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Effect of Replacing Groundnut Cake with Guar Meal on Growth Performance of Osmanabadi Weaned Kids

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ABSTRACT: The effect of substituting guar meal for groundnut cake on the growth performance of weaned Osmanabadi kids was the subject of the experiment. Twenty kids in all were chosen for the current study and divided into five treatments, each with four kids. The chosen goat kids for the experiment were divided into five groups: T1 (average age of three months and weight of twelve-five kg), T2 (average age of three months and weight of twelve-69 kg), T3 (average age of three months and weight of twelve-54 kg), T4 (average age of three months and weight of twelve-69 kg), and T5 (average age of three months and weight of twelve-84 kg), in that order. Treatment T1 is composed entirely of groundnut cake, while treatments T2, T3, T4, and T5 are composed of 25%, 50%, and 100% guar meal replacements, respectively. Use of a Complete Randomized Design was used for analysis. The growth performance in each treatment is not significantly different from the other, according to the results. The kids in treatment groups T1, T2, and T3 showed a substantially different total weight gain than groups T4 and T5. The experiment's findings demonstrated that the effects of the supplemented treatment were not statistically significant for live body weight, total weight gain, body length, body height, or chest circumference.

Keywords: Guar meal, Growth performance, Blood parameters, Cost structure.

INTRODUCTION

Goats play a crucial role in the livelihoods of India's small-scale farmers and landless laborers, serving as a vital as set that safeguards them against crop failures and contributes to their year-round income (Anonymous, 2012). According to the 20th Livestock census, the livestock population in India consists of 35.94% cattle, 20.45% buffaloes, 13.87% sheep, 27.80% goats, and 1.69% pigs. A comparative analysis with the previous livestock census (2012) reveals a note worthy increase of 10.14% in the combined percentage share of sheep and goat population, whereas there has been a slight decline in the percentage share of cattle, buffalo, and pig populations. The total goat population in India is estimated to be 148.88 million, with Maharashtra accounting for 10.60 million goats (Anonymous, 2019). The oil content of groundnut cake varies depending on the extraction method employed, with ghani-pressed cake containing 10-12% oil, expeller-pressed cake containing 6-8% oil, and solvent-extracted cake containing 0.5-0.7% oil. The protein content ranges from 40-50%, and the total digestible nutrients (TDN) range from 75-85%. Guar meal (*Cyamopsis tetragonoloba*) is becoming popular because of its high nutritive value. India is a major producer of guar that accounts for 80% of the total guar produced in world. Guar meal is good source of protein; it contains 33-47.5% crude protein and also contain 13% crude sapon in on dry matter basis. The experiment was under taken to evaluate effect of replacing groundnut cake with guar meal on growth performance of osmanabadi weaned kids.

MATERIAL AND METHODS

The present investigation was carried out on "Effect of replacing groundnut cake with guar meal on growth performance of osmanabadi weaned kids". The trial was conducted at Goat Unit, Department of Animal Husbandry and Dairy Science, College of Agriculture, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani. Selection of twenty weaned kids of same age and uniform conformation was done from the Goat Unit VNMKV, Parbhani to conduct the experiment. Twenty weaned kids were divided in five treatments groups and four kids in each treatment. All the kids were free from physiological disorder and diseases. The research was conducted during 1st February to 1st May 2023 at Goat Unit, VNMKV, Parbhani.

Treatment groups :

T_1: (Control) 100% groundnut cake in concentrate mixture.

T_2: 25% Guar meal replace with groundnut cake.

T_3 : 50% Guar meal replace with groundnut cake.

T_4 : 75% Guar meal replace with groundnut cake

T_5 : 100% Guar meal.

The observation recorded during the research was Body weight gain, body height, body length, chest girth, belly girth. The data was statistically analyzed by Complete Randomized Design (CRD).

RESULT AND DISCUSSION

A. Body weight

Every week during the ninety-day trial, the body weight of each Osmanabadi kid was measured and analysed. Weekly body weight analysis of the kid shown in Table 1.

The average body weight of the T_1, T_2, T_3, T_4 and T_5 groups at the beginning of the experiment was 12.50, 12.69, 12.54, 12.69, and 12.84 kg, according to the data. At the conclusion of the ninety-day study period, the average body weight was 15.48 kg, 16.45 kg, 16.31 kg, and 16.02 kg, respectively. There was no significant difference between the initial and final body weights of the five groups. This demonstrated that all the treatments improved in terms of live body weight; however, the treatments fed groundnut cake showed greater improvement than the treatment fed guar meal. Upto the treatment T_3 which contain 50% groundnut cake and 50% guar meal, the level of guar meal upto 50% found to increase body weight as equal as groundnut cake. The non significant effect on growth performance *i.e.* body weight across different protein sources was also supported by Goswami *et al.* (2012) who also reported that in crossbred calves fed concentrate replacing ground cake with guar meal at 50 and 75 per cent level no significant difference in weight gain was observed.

