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Effect of feeding complete feed block on blood bio-chemical profiles in calves of surti buffalo (*Bubalus bubalis*)

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Abstract
The present investigation entitled "Effect of Feeding Complete Feed Block on Blood Bio-chemical Profiles in calves Surti Buffalo (*Bubalus bubalis*)" was carried out from January to April 2022 on Surti Buffalo calves maintained at Livestock Research Station, Navsari Agricultural University, Navsari, Gujarat. For this experiment 16 Surti Buffalo calves aged more than three months were selected. Experimental animals were divided into 2 groups of 8 calves each of comparable age, sex and body weight. T1 group was offered conventional feed and T2 group offered complete feed block. Animals in both the groups were maintained under similar manage mental practices. Blood sample was collected from experimental animals on initial day and 90th day of experiment for estimation of serum biochemical profile. Such as Blood Glucose, Total Protein, Cholesterol and Blood Urea Nitrogen by commercial standard diagnostic kits on initial day and 90th day.
Overall Blood Glucose (92.81±1.34 mg/dl) ($p<0.01$) and Blood Glucose at 90th day ($p<0.05$) were significantly higher in complete feed block fed group (T2) as compared to T1 group (84.65±1.39 mg/dl). Overall Cholesterol level in calves was higher in T2 (149.03±4.61 mg/dl) as compared to T1 group (138.22±13.77 mg/dl) although the difference was not significant. Overall Total Protein level in calves was higher in T2 (9.42±0.99 gm/dl) as compared to T1 group (8.62±0.67 gm/dl) though the difference was not significant. Overall Blood Urea Nitrogen level in calves was higher in T2 (19.55±1.39 mg/dl) as compared to T1 group (17.86±1.42 mg/dl) though the difference was not significant.

Keywords: Complete feed block, blood cholesterol, total protein, blood urea nitrogen and blood glucose

1. Introduction

Farmers of Asian continent use tamed water buffaloes for ploughing, transporting and earning, therefore popularly known as "The living tractor of the East." (Bakkannavar *et al.* 2010) [1]. Due to their colour and high economic value, buffalo are known as Asia's "Black Gold" and have become the choice of milch animal for farmers (Presicce, 2007) [5].

The Surti buffalo (*Bubalus bubalis*) is one of India's most well-known breeds. The breeding tract of Surti buffalo is Kaira and Baroda districts of Gujarat state. The body is well-shaped and medium in size, with a wedge-shaped barrel. The head is quite large with straight conformation. This breed has medium-sized animals with sickle-shaped horns and prominent eyes with either black or brown in colour. The breed is distinguished by two white collars, one around the jaw and the other around the brisket. It yields milk with a high fat content (8-10%). Its milk output varies between 900 and 1300 kg. The age at first calving is 40-50 months, with a 400-500 days of inter-calving time. They give birth to calves weighing between 21 to 25 kg (Thamilvanan *et al.* 2009) [8].

Farmers in rural India frequently do not chaff and soak the straw or stover, instead feeds it to their animals in un-chopped or semi-chopped forms. Furthermore, un-chopped straw allows the animal to selectively take digestible pieces while leaving less digestible parts behind, resulting in increased wastage; additionally, the animal must expend more energy chewing un-chopped materials, resulting in increased energy expenditure (Chander, 2010) [2].

The terms "Complete Feed" and "Total Mixed Ration" (TMR) or "Complete Ration" (CR) are inter-changeable. As the name suggests, a complete feed block is an animal edible item created by compacting complete feed consisting of roughage and concentrate into a predetermined proportion capable of meeting the nutrient requirements for the targeted animal production system. The CCFB (Compressed Complete Feed Block) is a ready-to-eat complete diet that is convenient, affordable and multi-nutrient content. (Salem and Nefzaoui, 2003) [6].

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which results in a more stable and optimal environment for rumen fermentation, which ultimately improve production performance (Verma *et al*. 1996) [9].

2. Materials and Methods
The study entitled "Effect of feeding complete feed block on blood bio-chemical profiles in Surti Buffalo calves" was carried out in Surti Buffalo breed from January, to April, 2022 for a period of 90 days. The study was conducted at the Livestock Research Station, Navsari Agricultural University, Navsari. This unit is located at 20.95˚N 72.93˚E and at an elevation of 11.89 m above Mean Sea Level (MSL). The climate of the area is tropical with average maximum and minimum temperatures of 40 °C (104˚F) and 17 °C (62.6˚F) respectively. The experiment was undertaken to study the effect of complete feed block on growth performance of Surti buffalo calves under farm condition. The calves were divided into two groups, i.e., control (T1) and treatment (T2) comprised of eight numbers of buffalo calves in each group on the basis of age, sex and body weight. In T1 group conventional feed was offered while in T2 group complete feed block was offered to the animals.

