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JB Shedge

M.Sc., Department of Animal Husbandry and Dairy Science, College of Agriculture, VNMKV, Parbhani, Maharashtra, India

DV Bainwad

Associate Professor, Department of Animal Husbandry and Dairy Science, College of Agriculture, VNMKV, Parbhani, Maharashtra, India

AY Shinde

Ph.D., Department of Animal Husbandry and Dairy Science, College of Agriculture, VNMKV, Parbhani, Maharashtra, India

RS Bhendegave

M.Sc., Department of Animal Husbandry and Dairy Science, College of Agriculture, VNMKV, Parbhani, Maharashtra, India

Corresponding Author:

JB Shedge

M.Sc., Department of Animal Husbandry and Dairy Science, College of Agriculture, VNMKV, Parbhani, Maharashtra, India

Effect and economics feeding of guar meal on blood parameter of buffalo calves at organized farm

JB Shedge, DV Bainwad, AY Shinde and RS Bhendegave

Abstract

The objective of the present investigation was to study the effect of guar meal on the blood parameter and cost structure of Buffalo calves during experimental period (90 days). In the present investigation a total 11 buffalo calves for T₀ treatment 3 calves, T₁ treatment 4 calves and T₂ treatment 4 calves. The selected experimental buffalo calves were grouped in 3 groups viz; T₀ (Average age: 5 month and weight: 83.70 kg), T₁ (Average age: 6 month and weight: 84.11 kg) and T₂ (Average age: 5 month and weight: 83.18 kg), respectively. Treatment T₀ contain zero percent guar meal whereas T₁ and T₂ contains 10% and 20% guar meal respectively. Analysis carried out by Complete Randomized Design (Unequal Replications). Haematobiochemical parameters viz, total protein and serum albumin of calves of treatment T₂ and T₁ shows superior significant over control treatment T₀. Haemoglobin was significantly higher in treatment T₀ compared to the treatment T₂ and treatment T₁. There was no significant difference (P>0.05) observed in serum globulin, RBC count and WBC count of experimental groups. The cost of feeding treatment T₀ has highest cost per kg live weight gain and T₂ has low cost per kg live weight.

Keywords: Guar meal, protein supplement, Buffalo calves, haemato-biochemical parameters, cost structure

Introduction

Guar meal contains about 40-45% protein and is a good source of amino acids. It is richer in lysine (2.55%), cystiene (1.16%), and glycine (4.61%) than groundnut cake but comparable in respect to methionine. Mathur (1989) showed that guar meal is comparable to soybean meal in terms of nutritional content. For instance, the minimum crude protein percentage of guar meal is rated at 50% compared 48% of soya bean meal. Its crude fibre is at 6.8% maximum, while that of soyabean meal is at 3%; it has a minimum crude fat content of 5% verses 1% of soyabean meal, and has a higher protein solubility of 89% than soybean meal with 78%. Guar also contains 13% crude saponin on DM basis (Curl *et al.*, 1986)^[1]. Livestock is an integral part of agriculture and plays important role in contributing to national economy. Although we have large population of livestock, productivity is too low which is due to negligence in feeding regiment as the poor farmers cannot feed their animals adequately and the major constraint for this being the shrinkage of grass lands, erratic monsoons, and other human interventions with nature. India faces a net deficit (%) of 62.7 green fodder, 22.5 dry crop residues, and 64.0 concentrate feeds. There is a serious shortage of conventional feed resources. Hence, it is necessary to look for protein rich, nonconventional feed resources. Guar meal is one such feed. The experimental was under taken to evaluate effect of guar meal (*Cyamopsis tetragonoloba*) on growth performance of buffalo calves at organized farm with objectives: To study the blood parameter of buffalo calves and to estimate the cost structure

Materials and Methods

The experiment was conducted at Buffalo Unit, Department of Animal Husbandry and Dairy Science, College of Agriculture, Vasantnao Naik Marathwada Krishi Vidyapeeth, Parbhani. Total 11 buffalo calves for T₀ treatment 3 calves, T₁ treatment 4 calves and T₂ treatment 4 calves were selected from the Buffalo Unit, Department of Animal Husbandry and Dairy Science, COA, VNMKV, Parbhani to conduct the experiment. The selected experimental buffalo calves were grouped in 3 groups viz; T₀ (Average age: 5 month and weight: 83.70 kg), T₁ (Average age: 6 month and weight: 84.11 kg) and T₂ (Average age: 5 month and weight: 83.18 kg), respectively. The experiment was conducted during 18th February 2022 to 18th May 2022 at Buffalo unit. The experiment period was 90 days and 15 days pre-experimental period.

Treatments

Ingredient used in Treatment (T₀): 20 parts GNC +17 parts jawar grain+ 15 parts wheat grain + 20 parts gram + 15 parts pigeon pea + 10 parts wheat bran + 2 parts mineral mixture + 1 parts salt.

