J. Bangladesh Agril. Univ. 8(1): 87–90, 2010 **ISSN 1810-3030**

Comparative study of the performance of buffalo calves and cow calves by feeding Urea Molasses Block with straw based diet

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Abstract

An experiment was conducted to evaluate the performance of buffalo calves and cow calves supplementing Urea Molasses Block (UMB) with straw based diet. Three cow calves (average 1 year & 8 months age and 111 kg body weight) and three buffalo calves (average 1 year & 10 months age and 89 kg body weight) were grouped into A and B, respectively and fed for 60 days. It was found that, the DMI (kg/h/d) was 5.66±1.18 and 6.10±0.99, respectively in group A and B ($p>0.05$). The DMI in 1st and 2nd fortnight of the experiment in group A and B were 5.77±0.31 and 6.17±0.33; 4.96±0.43 and 5.77±0.39, respectively ($p<0.01$). But, the DMI in 3rd and 4th fortnight differs non-significantly ($p>0.05$). At the end of the experiment, the final body weight for group A and group B were 132.6±11.96 and 113±8.19 kg, respectively ($p>0.05$). The body weight gain per day for both groups were 0.36±0.05 and 0.40±0.05 kg, respectively ($p>0.05$). The average heart girth gain per day in group A and group B were 0.24±0.02 and 0.30±0.03 cm, respectively ($p>0.05$). The average wither height gain per day was 0.075±0.005 and 0.059±0.005 cm in group A and B, respectively ($p<0.05$). The average body length gain per day for group A and group B were 0.31±0.03 and 0.36±0.04 cm, respectively ($p>0.05$). The growth performance of buffalo calves is better than cow calves by feeding UMB with straw based diet.

Keywords: UMB, Body weight, Heart girth, Wither height, Body length

Introduction

Buffalo plays an important role in farmer's economic life, being an integral part of the farming system. Bangladesh possesses 1.26 million buffalo heads (DLS, 2008). Farmers prefer to use buffaloes for agricultural work because of their draught power, utilization of low quality roughages, docile temperament, more disease resistance and long working life. Livestock management involves the integrated application of scientific principles of feeding, breeding, housing and disease control of animals. Rice straw is the most important crop residue contributing more than 90% of the total DM available to the ruminant livestock in Bangladesh. It is poor quality roughage and the principal feed of our livestock. Urea Molasses Block (UMB) can be used as an important supplement to straw based diet in dairy cattle production in Bangladesh. UMB supplementation technique has recognized in dairy cattle production. No research work has yet been done in Bangladesh to judge the feasibility of using UMB to fed buffalo calves compare to cow calves. For this reason, the present research was undertaken.

Material and Methods

The experiment was conducted at the Bangladesh Agricultural University Dairy Farm for a period of 60 days. Six crossbred calves were selected for the experimental purpose. Among them, 3 animals were cow calf (group A: average 1 year & 8 months age and 111 kg body weight) and rest 3 animals were buffalo calf (group B; average 1 year & 10 months age and 89 kg body weight).

Preparation of Urea Molasses Block (UMB): The ingredients used for preparation of Urea Molasses Block (UMB) are molasses, wheat bran, rice polish, urea, lime (CaO) and salt @ 39.0, 20.0, 20.0, 10.0, 6.0 and 5.0 %, respectively.

Feeding of Animal: The animals were supplied with green grass, concentrate mixture, rice straw and UMB. Green grasses composed mainly of Para (*Brachiaria mutica*), Napier (*Pennisetum purpureum*), and German grass (*Echinocloa crusgalli*). Concentrate mixture was composed of wheat bran, rice polish, fish meal and common salt and the mixing ratio was 4:4:1:1. The amount of each item given the animal was presented in Table 1.

Table 1. Daily feed supplied to the animal

Feed Item	Group-A (Cow calf)	Group-B (Buffalo Calf)	Dry matter (%)	CP (%)
Green grass	4 kg/day/animal	4 kg/day/animal	30.42	8.4
Rice straw	5 kg/day/animal	5 kg/day/animal	92.80	7.46
Concentrate	0.5 kg/day/animal	0.5 kg/day/animal	90.99	15.29
UMB	0.5 kg/day/animal	0.5 kg/day/animal	79.75	16.31

Urea molasses block was supplied to the experimental animals two times in a day: at 7.30 AM, then at 4.00 PM. The block was supplied in an individual wooden box, so that the animal can not bite it and individual intake of UMB can be measured. The animals were allowed to lick the block for such a period in a day so that daily intake was of 0.5 kg. The concentrate mixture was supplied to the animals once in a day; at 1.00 PM. Green grasses were supplied with *ad libitum* at 11.00 AM. All the animals had free access to the clean cool fresh drinking water for 24 hours.

Management of the animal: During the experimental period, all the animals were housed in a well ventilated house. The house was cleaned once daily in the morning. During the experimental period, the dry matter intake (kg), body weight (kg), heart girth (cm), wither height (cm) and body length (cm) were measured. The data obtained were analyzed statistically designed in Completely Randomized Design (CRD) by using MSTAT computer program (Steel and Torrie, 1980).

