Comparative Performance of Calves Fed Milk and/or Milk Replacer Supplemented with Calf Starter up to Weaning Age in Nili-Ravi Buffaloes

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ABSTRACT

Buffalo calves are mostly deprived of milk due to premium prices of buffalo milk. The experiment was designed to determine the effect of whole milk, milk replacer and whole milk cum milk replacer on dry matter intake, average daily gain, and feed efficiency in Nili Ravi buffalo calves. Thirty six newborn female buffalo calves were randomly divided into three treatments A (Whole milk), B (50% whole milk & 50% milk replacer) & C (milk replacer). All the calves were offered calf starter (19% CP) from 20 to 120 day of age and free access to drinking water. Green fodder was also offered to all the treatment calves from 60 to 120 day of age. Average daily dry matter intake in treatment A, B and C was 1555.55±221.280, 1488.67±157.65 and 1459.04±172.19 g, respectively, the difference being non significant (P>0.05). The average daily weight gain of treatment A, B and C was 457.38±110.13, 426.67±78.70 and 362.22±107.83 g, respectively. There was a significant (P<0.05) difference between the weight gain of treatment A and C while there was non-significant (P>0.05) difference between the weight gain of treatment A&B and B&C. The mean values for FCR in all the three treatments (A, B and C) were 3.49±0.56, 3.560.50± and 4.30±1.24, respectively. The feed conversion ratio (FCR) of treatment A and B was better than treatment C. It can be concluded from this study that 50% whole milk can be replaced with milk replacer in daily milk allowance of Nili Ravi calves without effecting dry matter intake, growth rate and feed efficiency.

Keywords: whole milk, milk replacer, feed efficiency, weight gain, dry matter intake

INTRODUCTION

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). 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 (Bann, 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 behaviour (Brown et al., 2005; Khan et al., 2007). 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 labour (Heinrichs et al., 1995). Conventional milk replacer contains animal fat and whey protein. This nutrient imbalance is one of the main reason for reduced growth in milk replacer fed calves as compared with those raised on whole milk feeding (Quigley et al., 2006). Furthermore, higher protein Accepted April 10, 2013; Online February 24, 2014.
contents in milk may severely affect liver and kidney functions (Khan et al., 2007; Lohakare et al., 2006).

The overall goal of this trial was to determine the effect of feeding fresh milk, fresh milk + milk replacer and milk replacer on the performance of Nili-Ravi buffalo heifer calves.

MATERIALS AND METHODS

The experiment was conducted at Buffalo Research Institute and University of Veterinary and Animal Sciences, Ravi Campus Pattoki. Thirty six Nili Ravi buffalo heifer calves were used in the experiment. The calves were kept in individual pens (1 X 2 meter) provided with wheat straw as bedding material. The calves had free access to calf starter and fresh water. The calves were given colostrums for three days and then whole milk @ 10 % during adjustment period of fifteen days and then randomly divided into three experimental treatments (A, B and C) under completely randomized design. The animals in treatment A were offered whole milk @ 10% of their body weight, those in treatment B were fed 50% whole milk : 50% milk replacer (0.166 Kg dry milk replacer was mixed in 1 lit of warm water (60 °C) @ 10% of their body weight, while the animals on treatment C were given milk replacer (0.166 Kg dry milk replacer mixed in 1 lit of warm water (60 °C) @ 10% of their body weight. Calves on all the treatments were given calf starter and green fodder ad lib. The composition of commercial milk replacer and calf starter is given in Table 1.

Table 1. Chemical composition of milk replacer and calf starter (% dry matter).

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Milk Replacer</th>
<th>Calf Starter Ration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry matter</td>
<td>95.0</td>
<td>90.0</td>
</tr>
<tr>
<td>Crude protein</td>
<td>23.5</td>
<td>19.0</td>
</tr>
<tr>
<td>Fat</td>
<td>9.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Ash</td>
<td>7.5</td>
<td>9.0</td>
</tr>
<tr>
<td>Metabolizable energy M/cal/Kg</td>
<td>3300</td>
<td>2800</td>
</tr>
</tbody>
</table>

Liquid diet was offered through bucket (3.5 L capacity) fitted with soft rubber nipple by adopting two time feeding regimen (6:00 am & 6:00 pm). Steel bucket was attached to an iron rod at the front of individual pen at 75 cm above the floor. The bucket was washed using detergent (bioguard) after each feeding and dried in sun light. All the calves received liquid diet for the first 8 weeks @ 10% of their body weight and then decreased @ 1% decline every week up to weaning at 120th day of the experiment. Green fodder was offered after eight weeks as decline in the liquid feed started. Feed refusal was recorded on daily basis to calculate the individually intake of calf starter and green fodder.