Treatment (T₁): 10 parts GNC + 10 parts guar meal +17 parts jawar grain+ 15 parts wheat grain + 20 parts gram+ 15 parts pigeon pea+ 10 parts wheat bran+ 2 parts mineral mixture+ 1 parts salt.

Treatment (T₂): 20 parts guar meal +17 parts jawar grain+ 15 parts wheat grain + 20 parts gram+ 15 parts pigeon pea+ 10 parts wheat bran+ 2 parts mineral mixture+ 1 parts salt.

Results and Discussion

1. Effect of guar meal on blood parameter

Blood parameters of experiment calves were analyzed at the start of experiment (0 days) and at the end of experiment (90 days). It is important to recorded effect of guar meal on blood parameter viz., total protein, serum albumin, serum globulin, WBCs, RBCs and hamemoglobin which are explained as follows.

1.1 Total protein

The data regarding the total protein of calves blood obtained at initial (0 day) and final day (90 day) analyzed in Table 1.

Table 1. shows that the initial average total protein of calves was recorded as 6.28, 5.83 and 6.43 g/dI for treatments T₀, T₁ and T₂, respectively. Initially the difference of total protein among all treatments were not significant. The final average total protein of calves was recorded as 6.33, 6.34 and 6.96 g/dI for treatment T₀, T₁ and T₂, respectively. Treatment T₂ shows significant difference over treatment T₀ and T₁. Treatment T₁ shows significant difference over T₀. There is no significant difference in treatment T₀ and T₂ treatment T₂ and T₁.

Table 1: Effect of guar meal on average total protein (g/d) of buffalo calves

| Treatments | Initial total protein (g/dI) (0 days) | Final total protein (g/dI) (90 days) |
|--------------------------|---------------------------------------|--------------------------------------|
| T ₀ (Control) | 6.28 | 6.33 |
| T ₁ | 5.83 | 6.34 |
| T ₂ | 6.43 | 6.96 |
| S.Em. ± | 0.141 | 0.164 |
| CD at 5% | N.S. | 0.479 |

Initially total protein content was non significant but at the end experiments differed significantly which may due to guar meal and its protein content.

The result obtained in present study are comparable with Ojha *et al.* (2013)^[5] study was conducted the performance of male crossbred calves fed concentrate mixture containing ground cake (T₁), while in T₂ and T₃, deoiled Mahua seed cake and guar meal was included @ 10% respectively. The blood parameters Hb. PCV and biochemical parameters viz., total protein albumin, globulin did not differ significantly ($P < 0.005$) among different dietary treatment groups.

Whereas some research studies also observed non significant difference in total protein concentration in animals which are feeding of guar meal. Dinani (2010)^[2] who reported that diets containing roasted guar meal at levels of 7.5 and 15 per cent showed no significant difference in serum total protein, albumin, globulin and albumin to globulin ratio between

different treatments.

1.2 Serum Albumin

The data regarding the serum albumin of calves blood obtained at initial (0th day) and final (90 day) analyzed in Table 2.

Table 2. shows the initial average serum albumin of calves was 2.10, 2.20 and 2.29 g/dI for treatments T₀, T₁ and T₂, respectively. The final average serum albumin of calves was 2.03, 2.33 and 2.43 g/dI for treatments T₀, T₁ and T₂, respectively. Treatment T₂ showed significant difference with treatment T₀ and T₁. Treatment T₁ shows significant difference over T₀. There is no significant difference in treatment T₀ and T₂ treatment T₂ and T₁.

Initially serum albumin content was non significant but at the end experiments differed significantly which may to guar meal and its protein content.

Table 2: Effect of guar meal on average serum albumin (g/dI) of buffalo calves

| Treatments | Initial albumin (g/dI) (0 days) | Final albumin (g/dI) (90 days) |
|--------------------------|---------------------------------|--------------------------------|
| T ₀ (Control) | 2.10 | 2.03 ^b |
| T ₁ | 2.20 | 2.33 ^a |
| T ₂ | 2.29 | 2.43 ^a |
| S.Em. ± | 0.053 | 0.060 |
| CD at 5% | N.S. | 0.176 |

These present results were in accordance with Sharma *et al.* (2015)^[8] study was conducted for 120 days blood was collected to harvest the serum and serum metabolites were analyzed using standard protocol. The means values of albumin (g/dI) of all the experimental crossbred calves were found to be statistically. Similar with that of the control group.

1.3 Serum Globulin

The data regarding the serum globulin of calves blood obtained at initial (0 day) and final day (90 day) analyzed in Table 3.

