ABSTRACT

The present study was conducted on twenty Murrah buffaloes 60 days prepartum and randomly assigned to two experimental groups with 10 animals in each group; Control group was provided 20% higher nutrients than Kearl’s Feeding Standard and group 2 was provided 20% higher nutrients than Kearl’s Feeding Standard along with vitamin E (2000IU from 60 days prepartum to 30 days postpartum and 1500IU from 30 to 60 days postpartum) vitamin E 50% powder, Vet Chem supplementation and 50 gm of commercial mineral mixture (Agrimin, Agrivet Farm Care Division) to meet the expected requirements of the minerals. Body condition score (BCS) increased up to parturition and thereafter decreased in both the groups. The prepartum and postpartum changes in body weights (BW) were not apparently marked to be reflected in BCS changes which were almost similar (0.12 vs 0.16 prepartum and 0.39 vs 0.35 postpartum). Calves born to mineral and vitamin E supplemented buffaloes performed well in terms of their birth weight, body weight gain up to 90 days and calf weight to dam weight ratio. However, the differences between the two groups were statistically not significant. It can be concluded that vitamin E and mineral supplementation during peripartum period improves the performance of Murrah buffalo and their calves.

Keywords: BCS, BW, mineral, Murrah buffalo, vitamin E

INTRODUCTION

Vitamins and minerals (macro and microelements) play a vital role in metabolism, normal growth, production and reproduction. Requirement of these elements are very less and depends on the system of rearing, agronomic status and physiological status of the animal. Under tropical climatic conditions, mineral and vitamin deficiency problems have been recognized to be very common causing production and reproduction problems unless proper dietary suplementations are provided to save huge economic losses (Sharma et al., 2003; Yildiz et al., 2006). Prepartum cows undergo a number of changes from the end of lactation until subsequent parturition. Lactation ceases, and cows experience changes in type of diet, amount of dry matter intake, body condition, body weight, and fetal development. Kertz et al.
(1997) reported loss of BW at parturition. Previous studies have showed that body condition scores (BCS) at calving and body condition loss in early lactation were related to health (Dann et al., 2005), reproductive performance (Baruselli et al., 2001; Pryce et al., 2001; Buckley et al., 2003; Shrestha et al., 2005), fertility (Balakrishnan et al., 1997; Conreras et al., 2004; Roche, 2006) and milk yield (Ramasamy and Singh, 2004; Holter et al., 1990). The maintenance of an optimal body condition score relative to lactation stage, milk yield, nutrition and health status is perhaps the most important aspect of dairy buffalo management that facilitates a healthy transition from pregnancy to lactation. Supplementation of dams has been observed to enhance secretion of immune proteins, immunoglobulin (Ig) in colostrum by 80%, and improve growth and immune status and growth performance of the calves (Sikka et al., 2002; Sikka and Lal, 2006). In general, mineral deficiencies have been associated with altered metabolic profile leading to most periparturient disorders in buffaloes. Thus such disorders could probably be prevented by addressing to the basic etiology through balanced feeding and mineral supplementation during advanced pregnancy and early post-partum period, when the animals are highly prone to stress of heavy nutrient demand and drain (Mandali et al., 2002). There is lack of information regarding vitamin E and mineral supplementation on BCS, body weight and calf performance, therefore, the present study was conceived to fulfill the gap.

**MATERIALS AND METHODS**

Twenty Murrah buffaloes 60 days prepartum were selected and randomly assigned to two experimental groups with 10 animals in each group; group 1 (C) was provided 20% higher nutrients than Kearl’s Feeding Standard (Chauhan et al., 2000) and group 2 (T) was provided 20% higher nutrients than Kearl’s Feeding Standard (Chauhan et al., 2000) along with vitamin E (2000 IU from 60 days prepartum to 30 days postpartum and 1500 IU from 30 to 60 days postpartum) vitamin E 50% powder, Vet Chem supplementation (Panda et al., 2006) and 50 gm of commercial mineral mixture (Agrimin, Agrivet Farm Care Division) to meet the expected requirements of the minerals. The buffaloes used for the investigation were kept in conventional barns throughout the prepartum period and were shifted to calving pens 2 weeks prior to expected date of parturition for extra care and attention upto 5 days after parturition. After that they were shifted to loose housing and group management system where other lactating buffaloes were kept. The animals under investigation were body condition scored on entry in the experimental groups, on the day of parturition and at the end of the experiment. The condition-scoring chart formulated by Prasad (1994) was adopted in the present study. The fortnightly body weight of each animal was recorded early in the morning between 7.30 a.m. to 8.30 a.m. before providing the animals with any feeding stuff or water, using electronic weighing machine during the experimental period. Weight of calves at birth and 90 days was recorded.

Effect of vitamin E and mineral supplementation BCS, body weight and performance of calves was calculated by t test using Systat 6 software package.
RESULTS AND DISCUSSION

Body weight changes from pre to postpartum period

The supplemented buffaloes had higher body weight gains during 60 days prepartum period than the control group (Table 1 and 2). Thereby it fell sharply at parturition and continued to decline over the next 2 months. Compared to controls, the cumulative body weight loss in the supplemented buffaloes was less during the postpartum period. However, the differences in body weight at all stages were non significant but the supplemented group had higher body weight gains and per day body weight gain in the prepartum period and lower body weight losses and per day body weight loss postpartum than the control group at all the stages, reflecting improvement and beneficial effect due to Vitamin E and mineral supplementation. Supplementing prepartum Vitamin E and minerals appears to have helped in modulating pre and postpartum body weight changes. Also, it was observed that out of the total body weight loss (60.11 ± 3.71 vs. 62.67 ± 2.80) at parturition, calf birth weight was only 62.35 ± 2.33% and 57.19 ± 2.29%, respectively in the supplemented group and control group, reflecting rest loss to foetal adnexia (membranes and foetal fluids). It seemed that vitamin E and mineral supplementation tended to improve body reserves which resulted in lesser body weight loss postpartum than the control animals.