B. Body weight gain

The data on body weight gain in the Osmanabadi kids experiment under various treatments was computed using the difference between their initial body weight at day 0 and their final body weight at day 90. The data was then statistically evaluated using a completely randomized method. A data analysis is shown in Table 2.

Table 1: Effect of feeding Groundnut cake replace with Guar meal (*Cyamopsis tetragonoloba* L.) on body weight (Kg) of Osmanabadi kids.

Weeks	T1	T2	T3	T4	T5	SE	CD
1	12.50	12.69	12.54	12.69	12.84	1.540	NS
2	13.22	12.64	12.73	12.75	12.67	1.669	NS
3	13.43	12.85	12.65	12.91	12.74	1.637	NS
4	13.54	12.96	12.98	12.76	12.66	1.687	NS
5	13.74	13.19	13.62	12.46	12.76	1.779	NS
6	14.37	13.82	14.06	13.40	13.32	1.841	NS
7	14.83	14.34	14.64	13.77	13.74	1.881	NS
8	15.11	14.59	15.32	14.23	14.01	1.942	NS
9	15.59	14.87	15.38	14.54	14.30	2.014	NS
10	16.05	15.47	15.57	14.77	14.83	2.010	NS
11	16.21	15.68	16.07	15.51	15.03	2.084	NS
12	16.26	16.03	16.15	15.67	15.41	2.000	NS
13	16.31	16.45	16.31	16.02	15.48	1.972	NS

Table 2: Effect of feeding Groundnut cake replace with Guar meal (*Cyamopsis tetragonoloba* L.) on body weight gain (Kg) of Osmanabadi kids

Particular	Initial body weight (Kg)	Final body weight (Kg)	Total body weight gain (Kg)	Daily body weight gain (g)
T_1	12.50	16.31	3.81^a	42.22^a
T_2	12.69	16.45	3.76^a	41.77^a
T_3	12.54	16.31	3.77^a	41.88^a
T_4	12.69	16.02	3.33^b	37.00^b
T_5	12.84	15.48	2.64^c	29.33^c
SE	1.540	1.972	0.087	0.838
CD	NS	NS	0.262	2.526

Note: The mean value with different superscripts within same column differed significantly($P<0.05$)

The average weight growth in kilograms of the experimental Osmanabadi kids is displayed in Table 2. It is noted that T_1, T_2, T_3, T_4, and T_5 had initial body weights of 12.50, 12.69, 12.54, 12.69, and 12.84 kg, in that order. The kid that had treatments T_1, T_2, T_3, T_4, and T_5 had final body weights of 16.31, 16.45, 16.31, 16.02, and 15.48 kg, respectively.

It was shown that the groundnut cake supplementation treatment was noticeably better than the guar meal treatment. Significant differences in live body weight were observed between treatments. Treatment groups T_1, T_2 and T_3 were significantly differ over T_4 and T_5, whereas, treatments T_1, T_2 and T_3 were at par with each other. The difference between the kids initial and final body weights was used to compute their total body weight gain. T_1, T_2, T_3, T_4, and T_5 all experienced total body weight gains of 3.81, 3.76, 3.77, 3.33, and 2.64, in that order. T_1, T_2, T_3, T_4, and T_5 all experienced daily body weight gains of 42.22, 41.77, 41.88, 37, and 29.33 g, respectively. It was evident that kids receiving

replacement groundnut cakes gained more body weight than those receiving guar meal. T_1 treatment (100% groundnut cake) is superior as compared to T_5 treatment (100% guar meal). Upto T_3 treatment (50% guar meal), guar meal is suitable for growing kids, whereas, T_4 (75% guar meal) and T_5 (100% guar meal) are shows decreasing results.

In a similar study, Janampet *et al.* (2016) found that kid fed on ration T_2, which substitutes 50% toasted guar meal for GNC, had considerably ($P < 0.05$) higher average daily gain. However, these values were similar to those of the control group, which receives GNC as their protein source.

C. Body height

Data on body height (cm) of Osmanabadi kid under five treatments were recorded and evaluated on a weekly basis; the results are shown in Table 3.

Table 3exhibit the body height (in centimeters) of the kid during the first week of the experiment. The values for T_1 (control), T_2, T_3, T_4, and T_5 were 56.00, 54.75, 54.25, 54.25 and 51.00 cm, respectively. Table 3 data indicates that kid's body height increased steadily over the course of the experimental period for all treatments. At the thirteenth week, the body heights of T_1 (control), T_2, T_3, T_4, and T_5 were, in order, 59.25, 57.25, 57.38, 57.13, and 54.75 cm. Among the five treatments, no significant difference in the initial and final body height was found. Among all treatment groups the T_1 had higher gain in body height (cm), which could be 100% groundnut cake than other treatment groups.