Table 3: Effect of guar meal on average serum globulin (g/dI) of buffalo calves

| Treatments | Initial globulin (g/dI) (0 days) | Final globulin (g/dI) (90 days) |
|--------------------------|----------------------------------|---------------------------------|
| T ₀ (Control) | 4.07 | 4.00 |
| T ₁ | 3.66 | 4.32 |
| T ₂ | 4.09 | 4.54 |
| S.Em. ± | 0.182 | 0.347 |
| CD at 5% | N.S. | N.S. |

Table 3. shows the initial average total serum globulin of calves was 4.07, 3.66 and 4.09 g/dI for treatment T₀, T₁ and T₂, respectively. The final average serum globulin of calves was 4.00, 4.32 and 4.54 g/dI for treatments T₀, T₁ and T₂, respectively. The serum globulin was numerically higher under T₂ treatment than T₀ and T₁ treatment however, the difference observed were non-significant. There was non significantly affected the inclusion of guar meal on serum globulin.

The result obtained in present study are concordant with Dinani (2010)^[2] reported that diets containing roasted guar meal at levels of 7.5 and 15 per cent showed no significant

difference in serum globulin and albumin to globulin ratio between different treatments.

Ojha (2010) [4] reported that feeding of 10% guar meal in concentrate mixture in crossbred calves did not produce any significant difference in concentration of serum proteins (albumin, globulin) in comparison to control group.

1.4 Haemoglobin

The data regarding the haemoglobin of experimental calves obtained at initial (0 day) and final day (90 day) analyzed in Table 4.

Table 4: Effect of guar meal on average haemoglobin (g/dl) of buffalo calves

| Treatments | Initial haemoglobin (g/dl) (0 days) | Final haemoglobin (g/dl) (90 days) |
|--------------------------|-------------------------------------|------------------------------------|
| T ₀ (Control) | 11.23 | 12.14 ^a |
| T ₁ | 11.38 | 9.95 ^b |
| T ₂ | 12.18 | 10.93 ^{ab} |
| S.Em. ± | 0.609 | 0.477 |
| CD at 5% | N.S. | 1.391 |

Table 4. showed the initial average haemoglobin of treatment T₀, T₁ and T₂, respectively. Initial data obtained from all the treatments showed no significant difference (P > 0.05) among the treatments. The final average haemoglobin of treatment T₀, T₁ and T₂ were 12.14, 9.95 and 10.93 (g/dl), respectively. The statistical analysis on haemoglobin level of buffalo calves revealed that the average haemoglobin of calves at final observation among the treatment groups differ significantly (P < 0.05). The final average haemoglobin was observed in T₀ (12.14 g/dl) followed by T₂ (10.93 g/dl) and T₁ (9.95 g/dl), respectively. The result showed that the average haemoglobin level of T₁ not differs statistically from T₂.

These present result were in accordance with Ojha (2010) [4] have also observed that supplementation of 10% guar meal in concentrate mixture did not have any change in Hb values in crossbred calves of control and treatment groups.

1.5 WBC count

The data showing the WBCs of experimental calves obtained

Table 6: Effect of feeding guar meal on average RBC count (10³/μl) of buffalo calves

| Treatments | Initial RBCs (10 ³ /μl) (0 days) | Final RBCs (10 ³ /μl) (90 days) |
|--------------------------|---|--|
| T ₀ (Control) | 6.74 | 5.73 |
| T ₁ | 6.86 | 5.75 |
| T ₂ | 5.23 | 5.53 |
| S.Em. ± | 0.813 | 0.291 |
| CD at 5% | N.S. | N.S. |

2. Estimate cost structure

The cost of feeding rations in which guar meal replaced GNC in concentrate are presented in Table 7.

It is observed from Table 7. Total feed cost was Rs. 6366.05, 6486.35 and 5844.85 in treatment T₀, T₁ and T₂, respectively. The cost per kg live weight gain Rs. 177.13, 154.25 and 121.95 in treatment T₀, T₁ and T₂, respectively. It was seen

at initial (0 day) and final day (90 day) are analyzed and presented in Table 5.

Table 5: Effect of feeding guar meal on average WBC count (10³/μl) of buffalo calves

| Treatments | Initial WBC (10 ³ /μl) (0 days) | Final WBC (10 ³ /μl) (90 days) |
|--------------------------|--|---|
| T ₀ (Control) | 14333.33 | 15533.33 |
| T ₁ | 16275.00 | 13150.00 |
| T ₂ | 16475.00 | 11775.00 |
| S.Em. ± | 2589.27 | 1248.20 |
| CD at 5% | N.S. | N.S. |

Table 5. showed the initial average WBC count of treatment T₀, T₁ and T₂ were 14333.33, 16275.00 and 16475.00 (10³/μl), respectively. Initial data obtained from all the treatments showed no significant difference (P > 0.05) among the treatments. The final average WBC count of treatment T₀, T₁ and T₂ were 15533.33, 13150.00 and 11775.00 (10³/μl), respectively.