Detailed ingredients of complete feed block

Table 1: Ingredients of complete feed block

Ingredients	Proportion %
Millet bran	50
Molasses	10
Tech. Graded Urea	1
Calcite powder	2
Grinded salt	2
Wheat straw	25
Concentrate	10
Total	100

The calves were housed individually in well ventilated, clean and dry pucca shed with facilities for feeding and watering. The shed was disinfected with potassium permanganate solution, sanitized and white washed prior to introduction of calves.
Each buffalo calves were tied with rope near the manger to ensure that it received feed individually.
Animals were given different identification number. The control group (T1) was kept on conventional feeding as per farm routine, while treatment group (T2) was fed compressed complete feed block (CCFB). Both the diets were made iso-nitrogenous and isocaloric to meet the requirement for growth as per ICAR standards (2013). The calves were de-wormed and vaccinated before the start of the experiment and group housed on cemented concrete floor with provision of feeding and watering. All the calves were fed conventionally as per the requirement of adaptation period of 7 days. The daily feed offered and residue left in manger was recorded for calves separately.

2.1 Collection of blood
Blood samples of all the buffalo calves under each treatment groups were collected in the beginning and at the end of study. In every collection approximately 5-7 ml of blood was collected from each calf by jugular vein puncture and allowing the blood to flow directly from syringe into the sterilized collection tube. Blood was collected in anti-coagulated coated vial. The test tube was kept in slanting position and kept undisturbed for serum collection. The fresh separated serum was centrifuged at 3000 rpm for 10 minutes and the supernatant was stored at -20 °C in ultra-low temperature freezer (New Brunswick Scientific, England) until analysis. Each of these samples was analysed for serum concentration of glucose, blood urea nitrogen, cholesterol and total protein by standard protocol using commercial diagnostic kits.

2.2 Statistical Analysis
Data collected during course of experiment was first tabulated using descriptive statistics and analyzed by t-test and mean within the group was compared using Duncan Multiple Range Test (DMRT) with the help of SPSS software.

3. Results and Discussion
3.1 Cholesterol level in calves (mg/dl)

Table 2: Mean ± S. E of Cholesterol level in calves (mg/dl)

Day of observations	T1 (N=8)	T2 (N=8)	t-value	P-Value
Initial	128.7275±4.37	140.248±6.34	-1.496	0.157
90th day	147.7275±2.43	157.81±5.39	-1.704	0.111
Overall	138.22±13.77	149.03±4.61	-1.876	0.070
t-value	-3.797	-2.109	-	-
F-Value	5.037*	0.382	-	-

* & ** indicates significance at *p*<0.05 and *p*<0.01, respectively

The mean value of cholesterol at initial and 90th day of study as well as overall cholesterol for T1 group was 128.7275±4.37, 147.7275±2.43 and 138.227±13.77 and T2 group was 140.248±6.34, 157.81±5.39 and 149.03±4.61 respectively.
The overall mean of cholesterol level of T2 was higher as compared to T1 group. Moreover, cholesterol level in T2 group of calves was higher as compared to T1 group of calves on initial and 90th day also though the difference was not significant. The F-value of T1 group was significant (*p*<0.05).

3.2 Total Protein level in calves (mg/dl)

Table 3: Mean ± S. E of Total Protein level in calves (mg/dl)

Day of observations	T1 (N=8)	T2 (N=8)	t-value	P-Value
Initial	7.5612±0.82	8.1900±0.73	-0.568	0.579
90th day	9.6950±0.97	10.6500±1.80	-0.467	0.648
Overall	8.6281±0.67	9.4200±0.99	-0.660	0.514
t-value	-1.669	-1.262	-	-
F-value	0.651	1.278	-	-

The mean value of total protein at initial and 90th day of study as well as overall total protein for T1 group was 7.5612±0.82, 9.6950±0.97 and 8.6281±0.67 and for T2 group was 8.1900±0.73, 10.6500±1.80 and 9.4200±0.99 respectively.
The overall mean of total protein level of T2 group was higher as compared to T1 group. Moreover, total protein level in T2 group of calves was higher as compared to T1 group of calves on initial and 90th day though the difference was not-significant. The F-value suggests non-significant variation in total protein level from initial to 90th day in both the groups.

