COMPARATIVE PERFORMANCE OF SAHIWAL CALVES FED WHOLE MILK AND MILK REPLACER WITH OR WITHOUT CALF STARTER

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ABSTRACT

The objective of trial was to determine the effect of feeding whole milk or milk replacer during early age on average daily gain and growth of Sahiwal calves. The experiment was conducted at Livestock Experimental Station, Jahangirabad on forty eight new born female calves. Calves were fed colostrums and whole milk (WM) @ 10 % of body weight during first 14 days of age. The calves were randomly allotted six treatment groups i.e. A, B, C, D, E and F and were offered WM (Control), WM+calf starter (CS), WM+Milk replacer (MR), WM+MR+CS, MR and MR+CS, respectively. The experiment continued for 120 days. Daily milk intake was highest (P<0.05) in calves on treatment WM+CS (2.33±0.21 kg) followed by WM, MR, WM+MR+CS and MR+CS, respectively. Highest daily gain (P<0.05) was observed in the calves on treatment WM+MR+CS (0.38±0.02 kg). Increase in body height (P<0.05) was 0.70±0.07, 1.08±0.10, 0.75±0.09, 1.14±0.09, 0.74±0.09 and 1.13±0.10 cm, respectively on WM, WM+CS, WM+MR, WM+MR+CS, MR and MR+CS at fortnightly interval. Increase in body length was highest (P<0.05) on WM+CS diet. Significant differences (P<0.05) in heart girth were recorded among treatments. Cost to gain ratio was lowest (Rs 156.68) on treatment MR+CS.

Key word: Whole Milk, Milk Replacer, calf starter, Body measurements

INTRODUCTION

Cattle calves are the most neglected class of animals in Pakistan. The growth rate is much lower than the exotic dairy breeds (Khan et al., 1999) i.e. Holstein Friesian, Jersey etc. In Pakistan cattle are the mostly raised for meat and milk production. Among cattle Sahiwal are the most promising breed being extensively used for different purpose. Sahiwal calve population in Pakistan is 483832 (Anonymous, 2010) and are most neglected class resulting in high mortality and slow growth (Khan et al., 1999). Most critical period of feeding calves is first 2-3 weeks, during this immune and digestive system are readily developed with the regard to digestive secretion and enzymatic activity (Davis and Drackley, 1998). The systems of feeding milk and milk replacer calves have been developed in Bos Taurus but little in the indigenous cattle. The capacity of these modern systems needs to be exploited under our local conditions in indigenous dairy breeds to increased growth performance.

The main objective of the study was to evaluate the affect of whole milk and milk replacer for economical and optimum growth in Sahiwal calves.

MATERIALS AND METHODS

Newborn female Sahiwal calves (n=48) at the age of first 14 days were randomly allocated in to six treatments (eight in each) were fed green fodder and calf starter. Feeding whole milk, milk replacer and calf starter were adjusted according to body weight of calves. The calves were fed succulent green fodder @ 1 % of body weight on DM basis to help rumen development. The three treatments groups B, D and F were given starter ration @ 0.2% of body weight having 18% CP and 2870 kcal energy according to NRC (2001) standards were prepared at Livestock Experiment Station, Jahangirabad, Khanewal. Data were recorded for 120 days of experimental period on daily milk, milk replacer, calf starter intake, fodder intake, body weight, body measurements and economics of production. The data collected were subjected to statistical analysis using analysis of variance technique under completely randomized design (Steel et al., 1997). The difference between the treatment means were tested by applying Duncan multiple range test Duncan's (1955) for interpretation of results and drawing valid conclusion using appropriate computer software of statistical analysis (SAS, 9.1.3).
RESULTS

Milk and Replacer Intake: Mean daily fluid intake (whole milk and milk replacer intake) in Sahiwal calves on treatment A, B, C, D, E and F was 2.00 ±0.26, 2.33±0.21, 1.57±0.20, 1.29±0.18, 1.57±0.29 and 1.51±0.22 liter/calf, respectively. Milk intake was highest (P<0.05) in calves on treatment group B, while the lowest intake (1.51 ±0.22 kg) was observed in the calves on treatment group D fed milk replacer and 0.2 % of starter ration (Table 1). Whole milk and whole milk+O.2 % calf starter diet was consumed better by the calves having treatment I and II diets.

Weight Gain: Average daily weight gain (during 105 days) of the calves on treatment A, B, C, D, E and F was 0.23±0.02, 0.37±0.02, 0.28±0.01, 0.38±0.00, 0.26±0.01 and 0.37±0.00 kg/calf, respectively. The highest weight gain was observed in the calves on treatment D (0.38±0.00 kg) while lowest weight gain (0.23±0.02 kg) was observed in calves on treatment A (Table 1). Statistical analysis showed a significant difference (P<0.05) between treatments.

Body Measurements: Mean fortnightly body height increase in calves on treatment A, B, C, D, E and F was 1.77±0.17, 2.74±0.25, 1.90±0.22, 2.89±0.27, 1.87±0.23 and 2.87±0.25 cm, respectively. The mean increase body length in Sahiwal calves was 2.31±0.25, 3.35±0.45, 2.08±0.17, 3.27±0.27, 2.13±0.17 and 3.20±0.22 cm, respectively. Body length was highest in calves on treatment B fed on WM and 0.2 % starter ration. The mean increase in heart girth was 2.31±0.15, 4.72±0.24, 2.16±0.25, 4.92±0.38, 2.13±0.22, and 4.83±0.33 cm respectively, on treatment A, B, C, D, E and F (Table 2) at fortnightly basis. The body measurement was similar in group A, C and E fed whole milk and milk replacer while treatments B, D and F are also similar among each other having milk and milk replacer along with starter ration but significantly different (P<0.05) with A, C and E.

