Sixteen calves aged 9-12 months were divided into four equal groups and given four treatments viz. C = control, SJ = supplementation with supernatant juice to provide phosphorus as per NRC recommendations, SP = supplementation with superphosphate powder to provide phosphorus as per NRC recommendations and AP = supplementation with supernatant to provide phosphorus 20% above the NRC recommendations. The calves were fed mixture of berseem (70%), wheat straw (20%) and molasses (10%) on dry matter basis. Results indicated a significant effect of phosphorus supplementation (P<0.05) on daily dry matter intake which was higher in AP, followed by SJ and minimum dry matter intake was found in SP group. Maximum daily weight gain was recorded in SJ group, followed by AP and SP. The minimum weight gain was found in control calves. However, statistical analysis of data indicated non-significant effect of phosphorus supplementation on daily weight gain.

Key words: Sahiwal calves, super juice, dry matter intake, weight gain, superphosphate.

INTRODUCTION

In Pakistan, dairy animals have short productive life mainly due to late maturity and poor growth rate during calfhood. Phosphorous is intimately associated with normal functions of all animal tissues by virtue of its role in the process of energy metabolism. Little (1970) found a significant linear response in the voluntary feed intake in calves supplemented with phosphorous. This increase in feed intake was beneficial to increase the production by increasing growth rate of calves. Overall production was also increased due to decreased age at maturity.

Berseem (Trifolium alexandrinum), the most common winter and spring fodder in our country, is notoriously low in phosphorus contents (0.14%) and abundant in calcium (1.44%). Owing to a wide Ca:P ratio, animals fed predominantly on berseem, unless supplemented with some rich source of phosphorus, may suffer from phosphorus deficiency syndromes (Ranjhan, 1993). Concentrates, grains, bone flour, phosphoric acid, sodium and calcium phosphate may be used as sources of phosphorus but they are expensive and increase the cost of feeding particularly in calves. The value of above compounds in providing phosphorus depends in part upon the biological availability of the phosphorus (McMeniman, 1973).

Superphosphate or 'super juice' prepared by dissolving superphosphate fertilizer in water appears the cheap source of phosphorus for livestock feeding in Pakistan. Moreover, the use of super juice is a fairly popular dairy management practice in Australia (Radostits et al., 2000). Therefore, evaluation of single super phosphate as phosphorus supplement in terms of its effect on dry matter intake and weight gain of Sahiwal calves fed on berseem has been described in the present paper.
The data on daily feed intake and weight gain were collected during a study period of 60 days. The ration was fed a d libitum, twice daily and the orts collected next morning. Feed intake was recorded on the basis of dry matter intake. Feed samples were analyzed weekly for the phosphorus before making adjustment in phosphorus supplementation. All the calves were weighed individually at fortnightly intervals.

The data thus collected were statistically analyzed using Randomized Complete Block Design (Steel and Torrie, 1984). Least significant difference (LSD) was used for comparison of means of treatments.

RESULTS AND DISCUSSION

Dry matter intake

Dry matter Intake (DMI) in calves increased due to phosphorus supplementation. The highest increase in DMI occurred in AP group (29.79%), followed by SJ (26.45%) and SP (20.64%). However, a minimum increase in DMI (17.14%) was found in AP group (29.79%), followed by SJ and C (20.64%). A maximum increase in DMI (17.14%) was found in control group. Statistical analysis indicated that DMI was significantly increased due to phosphorus supplementation with single supper phosphate fertilizer in the form of super juice as compared to supplemented with powder form. However, non-significant differences were found between SJ and AP groups (Table 1). The possible reason for low DMI in the SP was bad flavor of fertilizer. However, an increasing trend in DMI was found in all calves at the end of trial.

Table 1: Effect of phosphorus supplementation on daily dry matter intake (DMI) and weight gain in Sahiwal calves

<table>
<thead>
<tr>
<th>Treatments</th>
<th>% increase in DMI intake (kg)</th>
<th>Mean DMI (kg ± SE)</th>
<th>% increase in weight (kg)</th>
<th>Mean weight gain (kg ± SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SJ</td>
<td>26.45</td>
<td>4.196 ± 0.431ab</td>
<td>14.36</td>
<td>0.229 ± 0.0125a</td>
</tr>
<tr>
<td>SP</td>
<td>20.64</td>
<td>3.694 ± 0.359c</td>
<td>10.21</td>
<td>0.162 ± 0.0172a</td>
</tr>
<tr>
<td>AP</td>
<td>29.79</td>
<td>4.366 ± 0.524a</td>
<td>12.63</td>
<td>0.200 ± 0.0192b</td>
</tr>
<tr>
<td>C</td>
<td>17.14</td>
<td>3.948 ± 0.622bc</td>
<td>9.67</td>
<td>0.108 ± 0.0661a</td>
</tr>
</tbody>
</table>

The results of the present study are in line with those of Valk and Sebek (1999), who pointed out no effect on weight gain with phosphorus supplementation. However, some previous studies (Valk and Sebek, 1999; Karn, 2001) indicated a significant effect of phosphorus supplementation on weight gain.

Based on the findings of the present study it was concluded that phosphorus supplementation with single supper phosphate fertilizer in the form of super juice had no beneficial effects in terms of daily weight gain in Sahiwal calves.

REFERENCES