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RESEARCH ARTICLE

COMPARATIVE PERFORMANCE OF BUFFALO CALVES FED ON WHOLE MILK AND CALF STARTER

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ABSTRACT

The study was conducted to assess performance of Calf starter on buffalo calf rearing. The study was conducted at Monpura of Bhola District and Baufol of Patuakhali, Bangladesh during January, 2020 to June, 2020. A total of 30 buffalo calves of about 6-10 days of age were selected randomly from study area and divided in two groups; having fifteen (15) calves in each. Calves were maintained under uniform managerial condition except milk feeding. The calves were weighed initially just after birth and 15 days apart thereafter by a platform digital balance. Each calf was weighed in the morning before feeding. Analysis of variance revealed that FCR of the values of control group (5.37) was significantly higher ($P < 0.05$) than that of treatment group (4.09). Variable costs to raise buffalo calves during 75 days of experiment were higher in treatment group (Tk. 10089±2840) than control group (Tk. 8830±401). Results considering for daily weight gain and FCR, it indicates that overall performance, calf starter group was found better than the conventional ration.

Key words: Calf starter, whole milk, weight gain, feed conversion ratio

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INTRODUCTION

Bangladesh is a south Asian country where the economy is based primarily on agriculture and livestock is an essential component of the rural economy and 10 million people are directly related with this sector for their income generation in Bangladesh. Among different livestock species, the number of buffaloes in Bangladesh is 1.497 million (BER-2020). Bhola is a buffalo concentrated area in Bangladesh. Available grazing land and favorable geographical environment make buffalo rearing a popular business in this area. At present the total buffalo population in Bhola is 90,827. In Bhola, normally two methods known as Bathan and are household rearing used for buffalo rearing. In average, 80-100 buffaloes are usually reared in Bathan and most of the families 'rear 2-3 buffaloes all year long according to the tradition in this area. They do not know how to rear buffalo in a scientific method (BER-2020). The demand for milk for human consumption restricts availability of milk for pre-ruminant feeding, resulting in underfeeding or starvation with a consequence of stunted growth and mortality (Ranjhan and Pathak, 1979). If suitable substitutes for milk are made available, the nutrition of infant pre-ruminants can be improved and survivability can be increased. In developed countries, alternatives to whole milk feeding to pre-ruminants are formulated using by-products of milk processing industry.

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Such practice is not feasible in the developing countries where milk by-products are scarce and expensive (Khan et al., 2012). Feeding milk replacer to calves is an alternative approach being used in many commercial dairy farms mainly in developed countries to combat this serious problem since long (Mete et al., 2000). The availability of cost effective milk replacer in the market is one of the major hindrance of calves' growth in Bangladesh. Buffalo has innate ability to produce milk having high milk fat contents ranging from 6-8.5%. Due to higher milk fat contents, its milk is preferred over cow milk and fetches better price (Sarwar et al., 2002, Khan et al., 2008). The demand for milk for human consumption restricts availability of milk for pre-ruminant feeding, resulting in underfeeding or starvation with a consequence of stunted growth and mortality (Ranjhan and Pathak, 1979). If suitable substitutes for milk are made available, the nutrition of infant pre-ruminants can be improved and survivability can be increased. In developed countries, alternatives to whole milk feeding to pre-ruminants are formulated using by-products of milk processing industry. Such practice is not feasible in the developing countries where milk by-products are scarce and expensive (Khan et al., 2012). Feeding milk replacer to calves is an alternative approach being used in many commercial dairy farms mainly in developed countries to combat this serious problem since long (Plaza and Fernandez, 1994; Sajko et al., 1998 and Mete et al., 2000). The availability of cost effective milk replacer in the market is one of the major hindrance of calves' growth in Bangladesh. Under current husbandry conditions, neonatal calves are often affected by lack of milk feeding due to higher buffalo milk price in market.

This is the main cause of mortality and delayed puberty. Successful calf health and growth depends on the combination of many factors related to management, nutrition and health of neonate (Heinrichs *et al.*, 1995). The use of milk replacer for feeding dairy calves saves milk for human utilization and sold to secure financial consideration (Bamn, 2002). Heifers which grow rapidly achieve puberty at a younger age and become productive earlier. Use of milk replacer instead of fresh milk is an alternate way to accelerate gain. The effect of composition, amount and feeding method of milk replacer to new born calves is evident on their health, performance and behavior (Khan *et al.*, 2008). Milk replacer is a good source of liquid feed for calves. It is often very economical than whole milk and in many conditions is more easily handled by labor (Heinrichs *et al.*, 1995). Conventional milk replacer contains animal fat and whey protein. This nutrient imbalance is one of the main reasons for reduced growth in milk replacer fed calves as compared with those raised on whole milk feeding (Quigley *et al.*, 2006). Furthermore, higher protein contents in milk may severely affect liver and kidney functions (Khan *et al.*, 2008). The overall goal of this trial was to determine the effect of calf starter on the performance of Nili-Ravi buffalo heifer calves.

MATERIALS AND METHODS

Study Area: The study was conducted at Monpura of Bhola District and Baufol of Patuakhali, Bangladesh during June, 2020 to September, 2020, under Promoting Agricultural Commercialization and Enterprises (PACE) Project.

Animal Selection: A total of 30 buffalo calves of about 6-10 days of age were selected randomly from study area and divided in two groups; having fifteen (15) calves in each. However calves were distributed randomly in each treatment group. A limited suckling with feeding whole milk considered as control, suckling along with feeding of wheat, shoti and soybean based calf starter considered as treatment.