Cost To Gain Ratio of Calf: Variable costs to raise calves on A, B, C, D, E and F were Rs. 8940±401, 9989±284, 7499±160, 7632±325, 6087±200 and 6189±980, respectively (Table 1). Feed costs were found to contribute 60 and 70 % of the total cost incurred in raising calves. Cost to gain one kg of weight was lowest (Rs. 156.68) in calves on treatment F followed by D (Rs. 189.85), E (Rs. 251.86), C (Rs. 255.06) and A (Rs. 355.60) is presented in Table 1. Duncan’s multiple range test indicated significant differences (P<0.05) between treatment in total variable costs involved during the experimental period on Sahiwal calves.

Table 1. Mean Daily Dry Matter Intake, Milk Intake and Weight gain of calves fed on different levels of whole milk and milk replacer

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Mean DMI (Kg)</th>
<th>Milk Intake (Kg)</th>
<th>Daily Gain (Kg)</th>
<th>Cost: Gain Ratio (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole Milk</td>
<td>4.51±0.52a</td>
<td>2.00±0.26a</td>
<td>0.23±0.02a</td>
<td>355.60</td>
</tr>
<tr>
<td>Whole Milk+ Calf Starter (CS)</td>
<td>5.93±0.89b</td>
<td>2.33±0.21b</td>
<td>0.37±0.02b</td>
<td>251.86</td>
</tr>
<tr>
<td>Whole Milk+ Milk Replacer</td>
<td>5.93±0.51a</td>
<td>1.57±0.20a</td>
<td>0.28±0.01a</td>
<td>255.06</td>
</tr>
<tr>
<td>Whole Milk+ Milk Replacer+ CS</td>
<td>4.52±0.63b</td>
<td>1.29±0.18b</td>
<td>0.38±0.03b</td>
<td>189.85</td>
</tr>
<tr>
<td>Milk replacer</td>
<td>5.67±0.61a</td>
<td>1.57±0.29a</td>
<td>0.26±0.01a</td>
<td>220.07</td>
</tr>
<tr>
<td>Milk Replacer+ Calf Starter</td>
<td>4.43±0.20b</td>
<td>1.51±0.22b</td>
<td>0.37±0.02b</td>
<td>156.68</td>
</tr>
</tbody>
</table>

Mean having similar superscript in a column are non significant

Table 2. Mean increase in body height, body length and heart girth (cm) in calves fed on different levels of starter diets.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Mean Increase in Body Measurements (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Body Height</td>
</tr>
<tr>
<td>Whole Milk</td>
<td>1.77±0.17a</td>
</tr>
<tr>
<td>Whole Milk+ Calf Starter (CS)</td>
<td>2.74±0.25b</td>
</tr>
<tr>
<td>Whole Milk+ Milk Replacer</td>
<td>1.90±0.22a</td>
</tr>
<tr>
<td>Whole Milk+ Milk Replacer+ CS</td>
<td>2.89±0.27b</td>
</tr>
<tr>
<td>Milk replacer</td>
<td>1.87±0.23a</td>
</tr>
<tr>
<td>Milk Replacer+ Calf Starter</td>
<td>2.87±0.25b</td>
</tr>
</tbody>
</table>

Mean having similar superscript in a column are non significant
DISCUSSION

The main goal of the Sahiwal calf rearing program was to exploit the milk and milk replacer intake, rate of gain and to check the economics of the calves. The study evaluated that the intake of milk and milk replacer fed along with the concentrate ration had significant effect on the performance of the calves. However, it was observed that the calves grown on milk and high protein diet have significant effect on the body growth.

Animal Performance: During the experimental period, the calves attained significant body weight. Calves fed milk and milk replacer along with starter showed non significant difference but significant in milk and milk replacer. Similar to our study the effect of milk replacer on weight gain was reported by Brown et al. (2005) and reported that increased nutrients intake from milk replacer can increase the growth rate and feed cost. Similar study was incorporated by Ballard et al. (2002) reported that calves having 27% crude protein in milk replacer, consume more starter ration have increased body weight. Similarly, Baruah et al. (1993) that crude protein intake of growing buffalo fed had a little difference on body weight, body size, daily weight gain and crude protein intake in buffalo heifers. Akayezu and Linn, (1994) observed that calf starter ration containing more crude protein in ration had significant effect on daily gain and performance of the calves. Jabbar et al. (1997) reported that average daily weight gain was increased as concentrate ration in the diet was increased when heifers were kept on conventional green fodder.

Body Measurement: Our findings were in accordance with the study of Tayeb et al. (1992) resulted that the supplemented had a significant effect on body measurement. Yanar et al. (2002a) also reported the gain in body measurements were obtained from calves fed concentrate diet. Blome et al. (2003) observed non significant change in body length, wither height and heart girth in calves fed milk replacers containing different amounts of protein.

Economics of Production: Variable costs to raise calves on A, B, C, D, E and F were significant among different treatments (Table 1). Feed costs were found to contribute 60 and 70% of the total cost incurred in raising calves. Cost to gain one kg of weight was lowest (Rs. 156.68) in calves on treatment VI fed milk replacer with starter ration. The low cost to gain ratio was due to the low price of the commercial milk replacer.

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REFERENCES