The current findings aligned with the research undertaken by Sagar and Pradhan (1977), which involved twenty-four calves between the ages of 320 and 390 days. The calves were given a combination (2.5) consisting of 72% maize, 37% groundnut cake, and 1% mineral mixture. The average daily feed intake was found to be 12.23, 12.34, and 11.70 kg/100 kg, respectively, when groundnut cake was substituted with guar meal at the 0, 50, and 100% levels.

Table 3: Effect of feeding Groundnut cake replace with Guar meal (*Cyamopsis tetragonoloba* L.) on body height (cm) of Osmanabadi kids.

Weeks	T1	T2	T3	T4	T5	SE	CD
1	56.00	54.75	54.25	54.25	51.00	2.950	NS
2	56.50	54.75	54.38	54.63	51.38	2.929	NS
3	56.88	55.25	54.88	55.00	51.88	2.939	NS
4	57.25	55.38	55.38	55.25	52.25	2.966	NS
5	57.50	55.63	55.88	55.63	52.63	2.962	NS
6	57.88	55.75	56.13	55.75	53.13	2.924	NS
7	58.00	56.13	56.38	56.13	53.25	2.925	NS
8	58.38	56.25	56.63	56.25	53.63	2.924	NS
9	58.50	56.25	56.63	56.63	53.75	2.920	NS
10	58.63	56.75	56.75	56.63	54.13	2.929	NS
11	58.88	56.75	57.00	56.63	54.25	2.886	NS
12	59.13	57.25	57.13	57.13	54.25	2.917	NS
13	59.25	57.25	57.38	57.13	54.75	2.892	NS

D. Chest girth

Table 4 records, analyzes, and illustrates the weekly chest girth (cm) of Osmanabadi kid under five treatments.

Over the course of the 90-day investigation, the Osmanabadi kids chest circumference observations were documented weekly. Table 4 displays the chest circumference (in centimeters) of the kid in the first week of the trial. The values for T_1 (control), T_2, T_3, T_4, and T_5 were 57.25, 56.00, 53.50, 54,25, and 53.50 cm, respectively. Table 4.5 shows that throughout the trial period, chest circumference increased in all treatments. Up until the last week, there had been no significant difference. At the thirteen week, the chest circumference of T_1 (control), T_2, T_3, T_4, and T_5 were 60.50, 61.38, 57.00, 57.38, and 56.50 cm, in that order. Statistically it shows non significant data from initial week to final week.

In the study by Sagar and Pradhan (1977), twenty-four calves, ranging in age from 320 to 390 days, were fed a combination (2.5) consisting of 72% maize, 37% groundnut cake, and 1% mineral mixture. Groundnut cake replaced with gaur meal at 0, 50, and 100% of the level average daily feed consumption resulted in metabolic weight values of 12.23, 12.34, and 11.70 kg/100 kg, respectively. The gains per day were 1.09, 1.07, and 0.96 kg. When calves were fed guar meal, there was a noticeable rise in chest circumference.

E. Body length

Weekly observations of the Osmanabadi kid body length (in centimeters) were made during the course of the 90-day experiment presented in Table 5.

Table: 4. Effect of feeding Groundnut cake replace with Guar meal (*Cyamopsis tetragonoloba* L.) on chest girth (cm) of Osmanabadi kids.

Week	T_1	T_2	T_3	T_4	T5	SE	CD
1	57.25	56.00	53.50	54.25	53.50	2.931	NS
2	57.88	56.13	53.75	54.15	54.13	2.954	NS
3	58.25	56.38	54.25	55.00	54.50	2.962	NS
4	58.50	56.50	54.75	55.25	54.75	2.981	NS
5	58.88	56.88	55.25	55.63	55.00	2.951	NS
6	59.13	57.25	55.63	55.75	55.25	2.947	NS
7	59.38	57.25	55.75	56.13	55.50	2.963	NS
8	59.63	57.75	56.13	56.25	55.75	2.947	NS
9	59.88	57.75	56.25	56.25	56.00	2.971	NS
10	60.00	58.25	56.50	56.63	56.00	2.919	NS
11	60.13	58.38	56.63	56.88	56.13	2.938	NS
12	60.38	58.50	56.88	57.00	56.50	2.925	NS
13	60.50	58.88	57.00	57.38	56.50	2.867	NS

Table 5: Effect of feeding Groundnut cake replace with Guar meal (*Cyamopsis tetragonoloba* L.) on body length (cm) of Osmanabadi kids.

