreement with Murty (1953) (10.47 millions/cu. m.m.), Purushotham and Mahendra (1963) (11.04 millions/cu.m.m.) Pandey and Pal (1971) (10.44 millions/cu. m.m.) and Taneja *et al.* (1971) (11.56 millions/cu. m.m.) for different breeds of sheep. Similarly average total leucocytes count of blood observed in the present study is also more or less parallel to that of Bhattacharya and Uwayjan (1975) (4.9 thousands/cu.m.m.) and Schalm *et al.* (1975) (4.0 to 12.0 thousands/cu.m.m.).

The results further indicate that the mean haemoglobin content in the blood of sheep of treatment group I, increased upto 5th four week's period, whereas in treatment Group III there was continuous rise till 6th four week period. The treatment group II did not show any definite trend. The variation in the haemoglobin content can not be explained without further detailed study. The haemoglobin content varied significantly ($P < 0.05$) amongst groups, periods and treatments. The interaction effect between groups and period; and between period and treatment was not significant ($P > 0.05$).

The average total erythrocytes count reached its peak value during the third four weeks period, the subsequent trend being uneven. The variation in the total erythrocytes count in different periods was highly significant ($P < 0.01$). The total leucocytes count of blood was maximum in the first four weeks period in all the three treatment groups. It tended to decline in period two and increased slightly in period 3rd and 4th. During the 5th and 6th four weeks periods total leucocytes count was comparatively low. The total leucocytes count varied significantly ($P < 0.01$), between groups and periods.

TABLE 2

Mean haemoglobin content, mean total erythrocytes count and mean total leucocytes count in different periods.

Period	*1st Four week*	*2nd Four week*	*3rd Four week*	*4th Four week*	*5th Four week*	*6th Four week*	*Mean*
			Treatment I				
Mean Hb content (g/100 ml)	9.27 ±0.251	9.77 ±0.222	10.2 ±0.171	10.37 ±0.509	10.87 ±0.400	10.70 ±0.143	10.19 ±0.133
C.V. %	6.64	5.55	4.11	12.02	9.14	3.29	8.79
Mean total Erythrocytes count (Millions/cu mm)	10.66 ±0.547	10.42 ±0.342	13.54 ±0.662	11.56 ±0.832	11.87 ±0.514	11.01 ±0.158	11.51 ±0.272
C.V. %	12.58	8.039	11.98	17.62	10.60	3.53	14.19
Mean total leucocytes count (Thousands/ cu mm)	6.68 ±0.269	5.40 ±0.349	5.87 ±0.399	5.69 ±0.634	5.58 ±0.323	4.65 ±0.292	5.65 ±0.169
C.V. %	9.85	15.85	16.68	27.29	14.19	15.32	18.00
			Treatment II				
Mean Hb content (g/100 m)	10.70 ±0.447	9.63 ±0.500	10.33 ±0.152	10.43 ±0.260	11.40 ±0.233	11.27 ±0.389	10.61 ±0.151
C.V. %	10.22	6.70	3.60	6.11	5.87	8.45	8.75
Mean total Erythrocytes count (Millions/cu mm)	10.02 ±0.414	10.44 ±0.547	12.77 ±0.652	12.00 ±0.552	12.30 ±0.356	11.45 ±0.375	11.50 ±0.247
C.V. %	10.11	12.85	11.73	11.28	7.10	8.02	12.93
Mean total Leucocytes count (Thousands/cu mm)	6.43 ±0.516	5.26 ±0.354	6.04 ±0.358	5.54 ±0.349	5.03 ±0.334	5.18 ±0.165	5.59 ±0.158
C.V. %	19.64	16.47	14.43	15.45	16.276	7.82	17.04
			Treatment III				
Mean Hb content (g/100 mm)	9.80 ±0.148	10.00 ±0.225	10.07 ±0.169	10.43 ±0.250	10.47 ±0.281	11.27 ±0.272	10.33 ±0.119
C.V. %	3.69	5.51	4.10	5.87	6.58	5.90	6.96
Mean total Erythrocytes count (Millions/cu mm)	10.81 ±0.415	11.76 ±0.685	13.33 ±0.415	11.24 ±0.272	11.01 ±0.340	12.01 ±0.344	11.69 ±0.216
C.V. %	10.81	14.26	7.62	5.93	7.57	7.02	11.10
Mean total leucocytes count (Thousands/cu mm)	6.42 ±0.175	5.31 ±0.399	5.39 ±0.416	6.21 ±0.349	4.82 ±0.365	4.93 ±0.306	5.51 ±0.165
C.V. %	6.69	18.42	18.92	13.77	18.55	15.19	18.01

REFERENCES

A.O.A.C. 1970. Methods of Analysis, Assoc. Official Agri. Chemists, 11thed., Washington, DC. 20044. U.S.A.