Housing and feeding of experimental Calf: The calves were housed in an open calf shed and the calf shed provided with feed trough for feeding concentrate mixture and green grass and a plastic bucket for feeding water. All calves under control and treatment groups were supplied an iso-nitrogenous diet (CP content 25%) at a rate of 10% of their body weight. Calves fed whole milk or calf starter twice daily using a plastic bottle.. Green grass and concentrate mixture were supplied *ad lib* after 2 weeks of age. The experiment was carried out for a period of 75 days.

Measurement of body weight: The calves were weighed initially just after birth and 15 days apart thereafter by a platform digital balance. Each calf was weighed in the morning before feeding.

Chemical Composition of Calf Starter

Ingredient	Percent(%)
Broken Wheat	10
Wheat Bran	40
Khesari	24
Til oil cake	15
Fishmeal	3
Soymeal	5
Salt	0.5
DCP	0.5
Oyster shell	2
Total	100

Statistical analysis: The data generated from this study were entered in Microsoft Excel Worksheet and descriptive statistics were performed. The pregnancy rates in different experiments were expressed as percentage (%). The data were analyzed by using SPSS software version 17. The variation in pregnancy rates was considered significant when the P value was less than 0.05.

RESULT AND DISCUSSION

One of the main reasons of not rearing the buffalo calves in the dairy farms is high milk price and demand. Hence, economics of calf rearing was carried out to examine the recurring expenditure incurred to rear buffalo calves up to three months of age by replacing buffalo whole milk with soymilk in different proportions. Information on calf growth and cost of calf rearing is important for the successful raising of calves as replacement stock.

Table 01. Daily Weight gain, FCR and Variable cost of Buffalo calf rearing

Indications	Treatment Group (Mean±SEM) kg	Control Group (Mean±SEM) kg
0 Days Average Weight(kg)	19.83±0.54	19.16±0.31
15 Days Average Weight(kg)	24.6±0.53	20.83±0.31
30 Days Average Weight(kg)	28.66±0.57	23±0.44
45 Days Average Weight(kg)	32.47±0.64	25.66±0.71
60 Days Average Weight(kg)	35.8±0.76	27.83±0.60
75 Days Average Weight(kg)	39.27±0.75	29.83±0.95
Daily weight gain(gm)	0.259*±0.02	0.142±0.01
FCR	4.09*	5.37
Variable costs to raise buffalo calves	10089*±284	8830±401

NS=p>0.05; *= p<0.01

Weight Gain: Average initial weight (0days) of control and treatment group were 19.16±0.31 and 19.83±0.54 kg/calf respectively and final weight (75days) were 29.83±0.95 and 39.27±0.75 kg/calf, respectively. Average daily weight gain (during 75 days) of the calves on treatment and control group were 0.259±0.02 and 0.142±0.01kg/calf, respectively (Table 01). The highest weight gain was observed in the calves on treatment group (0.38±0.00 kg) while lowest weight gain (0.23±0.02 kg) was observed in calves on control group (Table 01). Statistical analysis showed a significant difference (P<0.05) between treatment. Sekhon *et al.* (1984) are similar with this study. They observed 0.23 kg growth rate in buffalo calves fed on calf starter along with raw milk. However, the results obtained by Ahmed *et al.*, (2004) are not in accordance with this study. They reported that the daily weight gain of buffalo suckling calf in Pakistan were 0.47kg and 0.34kg with calf starter and conventional ration which was higher than our because they studied with high yielding buffalo. Thorat and Nagpaul (1982) observed similar daily weight gain (0.404 kg) in Murrah buffalo calves when calf starter was given *ad libitum* along with conventional whole milk. Fiems *et al.* (1989) also observed similar values (0.40 kg) of growth rate in Belgian White Blue male calves fed on milk replacer and calf starter ration.

Feed Conversion Ratio (FCR): Feed conversion ratio in buffalo calves of control and treatment group were 5.37 and

4.09, respectively (Table 01). Analysis of variance revealed that FCR of the values of control group was significantly higher ($P < 0.05$) than that of treatment group. Abdullah *et al.*, (2013) studied the Comparative Performance of Calves Fed Milk and/or Milk Replacer Supplemented with Calf Starter up to Weaning Age in Nili-Ravi Buffaloes. Similarly they reported the FCR were 3.49 ± 0.56 , $3.560.50 \pm$ and 4.30 ± 1.24 , respectively. These findings were same as observed by Lee *et al.*, (2008). They stated that the FCR of calves on high protein diet was 3.9 and on high energy diet was 4.2. However, the result of Tahir and Iqbal (1992) are not in accordance with this study. They reported same FCR values (2.17) in buffalo calves fed on milk @ 10% of body weight and calf starter along with green fodder. This may be due to breed difference or climatic variation in this study, calf starter had greater feed intake and weight gain than the calves fed on conventional ration.

Cost of Rearing of Buffalo Calf: Variable costs to raise buffalo calves during 75 days of experiment in control and treatment group were Tk. 8830 ± 401 and Tk. 10089 ± 284 , respectively (Table 1). Feed costs were found to contribute 60 and 70 % of the total cost incurred in raising calves. Similarly, Shakya *et al.*, 2016 reported that Total recurring expenditure during three months experimental period on Soymilk as Partial Milk Replacer for Buffalo Calf Rearing was Rs. 13562.51. Several studies indicated that milk replacer had several benefits to the farmers as easy to store, desirable calf performance, proper health monitoring and most important is economics (Wagener and Lang out, 2007 and Aquino *et al.* 2008). The findings of the present study are in accordance with these findings

Conclusion

On the basis of results of this present study, calf starter ration was found better in terms of weight gain and FCR. Thus, it may be used to feed the calves up to 75 days of age to enhance the growth and to reduce the weaning stress at weaning time.

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