Week	T_1	T_2	T_3	T_4	T5	SE	CD
1	46.00	44.75	45.25	43.75	41.75	2.765	NS
2	46.38	45.13	45.38	43.88	42.13	2.785	NS
3	46.75	45.25	45.50	44.25	42.63	2.758	NS
4	47.00	45.75	46.00	44.63	43.00	2.710	NS
5	47.13	46.25	46.50	44.93	43.63	2.708	NS
6	47.38	46.25	46.88	45.25	43.75	2.680	NS
7	47.63	46.75	46.88	45.50	44.13	2.698	NS
8	47.88	46.75	47.38	45.75	44.25	2.680	NS
9	48.00	46.88	47.38	46.00	44.38	2.715	NS
10	48.13	47.25	47.75	46.00	44.50	2.734	NS
11	48.38	47.38	47.88	46.00	44.75	2.705	NS
12	48.63	47.75	47.88	46.50	44.88	2.659	NS
13	48.88	47.75	48.38	46.50	45.25	2.689	NS

Table 5 reveals the kid's body length (in centimeters) for the first week of the experiment: T_1 (control), T_2, T_3, T_4, and T_5 had respective values of 46.00, 44.75, 45.25, 43.75, and 41.75 cm, respectively. Table 5 shows that kid's body length increased during the trial period across all treatments. Up until the thirteenth week, there was no significant difference at first. At the thirteenth week, the body lengths of T_1 (control), T_2, T_3, T_4, and T_5 were 48.88, 47.75, 48.38, 46.50, and 45.25 cm, in that order. It shows from initial to final the statistically it was non significant to each others. In treatment T_1 and T_3 body length is increases as compare to other treatments. Upto 50% guar meal (T_3) level of guar meal shows in suitable manner and increases level of guar meal are not suitable for their growth.

In a similar study, done by Sagar and Pradhan (1977), twenty-four calves, ranging in age from 320 to 390 days, were given a mixture (2:5) consisting of 72% maize, 37% groundnut cake, and 1% mineral mixture. At the 0, 50, and 100% levels of guar meal substitution for groundnut cake, the average daily feed consumption was 12.23, 12.34, and 11.70 kg/100 kg metabolic weight. Daily gains were 0.96, 1.19, and 1.07 kg; feed efficiency was 0.10, 0.17, and 0.17; and the percentage of dry matter that could be digested was 59.6, 63.7%, and 66.6%, respectively. It was noted that in calves fed guar meal, there was an increase in heart circumference, height, and width while body length remained constant.

F. Estimation of feeding cost

Cost of feeding guar meal (*Cyamopsis tetragonoloba* L.) with concentrate mixture by replacing groundnut cake was recorded and presented in Table 6.

Table 6 displays the treatment T_1, T_2, T_3, T_4, and T_5, the total feed cost per kid was 900.6, 879.6, 858.6, 837.6, and 816.6 Rs, respectively. For treatments T_1, T_2, T_3, T_4, and T_5, the cost per kg of live weight gain was 236.37, 233.93, 227.74, 251.53 and 309.31Rs, respectively.

Table 6 data aligned with the findings of Chhikara *et al*. (2019), who discovered that T_2 had lower costs for dry matter required per kilogram of body weight gain and daily ration consumption than the other two groups. Therefore, as a source of protein, roasted guar Korma can be introduced to the diet of growing buffalo calves at a rate of fifty or one hundred percent without compromising their diet's DM consumption, nutrient utilization, growth, or feeding expenses.

Table 6: Economics of feeding groundnut cake and guar meal with concentrate mixture to Osmana badi kids.

Treatment / Particulars	T_1		T_2		T_3		T_4		T_5	
	Qty (kg)	Rs.	Qty (kg)	Rs.	Qty (kg)	Rs.	Qty (kg)	Rs.	Qty (kg)	Rs.
Common feeding Roughages charges/kid		480		480		480		480		480
Concentrate mix. cost/kg	1	35.05	1	33.30	1	31.55	1	29.80	1	28.05
Requirement and charge of total homemade concentrate mix/kid	12	420.6	12	399.6	12	378.6	12	357.6	12	336.6
GNC (60 Rs/kg) charges/kid		1200		900		600		300		-
Guar meal (25 Rs/kg) charges/kid		-		125		250		375		500
Total cost of feeding roughages + concentrates		900.6		879.6		858.6		837.6		816.6
Total live weight gain	3.81		3.76		3.77		3.33		2.64	
Cost/kg live weight gain		236.37		233.93		227.74		251.53		309.31

CONCLUSIONS

There was no significant effect of body weight, body length, body height and chest girth of kids under different diets. From the present investigation it can be concluded that incorporation 50 per cent guar meal and 50 percent groundnut cake in concentrate diet is economical without affecting the growth of the kids.

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