Results and Discussion

Dry matter intake (Kg): The average daily dry matter intake was 5.66±1.18 and 6.10±0.99 kg in group A and group B, respectively ($p<0.05$). The average daily DMI in 1st and 2nd fortnight of the experiment in A and B were 5.77±0.31 and 6.17±0.33; 4.96±0.43 and 5.77±0.39, respectively ($p<0.01$). But, the DMI in 3rd and 4th fortnight in A and B were 5.87±1.83 and 6.39±1.40; 6.01±0.76 and 6.07±0.76, respectively ($p<0.05$) (Table 2). The present findings supported by the findings of Meenakshi *et al.* (1988) and Sudhakar *et al.* (2002). Meenakshi *et al.* (1988) reported that supplementation with urea molasses block (UMB) increased daily dry matter intake and Sudhakar *et al.* (2002) observed significant difference ($p>0.01$) in average daily dry matter intake in buffaloes fed UMMB supplemented ration.

Table 2. Dry matter intake (kg) and live weight of animals throughout the experimental period

Parameters	Group-A	Group-B	Level of significance
Dry Matter Intake (kg/d)			
1st 15 d	5.77 ± 0.31	6.17 ± 0.33	**
2nd 15 d	4.96±0.43	5.77± 0.39	**
3rd 15 d	5.87±1.83	6.39±1.40	NS
4th 15 d	6.01±0.76	6.07±0.76	NS
Average Dry Matter Intake (kg/d)	5.66±1.18	6.10±0.99	NS
Body weight (kg)			
Initial body weight	111±11.53	89±5.29	*
Final body weight	132.6 ± 11.96	113 ± 8.19	NS
Body weight gain/d (kg)	0.36±0.05	0.40±0.05	NS

NS: Non Significant
**: Significant at $p<0.01$
*: Significant at $p<0.05$

Changes in body weight of calves (Kg): The average final body weight for group A and group B were 132.6 ± 11.96 and 113 ± 8.19 kg, respectively (p>0.05). The body weight gain per day for both groups were 0.36±0.05 and 0.40±0.05 kg, respectively (p>0.05) (Table 2). The result of the study contradicts with the results of Sahoo *et al.* (1990) who study on 12 male growing buffalo calves with supplementing molasses urea diet and found live wt. gains were 212.77 ± 28.6g, 341.3±35.5g and 354.7±35.2g in groups 1 to 3 respectively showing significantly higher (p<0.05) gain in the urea molasses supplemented groups than that of the control. This experiment also contradicts with Firke *et al.* (1994) who found that significantly (p<0.01) higher daily weight with buffalo calves than cow calves.

Changes in heart girth of calves (cm): The average final heart girth was 119.73± 5.14 and 113.83± 2.86 cm for group A and group B, respectively (p>0.05). The heart girth gain per day in group A and group B were 0.24±0.02 and 0.30±0.03 cm, respectively (p>0.05) (Table 3). According to James (2002), about 50% of the total gain in heart girth occurs during the first 6 months, 25% from 7-12 months and the remaining 25% during the last 12 months and the age of the experimental animal (group A Cow calf and group B Buffalo calf) were 1 year 8 months and 1year 8.5 months, respectively. It assumes that the skeleton of heart frame also may complete or near to complete its growth within this age limit as because the correlation between height and body weight is 0.97 reported by James (2002). Some authors reported a correlation of 0.605-0.97 (Mullick, 1949; Mourad and Anous, 1991) between the heart girth and body weight. Moreover, Khan (2000) also found a statistically non-significant higher heart girth value by using different energy level with animals aged above 2 years.

Changes in wither height of calves (cm): The average final wither height in group A and group B were 47.17±2.03 and 43.20±2.75 cm, respectively (p>0.05). Wither height gain per day was 0.075 ± 0.005 and 0.059 ± 0.005 cm in group A and B, respectively (p<0.05) (Table 3). Mukai (1990) reported that the heart girth and withers height of Japanese Black Cattle increased steadily during 1914-1985.

Table 3. Heart girth, wither height and body length of calves throughout the experimental period

Parameters	Group-A	Group-B	Level of Significance
Heart girth (cm)			
Initial heart girth	105.33 ±6.51	96 ± 4.58	NS
Final heart girth	119.73± 5.14	113.83± 2.86	NS
Heart girth gain/day (cm)	0.24±0.02	0.30±0.03	NS
Wither Height (cm)			
Initial wither height	42.67±2.08	39.67±2.52	NS
Final wither height	47.17±2.03	43.20±2.75	NS
Wither height gain/day (cm)	0.075±0.005	0.059±0.005	*
Body Length (cm)			
Initial body length	95±7.55	89.33±8.08	NS
Final body length	113.6±7.34	110.93 ± 8.06	NS
Body length gain/day (cm)	0.31±0.03	0.36±0.04	NS

NS: Non Significant
*: Significant at p<0.05

Changes in body length of calves (cm): The average final body length of group A and group B were 113.6±7.34 and 110.93 ± 8.06 cm, respectively (p>0.05). Body length gain per day for group A and group B were 0.31±0.03 and 0.36±0.04 cm, respectively (p>0.05) (Table 3). Begum (1992) reported that, the average daily length increment were 0.07, 0.08 and 0.07 cm for group A, B and C respectively. The daily increment in B group was higher than that of calves in group in A and C may due to intake of treated straw.

Conclusion

Urea Molasses Block (UMB) may be used as a supplementation for straw based diet for enhancing the performance of buffalo calves compared to cow calves.

Acknowledgements

The author acknowledged gratefully to the Ministry of Science, Information and Communication Technology, Government People's Republic of Bangladesh for financial help to conduct the research. Active help from the Faculty Member of the Dairy Science Department and Staff from the University Dairy Farm is also acknowledged.

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