All animals were weighed at the start of experiment and then at weekly interval. Samples of milk and milk replacer were taken fortnightly and those of calf starter and green fodder monthly for determination of dry matter by the method of AOAC (2000). Feed conversion ratio was calculated as the ratio of dry matter intake to live weight gain (Lamb, 2009). All the animals were vaccinated against FMD and HS at 1 month of age while deworming was done at 25 day of age. Each animal was observed daily for any change in behavior and abnormality and treated by veterinarian at the farm accordingly.

Data collected were analyzed using ANOVA technique using Completely Randomized Design by using SAS 9.1. Differences among treatment means was tested through LSD test (Steel et al, 1997).
RESULTS

The performance parameters of buffalo calves fed either milk, milk replacer or the blend are shown in Table 2.

Table 2. Performance of Nili-Ravi buffalo calves fed milk and/or milk replacer.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Treatment A (WM)</th>
<th>Treatment B (50% WM + 50% MR)</th>
<th>Treatment C (MR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total DMI (g)</td>
<td>1555.55±221.28</td>
<td>1488.67±157.65</td>
<td>1459.04±172.18</td>
</tr>
<tr>
<td>Average Daily Gain (g)</td>
<td>457.38±110.13</td>
<td>426.67±78.70</td>
<td>362.22±107.83</td>
</tr>
<tr>
<td>FCR</td>
<td>3.4998±0.56</td>
<td>3.5576±0.50</td>
<td>4.304±1.24</td>
</tr>
</tbody>
</table>

WM= Whole milk, MR= Milk replacer, DMI= Dry matter intake, FCR=Feed conversion ratio

The least square means of total dry matter (Milk, concentrate and fodder) intake were not different (P>0.05) among all the treatments. There was a slightly increase of dry matter intake in calf raised on whole milk. This might be due to higher fat contents of whole milk. The average daily gain was higher (P<0.05) in whole milk group than milk replacer group, while it was similar (P>0.05) between whole milk and 50% whole milk + 50% milk replacer group. There was also non-significant (P>0.05) difference in 50% whole milk + 50% milk replacer and milk replacer group. The difference between Treatment A and C might be due to more DMI in treatment A than that in C. The FCR is a useful tool to evaluate the effects of diet quality, environment and management practices on production efficiency in growing calves. The FCR was better (P<0.05) in treatment A than that in treatment C. While it was similar (P>0.05) between treatments A & B and B & C. The milk replacer used in this trial consisted of ingredients being 65% from animal and 35% from vegetable source. The improved FCR in treatment A may be due to better palatability of whole milk as animals source ingredients are are more palatable than vegetable source.

DISCUSSION

The findings of non-significant difference (P>0.05) in the dry matter intake of the three treatments viz: A, B and C are similar to those observed by Hill et al., 2008a. They stated that dry matter intake was not affected by the use of more fat in liquid diet. The average daily gain of calves raised on treatment A, B and C liquid diets was 457.38, 426.67 and 362.22 gm/day. These findings are in line with the finding of Hill et al., 2008b who observed average daily gain of calves were 0.437 kg/day, 0.380kg/day and 0.375 kg/day raised on different liquid diets. The findings of average daily gain are in line with the finding of Hill et al., 2008a who observed the average daily gain of calves on milk replacer was 368gm/day. The findings of FCR for treatment A, B and C were 3.4, 3.5 and 4.3, 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.

Implications

The above research showed that Nili Ravi buffalo calves gained more on whole milk and 50% whole milk + 50% milk replacer diet. There is non-significant difference in the average daily gain of calves raised on these treatments. So, It can be concluded from this study that 50% whole milk can be replaced with milk replacer in daily milk allowance of the Nili Ravi calves without effecting the growth rate and dry mater intake, with better feed conversion ratio.
REFERENCES


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