Basu Thakur, A. K. and G. C. Negi, 1968. A study of phenotypic biometry of indigenous Rampur Bushair sheep. *Indian J. Vet. Sci. and Anims. Husb.* **38** (3): 258.

Basu Thakur, A. K. and O. N. Singh, 1969. A study on body weight and conformation of Coimbatore and Corriedale sheep. *Indian Vet. J.* **46** (12): 1065.

Basu Thakur, A. K., J. M. Mahajan and O. N. Singh, 1967. Study on body weight and conformation of Gaddi and Romney Marsh sheep. *Indian Vet. J.* **44** (7): 589.

Bhasin, N. R., R. N. Desai and B. D. Kapri, 1968. Studies on body size in relation to clean fleece yield in Bikaneri sheep. *Indian J. Vet. Sci. and Anim. Husb.* **38** (4): 632.

Bhattacharya, A. N. and M. Uwayjan, 1975. Effect of high ambient temperature and low humidity on nutrient utilization and on some physiological responses in AWASSI sheep fed different levels of roughage. *J. Ani. Sci.* **40** (2): 320.

Dave, P. O. 1977. Monograph on Patanwadi sheep of Gujarat. Directorate of Animal Husbandry, Gujarat State, Krishibhawan, Ahmedabad-380 006.

Juma, K. H., M. Faraj, J. Eliya and K. Al-Aubaidy, 1969. Studies on growth in Awassi sheep. *Indian J. Anim. Sci.* **39** (6): 503.

Kaushish, S. K., D. C. Bhatia and K. L. Arora, 1976. Studies on adaptability of sheep to sub-tropical climate and seasonal changes in rectal temperature, cardio-respiratory and haematological attributes of Nali sheep. *Indian Vet. J.* **53** (10): 760.

Kolmer, J. A., E. H. Spaulding and H. W. Robinson, 1969. Approved Laboratory Technique. 5th Indian edition. Scientific Book Agency, Calcutta.

Murty, V. N. 1953. Physiological studies on the blood of domestic animals. Part VII-sheep. *Proc. Indian Sci. Congr.* **3**: 240.

Pandey, J. N. and A. K. Pal, 1971. Studies on haematological constituents of blood and biochemical constituents of blood serum of sheep fed AKRA (VICIA Species) for about one year. *Indian Vet. J.* **48** (12): 1260.

Pandya, N. M. and A. D. Dave, 1981. Effect of different rations in growth rate of Patanwadi sheep. *GAU Res. J.* **7** (1): 26.

Purushotham, N. P. and M. Mahendra, 1963. A note on the comparative study of the blood picture in domestic animals. *Indian Vet. J.* **40** (9): 553.

Schalm, O. W., N. C. Jain and E. J. Carroll, 1975. Veterinary Hematology, 3rd Edition. Lea & Febiger. Philadelphia.

Sharma, D. P., P. D. Malik and K. L. Sapra, 1973. Age-wise and species-wise haematological studies in farm animals. *Indian J. Anim. Sci.* **43** (4): 289.

Snedecor, G. W. and W. G. Cochran, 1967. Statistical Methods, Oxford and IBH Publishing Co.

Soliman, M. K. and S. Eurousi, 1965. Blood iron and haemoglobin level in healthy Egyptian sheep, Cattle, Buffaloes and Camels. *Indian Vet. J.* **42** (11): 831.

Taneja, G. C., P. K. Ghosh, R. K. Abichandani and D. Goyal, 1971.

Seasonal variations in blood composition in high and low potassium type Marwari sheep. *J. Agri. Sci.* **77** (1): 37.