

A Study on the Growth Performance of Crossbred Growing Bull Calves Fed by Supplementing Molasses with Straw Based Diets and Conventional Concentrates

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Abstract: The experiment was conducted to evaluate the effect of supplementing molasses with straw based diets on the growth performances of male crossbred calves. For this purpose, twelve bull calves of about one year and a half years to 2 years of age having similar body weight were divided into two groups (six in each group). Calves on one group received the as usual basal diet (straw+concentrates) offered by the dairy farm and the other group received the basal diet+500 g of molasses per head/day. Ration was formulated in such a way so that both group had similar level of metabolizable energy (ME). From the result it was observed that per day body weight gain, heart girth, height and length increment of molasses group calves were significantly higher than that of the calves on as usual basal diet group (control). It was concluded that straw-based diets could be supplemented successfully by molasses, which is widely available in country especially in sugar mill areas.

Key words: Growth performance, growth calves, supplementing molasses, straw based diets

Introduction

The biggest constraint of livestock production in the country is the acute shortage of quality feeds and fodder. To overcome the scarcity of quality feed it is necessary to find out the feasibility of using supplementing molasses. Molasses is one of the few potential cattle feeds that remain under utilized. Molasses supplies readily available energy and sulphur to rumen micro flora. Molasses has a special value in increasing the palatability, digestibility and general efficiency of the feed. The use of supplement is that the intake of low quality forage becomes limited and intake of concentrates increases that help higher production (Schiere and Ibrahim, 1986).

So the present research was carried out with following objectives in mind.

1. To study the effect of supplementing molasses with straw based diet on the feed intake and dry matter intake of crossbred calves.
2. To study the effect of supplementing molasses with straw based diet and conventional concentrates on the growth performance of growing animals.

Materials and Methods

The experiment was conducted at the Dairy Farm under the Department of Dairy Science, Bangladesh Agricultural University, Mymensingh. Twelve crossbred growing bull calves were used in this experiment for the period of 90 days. The selected calves were more or less similar in age, body wt. and general body condition and approximately one and a half years to 2 years old with an average body wt. 135 kg. The calves were divided into two groups:

(Group A) molasses groups

(Group B) control groups

Each group consists of 6 calves. Two feed mixtures A and B were given to two different respective groups. All the groups were given almost equal amount of concentrate mixture containing 0.5 kg wheat bran, 0.5 kg sesame oil cake, 0.5 rice polish, common salt was supplied as mineral supplement. 500 g of molasses with rice straw and conventional concentrates mixture to the calves of group A and only rice straw, rice polish, wheat bran, sesame oil cake were given to the calves to group of control group. The ration was formulated according to Agricultural Research Council (ARC, 1980) method and expecting 0.5 kg body weight gain/d/calf.

The present study was conducted to observe the effect of supplementing molasses with straw based diet and conventional concentrates on growth performance in terms of body weight gain, heart girth, length and height.

Results and Discussion

The experiment was conducted to evaluate the supplementing molasses with straw based

Table 1: Composition and estimated intake of ME, RDP, UDP and CP of two ration during the experimental period Ration-A (Molasses group)

Ingredients	Fresh wt. (Kg/d)	DM (kg/D)	ME (Mj/d)	RDP (g/d)	UDP (g/d)	CP (g/d)
Rice straw	4.00	3.41	20.46	112.53	37.50	150.04
Molasses	0.50	0.37	4.40	11.84	2.96	14.80
Wheat bran	0.50	0.44	4.70	56.32	18.48	74.80
Rice polish	0.25	0.21	1.95	16.96	8.86	25.83
Sesame oil cake	0.50	0.45	4.50	87.75	47.25	135.00
Total	5.75	4.88	36.01	285.4	115.06	400.47

diets and conventional concentrate mixtures on the growth performance of cross bred growing calves. Supplementing molasses with rice straw and concentrate mixture was treated group (Group A) and rice straw with concentrate mixture was control group (Group B). Performance had been monitored in terms of DM intake, body weight gain, heart girth, length and height.

DM Intake

The average daily dry intake in the calves of A and B groups were 4.699 ± 0.10 and 4.3 ± 0.07 kg (Table 3). The average weekly dry matter intake of the each calves of two groups were 32.89 ± 0.70 and 30.1 ± 0.49 (Table 3). The higher dry matter intake was observed in group A which was supplemented with 500 g of molasses and this was significantly higher ($P < 0.01$) than another group. The higher dry matter intake of the animals of this group may be due to the supplementation of molasses with straw based diet and conventional concentrate mixture which stimulate the intake of straw. It is supported by temperature the finding of Saadullah *et al.* (1981).

Body Weight Gains

Average daily weight gains were 392 ± 3.4 and 303 ± 30 g in the calves of group A and B respectively (Table 4). Statistical analysis showed that there was significant difference ($p < 0.01$) between the growth rates of different types of calves. The average body weight gain measured on weekly basis were 2.74 ± 10.02 kg of group A and 2.12 ± 0.2 kg for group B.