Data from the final observation also showed higher values of WBC in treatments T₀ (Control) with non significant difference (P > 0.05). The final average WBC count was observed low in T₁ and T₂ compared to higher in T₀ (Control).

1.6 RBC count

The data showing the RBC count experimental calves obtained at initial (0 day) and final day (90 day) are analyzed and presented in Table 6.

The Table 6. showed that initial average RBC count of calves was 6.74, 6.86 and 5.23 (10³/μl) for treatment T₁, T₂ and T₃, respectively. The final average RBC count of calves was 5.73, 5.75, 5.53 (10³/μl) for treatments T₀, T₁ and T₂, respectively. There was no significant difference observed in final average RBC count among the treatments. Data from the final observation also showed higher values of RBCs in treatment T₂ with non significant difference (P > 0.05). The final average RBC count was observed low in T₀ and T₁ compared to higher in T₂.

from the results treatment T₀ has highest cost per kg live weight gain and treatment T₁ has lowest cost per kg live weight gain. The results obtained in present study are similar with Kamran *et al.* (2002) reported that as the level of guar meal increased in the ration, the price decreased but at the same time cost per kg of live weight increased.

Table 7: Cost of feeding in growing buffalo calves under different dietary treatment

| Sr. No. | Particulars | T ₀ (Control) | | T ₁ | | T ₂ | |
|---------|--------------------------------------|--------------------------|------------|----------------|------------|----------------|------------|
| | | Quantity (kg) | Cost (Rs.) | Quantity (kg) | Cost (Rs.) | Quantity (kg) | Cost (Rs.) |
| 1. | Guar meal (Rs. 21/kg) | - | - | 10 | 210 | 20 | 420 |
| 2. | Groundnut cake (Rs. 50/kg) | 20 | 1000 | 10 | 500 | - | - |
| 3. | Jawar grain (Rs. 20/kg) | 17 | 340 | 17 | 340 | 17 | 340 |
| 4. | Wheat grain (Rs. 25/kg) | 15 | 375 | 15 | 375 | 15 | 375 |
| 5. | Gram (Rs. 30/kg) | 20 | 600 | 20 | 600 | 20 | 600 |
| 6. | Pigeonpea (Rs. 35/kg) | 15 | 525 | 15 | 525 | 15 | 525 |
| 7. | Wheat bran (Rs. 21/kg) | 10 | 210 | 10 | 210 | 10 | 210 |
| 8. | Mineral mixture (Rs. 130/kg) | 2 | 260 | 2 | 260 | 2 | 260 |
| 9. | Salt (Rs. 10/kg) | 1 | 10 | 1 | 10 | 1 | 10 |
| 10. | Green roughages (Rs. 2/kg) | 1012.05 | 2024.1 | 1152.4 | 2304.8 | 1055.25 | 2050.50 |
| 11. | Dry roughages (Rs. 3/kg) | 340.65 | 1021.95 | 383.85 | 1151.55 | 351.45 | 1054.35 |
| 12. | Total feeding cost | - | 6366.05 | - | 6486.35 | - | 5844.85 |
| 13. | Total live weight gain | - | 35.94 | - | 42.05 | - | 47.93 |
| 14. | Cost per kg live weight gain (Rs/kg) | - | 177.13 | - | 154.25 | - | 121.95 |

The data from the table 7. showed similarities with Chhikara *et al.* (2019) [7] found that the cost of ration consumed daily and the cost of dry matter required per kg body weight gain were also lower in T₂ as compared to the other two groups. Hence, roasted guar Korma can be added at 50 or 100 per cent level in diet, as a protein source, of growing buffalo calves without affecting the DM intake, nutrient utilization, growth and cost of feeding. Similar findings were given by Etman *et al.* (2014) [3] in buffalo calves, Walla *et al.* (2016) in milk production in Egyptian buffaloes and Janampet *et al.* (2016) [6] in growing kids.

Results are also corroborated with Sultana *et al.* (2015) found that the cost of feed per kg body weight gain was 136.50, 128.36 and 133.20, respectively for control, T₁ and T₂ rations 50% replacement of groundnut cake with guar meal was found to be more economic than other two rations. These result agreed with those reported by Shahbazi and Etman *et al.* reported that with increasing guar meal level in experimental rations increased economic efficiency.

Conclusion

The feeding of guar meal improves total protein and serum albumin and there is no adverse effect of guar meal on serum globulin, haemoglobin, RBCs and WBCs. Cost of per kg body weight gain reduced as the level of roasted guar meal increased in the diet. From the present investigation it can be concluded that incorporation 20% guar meal in concentrate diet is economical without affecting the blood parameter of the buffalo calves.

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