Similar trends in body weight changes following UMMB supplementation have been reported in buffaloes (Brar and Nanda, 2007) and feeding cationic or anionic diets in cattle (Gulay et al., 2008). Body weight loss at parturition is physiological owing to expulsion of foetus, foetal fluids and placenta (Brar and Nanda, 2007) and stress of parturition. The weight loss thereafter is primarily due to mobilization of body reserves for fulfilling the demands for maintenance and production of milk (Grummer, 2006). Body weight loss could be curtailed and an early body weight rise could be commenced through supplementary feeding in both pre and postpartum period (Sharma et al., 1993). Adequate nutrition and management are recommended during the last trimester of pregnancy to minimize body weight loss or enhance body weight recovery after calving (Prakash et al., 1990; Chauhan et al., 2000).

Body condition score

Body condition score reflected changes in

Table 1. Performance of vitamin E and mineral supplemented buffaloes.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Supplemented</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bwt gain prepartum (Kg)</td>
<td>45.44 ± 4.94</td>
<td>39.44 ± 2.99</td>
</tr>
<tr>
<td>Per day gain prepartum (kg)</td>
<td>0.76 ± 0.08</td>
<td>0.66 ± 0.07</td>
</tr>
<tr>
<td>Wt loss parturition (Kg)</td>
<td>60.11 ± 3.71</td>
<td>62.67 ± 2.80</td>
</tr>
<tr>
<td>Calf wt % parturition loss</td>
<td>62.35 ± 2.33</td>
<td>57.19 ± 2.29</td>
</tr>
<tr>
<td>Calf wt % buffalo wt</td>
<td>6.06 ± 0.25</td>
<td>5.70 ± 0.23</td>
</tr>
<tr>
<td>Bwt loss postpartum (Kg)</td>
<td>33.22 ± 11.04</td>
<td>41.11 ± 8.56</td>
</tr>
<tr>
<td>Per day loss postpartum (Kg)</td>
<td>0.67 ± 0.19</td>
<td>1.04 ± 0.05</td>
</tr>
</tbody>
</table>

* - Significant (P<0.05); ** - Significant (P<0.01)
Table 2. Effect of vitamin E and mineral supplementation on body weight, BCS, calf weight and milk yield in buffaloes.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Treatment</th>
<th>Initial</th>
<th>Just before parturition</th>
<th>Just after parturition</th>
<th>30 days</th>
<th>60 days</th>
<th>90 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body weight (Kg)</td>
<td>Supplemented</td>
<td>625.22±9.93</td>
<td>670.67±7.14</td>
<td>610.56±8.14</td>
<td>576.00±9.36</td>
<td>577.33±10.32</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>650.67±21.39</td>
<td>690.11±21.95</td>
<td>627.11±21.38</td>
<td>593.11±22.99</td>
<td>583.56±21.90</td>
<td>-</td>
</tr>
<tr>
<td>BCS</td>
<td>Supplemented</td>
<td>3.89±0.14</td>
<td>4.01±0.11</td>
<td>-</td>
<td>-</td>
<td>3.62±0.15</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3.88±0.18</td>
<td>4.04±0.17</td>
<td>-</td>
<td>-</td>
<td>3.69±0.17</td>
<td>-</td>
</tr>
<tr>
<td>Calf weight (kg)</td>
<td>Supplemented</td>
<td>36.89±1.20</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>71.83±4.13</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>35.56±1.33</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>65.57±4.43</td>
</tr>
</tbody>
</table>

* - Significant (P<0.05); ** - Significant (P<0.01)

BCS – Body Condition Score
the body weight in both supplemented and control buffaloes (Table 2). BCS increased up to parturition and thereafter decreased in both the groups. The prepartum and postpartum changes in body weights were not apparently marked to be reflected in BCS changes which were almost similar (0.12 vs. 0.16 prepartum and 0.39 vs. 0.35 postpartum) in both supplemented and control groups, respectively. Lack of any gross apparent difference of changes could be due to better and high plane of nutrition available to both groups. Lower milk production compared to cattle may be a reason for not being affected by negative energy balance to be reflected in BCS. Also it may be attributed to higher protein and energy utilizing efficiencies in buffaloes as compared to cattle at similar fat corrected milk production level, plane of energy and protein nutrition, body size and weight change (Paul et al., 2003) which could be the reason for less negative energy balance reflected in buffaloes during postpartum period.

**Performance of the calves**

Calves born to mineral and vitamin E supplemented buffaloes performed well in terms of their birth weight and body weight gain up to 90 days and calf weight to dam weight ratio. However the difference between the two groups was non-significant but the supplemented group had higher values than the control group which could be attributed to vitamin E and mineral supplementation. Supplementation of dams has been observed to enhance secretion of immune proteins, immunoglobulin (Ig) in colostrum by 80%, and improve growth and immune status of the calves (Sikka et al., 2002; Sikka and Lal, 2006).

**CONCLUSION**

During peripartum period vitamin E and mineral supplementation seems to improve the performance of buffaloes and their calves. Body condition score (BCS) is a logistic tool for assessment of nutritional status of animal and management for optimal performance. The maintenance of an optimal body condition score relative to lactation stage, milk yield, nutrition and health status is perhaps the most important aspect of dairy cow management that facilitates a healthy transition from pregnancy to lactation.

**REFERENCES**

Chauhan, T.R., N.D. Sharma, S.S. Dahiya, B.S.