Table 2: Ration-B (control group)

Ingredients	Fresh wt. (Kg/d)	DM (kg/D)	ME (Mj/d)	RDP (g/d)	UDP (g/d)	CP (g/d)
Rice straw	3.75	3.19	19.10	105.27	35.07	140.36
Sesame oil cake	0.50	0.45	4.50	87.75	47.25	135.00
Wheat bran	0.50	0.44	4.70	56.32	18.48	74.80
Rice polish	0.50	0.43	3.99	34.74	18.14	52.89
Total	5.25	4.51	23.34	284.08	118.94	403.05

Table 3: Mean \pm SD of dry matter intake (kg) during the experimental period

	A	B	Level of significant
Average amount of supplied feed	5.75 ± 0.00	5.25 ± 0.00	
Average daily feed intake	5.61 ± 0.07	5.12 ± 0.079	
Average daily dry matter intake	4.69 ± 0.10^a	$4.30^b \pm 0.07$	**
Average weekly dry matter intake	32.89 ± 0.70	30.10 ± 0.49	**

*a, b values with dissimilar superscripts in the same line differ significantly, ($P < 0.01$)

Table 4: Mean±SD of body weight gains (kg) of calves during the experimental period for 13 weeks

	A	B
Average initial body weight	5.75±0.00	5.25±0.00
Average final body weight	5.61±0.07	5.12±0.07
Average total body weight gains	4.69±0.10 ^a	4.3±0.07 ^b
Average weekly gains	32.89±0.70	30.1±0.49
Average daily body weight gains (g)		

*a, b values with dissimilar superscripts in the same line differ significantly, (P<0.01)

From Table 4, it was found that the growing crossbred calves of group A (treated group) gained more body weight than did the growing calves of group B (control group). The highest growth rate showed in group A may be due to greater availability of energy and sulphur from the supplementary molasses which may enhance microbial synthesis in the rumen and subsequently become available to the host animal for increasing live weight gain. Several workers observed better body weight gains in different types of cattle by feeding molasses-urea supplement ration (Zilkibaen, 1962; Su *et al.*, 1984; Daniel *et al.*, 1986). The performance of the animals of control group (B) is poor in respect of body weight gain. DM intake of the only available rice straw was lowest may be due to its poor quality.

Heart Girth Increment

Average daily increments in heart-girth were 0.16±0.01 and 0.11±0.0 cm. in the calves of group A and B (Table 5), respectively. The differences between treatments were statistically significant (P<0.01). The average weekly increments for the groups of A and B were 1.14±0.04, 0.79±0.01 cm, respectively.

The increased heart girth by calves in ration A may be due to intake of energy form supplementary molasses with straw based diet.

Table 5: Average different changes in heart girth (cm) of calves during the experimental period for 13 weeks

	A	B
Average initial heart girth	111.76±1.57	110.05±1.90
Average final heart girth	126.43±2.06	115.36±1.72
Average total heart girth gains	14.66±0.49	10.23±0.31
Average weekly gains	1.14±0.04	0.79±0.01
Average daily gains (cm/d)	0.16±0.01 ^a	0.11±0.00 ^b

*a, b values with dissimilar superscripts in the same line differ significantly, (P<0.01)

Height Increment

Average daily increments in height were 0.15 ± 0.002 and 0.10 ± 0.005 cm in the calves of group A and B respectively (Table 6). The differences between treatments were statistically significant ($P < 0.01$). The average weekly increments for the groups of A and B were 1.08 ± 0.01 and 0.71 ± 0.04 cm, respectively. The average total increment in height were 13.93 ± 0.15 and 9.2 ± 0.35 cm in the calves of group A and B.

Length Increment

The average daily increments in length were 0.14 ± 0.002 and 0.11 ± 0.02 cm in the calves of group A and B respectively. Statistical analysis showed that there was significant difference between the two groups of different calves ($P < 0.01$). The average weekly increments for the groups A and B were 1.02 ± 0.02 and 0.78 ± 0.05 cm, respectively (Table 7).

From the experiment, it was found that there was significant difference of DM, intake between the molasses group and control group and performance of calves were found better when they consumed molasses with straw based diet along with concentrate mixture. So farmers are recommended to fed molasses to their growing calves for getting maximum production form them.

From the analysis of variance it is evident growth performance in terms of live weight gain, increment of height length and heart girth of group A, supplemented with molasses was significantly ($P < 0.01$) higher than that of group B. This was because supplementing molasses with

Table 6: Average different changes in height (cm) during the experimental period for 13 weeks

	A	B
Average initial height	93.96 ± 1.35	83.73 ± 0.68
Average final height	107.90 ± 1.45	92.93 ± 0.40
Average total increment in height	13.93 ± 0.15	9.20 ± 0.53
Average weekly increment in height	1.08 ± 0.01	0.71 ± 0.04
Average daily increment in height (cm/d)	0.15 ± 0.002^a	0.10 ± 0.005^b

Table 7: Average different changes in length (cm) during the experimental period for 13 weeks

	A	B
Average initial length	98.667 ± 3.01	85.200 ± 3.80
Average final length	111.800 ± 3.04	95.330 ± 4.06
Average total increment in length	13.130 ± 0.23	10.130 ± 0.59
Average weekly increment in length	1.020 ± 0.02	0.780 ± 0.05
Average daily increment in length (cm/d)	0.140 ± 0.002^a	0.110 ± 0.02^b

*a, b values with dissimilar superscripts in the same line differ significantly, ($P < 0.01$)

straw based diet increases palatability and digestibility. That is why sufficient amount of micro-organisms were formed in the rumen.

From this experiment it is clear that molasses with straw based diet and conventional concentrates increases the live weight gain. So molasses can be used for growing calves with rice straw for better performance, mainly on the body weight gain, heart girth, length and height increment.

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