3.2 Blood Urea Nitrogen level in calves (mg/dl)

Table 4: Mean ± S. E of Blood Urea Nitrogen level in calves (mg/dl)

Day of observations	T1 (N=8)	T2 (N=8)	t-value	P-Value
Initial	13.0187±0.93	14.7537±0.98	-1.278	0.222
90th day	22.7050±1.06	24.3462±0.87	-1.188	0.254
Overall	17.8618±1.42	19.5500±1.39	-0.847	0.404
t-value	-6.831	-7.271	-	-
F-value	0.073	0.411	-	-

The mean value of blood urea nitrogen on initial and 90th day of study as well as overall blood urea nitrogen for T1 group was 13.0187±0.93, 22.7050±1.06 and 17.8618±1.42 and for T2 group was 14.7537±0.98, 24.3462±0.87 and 19.5500±1.39 respectively.

The overall mean of BUN level of T2 group was higher as compared to T1 group though it was not significant. Similarly BUN level was also higher in T2 group on both initial and 90th day as compared to T1 group though the difference was not-significant. The F-value of both the groups were not significant. While comparing within group BUN level showed increasing trend from initial to 90th day.

3.3 Blood Glucose in calves (mg/dl)

Table 5: Mean ± S. E of Blood Glucose level in calves (mg/dl)

Day of observations	T1 (N=8)	T2 (N=8)	t-value	P-Value
Initial	86.7462±1.81	91.1612±1.17	-2.038	0.61
90th day	82.5712±1.94	94.4612±2.35	-3.890*	0.02
Overall	84.6587±1.39	92.8112±1.34	-4.212**	0.00
t-value	1.567	-1.253	-	-
F-value	0.322	4.481	-	-

The mean value of blood glucose at initial and 90th day of study as well as overall blood glucose for T1 group was 86.7462±1.81, 82.5712±1.94 and 84.6587±1.39 and for T2 group was 91.1612±1.17, 94.4612±2.35 and 92.8112±1.34 respectively.

The overall mean of blood glucose level of T2 group was higher as compared to T1 group. The F-value of both the groups did not varied significant. Blood glucose level in T2 group of calves was higher as compared to T1 group of calves on initial and 90th day.

Patil *et al.* (2013) [4] reported that feeding of complete compressed feed block containing de-oiled mahua seed cake at 5% level induced no adverse effect on serum biochemical profile in 12 growing crossbred calves during long term feeding.

While, De and Singh (2003) [3] studied the effect of cold process monensin enriched urea molasses mineral blocks on performance of crossbred calves fed a wheat straw based diet in four treatment groups. Calves in groups I and II were fed wheat straw *ad libitum* with a concentrate mixture with or without monensin (30 mg per day per animal). Calves in groups III and IV were fed wheat straw ad libitum with 70% of the allocated concentrate mixture and had free access to Urea Molasses Mineral Block (UMMB) with or without monensin (100 ppm). They found that the blood glucose level was increased due to monensin treatment. There is significant difference between the treatment groups ($p<0.05$) in experiment no difference was reported dur to TMR.

However, Sharma *et al.* (2015) [7] reported the effect of feeding Compressed Complete Feed Block (CCFB) with or without 5% guar meal in the diet and they studied the effect of feeding compressed complete feed block containing 5% guar meal on blood biochemical profile of twelve Crossbred calves in two experimental groups *viz.* control group (T1) and treatment group (T2). T1 was fed with Compressed Complete Feed Block (CCFB) alone and T2 complete feed block containing 5% guar meal. Results revealed that the Mean values for serum glucose (mg/dl), total protein (g/dl), albumin (g/dl), globulin (g/dl) of all the experimental crossbred calves were found to be statistically similar with that of the control group.

Similarly, Singh *et al.* (2016) [10] conducted a feeding trial to assess the effect of feeding wheat or rice straw based complete ration as mash or block form on growth in crossbred calves were divided into four groups of 6 calves each on the basis of body weight. They also found no significance difference in serum glucose and total protein among the different groups of crossbred calves.

4. Conclusions

Overall blood glucose ($p<0.01$) and blood glucose at 90th day ($p<0.05$) was significantly higher in CFB fed group (T2) as compared to T1 group. Moreover, overall level of Cholesterol, Total Protein and BUN were higher in CFB fed group though it was not significant. Thus, Blood profile due to feeding of complete feed block shift towards positive side especially with respect to serum glucose level.

5. Acknowledgment

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