EFFECT OF DIFFERENT NON-PROTEIN NITROGEN (NPN) SOURCES ON PERFORMANCE OF LACTATING NILI-RAVI BUFFALOES

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ABSTRACT

Eighteen lactating Nili-Ravi buffaloes of same lactation stage were divided into three groups with equal number of buffaloes in each group to study the effect of different NPN sources on milk production and milk composition. Iso-nitrogenous feed was prepared for all the groups. Feed A was control; feed B was reformulated by addition of 1% urea, while Feed C was reformulated by addition of 1% Optigen. Among three treatment groups, highest milk production was observed in group C reformulated with addition of 1% Optigen, lowest milk production was with group A. However, there was non-significant difference (P≥0.05) among all three treatment groups for milk production and milk composition. Difference in milk urea nitrogen level was non-significant (P≥0.05) among all treatment groups. There was slight increase in milk urea nitrogen level in group B while decrease in milk urea nitrogen was observed in group A and C, respectively. Blood urea nitrogen level showed non-significant difference (P≥0.05) among all groups. It was concluded that the use of Optigen in buffalo feed improved the milk production without affecting milk composition. It can replace the conventional NPN sources without any adverse effects on health of buffaloes.

Key words: Nili-Ravi, Urea, Optigen, slow release

INTRODUCTION

Among the problems facing the livestock in the tropics is the low protein tropical grasses and the high cost of alternate sources of protein such as the Soybean and other oil cake. A portion of nitrogen in feeds for ruminants may be provided in the form of simple nitrogen compounds (non-protein nitrogen / NPN) that are degraded in the rumen to release ammonia (NH₃), which is used by rumen microorganisms to produce amino acids. Urea (NPN), releases NH₃ faster than it can be converted into microbial protein and it leads to absorption of excess NH₃ through the rumen wall, thus causing toxicity (Velez et al. 2006). Balanced diets with Optigen (slow NPN releasing product) promotes better growth of fibrolytic bacteria which requires non-protein nitrogen (NPN) for development, increased production of microbial protein and better management nitrogen environment (Alltech Inc., 2004). Keeping in view the importance of NPN as cheap source in animal feeding, the present study was planned to ascertain the feasibility of using non protein nitrogen in animal feed through ensiling with other feed material.

MATERIALS AND METHODS

The present experiment was conducted at Livestock Production Research Institute Bahadarnagar Farm Okara. A total number of 18 Nili-Ravi buffaloes of same lactation stage were randomly selected for the experiment with duration of 60 days.

Experimental Procedure: The experimental buffaloes were divided into three groups on the basis of milk production. All the animals were dewormed for internal and external parasites with ivomec before the start of the experiment. Buffaloes were offered three different types of treatments. The basal diet of all the four groups consisted of concentrate @ 1kg/2.5kg of milk production with fodder ad libitum. Group 1 was offered with basal diet, group 2 was offered with basal diet with the addition of 1% urea and group 3 was offered with basal diet with the addition of 1% Optigen. An adjustment period was given for fifteen days for experimental rations. During the trial, the followings parameters were observed viz. daily milk production (morning + evening), fortnightly milk composition, fortnightly milk urea nitrogen level and fortnightly blood urea nitrogen level. The proximate analyses of all the rations were conducted according to methods of AOAC (2000).
Statistical Analysis The data thus obtained were statistically analyzed under completely randomized design through ANOVA technique (Steel et al., 1997). The difference among treatment means was tested through least significant difference test.

RESULTS AND DISCUSSION

Milk production and composition in different groups of lactating Nili Ravi buffaloes fed on various concentrations of NPN sources are presented in Fig. 1 and Table 1

Milk Production: Milk production in buffaloes kept on different treatments was recorded on daily basis (morning and evening) and results show that the daily milk yield of group A, B and C was, 7.01 L, 7.23 L and 8.63 L respectively at 8th week. The statistical results showed significant difference for milk yield per day among all the groups. Maximum milk production was observed in group C followed by group B and A (Fig. 1). Increase in milk production in group C is similar to Inostroza et al., (2010); Stewart et al., (2008) and Galo et al. (2003) who explained that increase in milk was due to coated urea product. Milk production for group B was 1.6 L higher than other groups (P<0.01). A greater yield of microbial nitrogen for group B than group C in ruminal continuous culture has been reported (Tikofsky and Harrison, 2007; Harrison et al., 2008), which may partially explain the increase in milk yield.

Milk Fat: Milk fat was analyzed fortnightly and showed 7.06%, 7.35% and 6.65% in group A, B and C respectively (Table 1). The milk fat in Optigen treated group was similar to Tikofsky and Harrison (2007) whoever disagrees with Stewart et al., (2008). The fat content was lower (P <0.05) in milk from buffaloes receiving Optigen than reported by Cevallos (2006) who found no significant difference between treatments with values of 3.18% in 1200 and Optigen 3.01% in the control. The milk fat increase in group B is in similar to Sharma et al., (2009), Nisa et al., (2004), Plummer et al., (1971) and Wanapat et al., (2009). Galo et al., (2003) reported that there was no effect for non-protein nitrogen treatment on milk fat percentage.

Milk Protein: Mean Milk protein percentage in group A, B and C was 3.07%, 3.09% and 3.03% respectively. Oldham et al., (1985) and Nisa et al., (2004) reported increased milk protein by NPN feeding. The increase in protein % in group B disagrees with Stewart et al., (2008).

Milk Urea Nitrogen: Milk urea nitrogen level was higher in group B than group C and A. The current findings match with Zia-ul-Hasan et al., (2011). The milk urea nitrogen value in group C disagrees with Stewart et al., (2008) where milk urea nitrogen value was increased. The milk urea nitrogen level in group A is higher to Shewy et al., (2010). The increased milk urea nitrogen level in group A disagrees with Nisa et al., (2004) where milk urea nitrogen level was decreased. The milk urea nitrogen level in group B is similar to Sharma et al., (2009).

**Implications:** So it was concluded that the use of Optigen in buffalo feed improved the milk production significantly without affecting the milk composition. It can replace the conventional NPN sources without any adverse effects on health of buffaloes. Optigen can be used as economical and is an effective slow release NPN source.

**Table 1:** Effect of slow release NPN on milk composition parameters in Nili Ravi buffaloes

<table>
<thead>
<tr>
<th>Milk Fat percentage</th>
<th>Groups</th>
<th>Before Trial</th>
<th>After 15 days</th>
<th>After 30 days</th>
<th>After 45 days</th>
<th>After 60 days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group A</td>
<td>7.44±1.02</td>
<td>6.13±1.77</td>
<td>7.29±1.16</td>
<td>6.82±0.63</td>
<td>7.65±1.70</td>
</tr>
<tr>
<td></td>
<td>Group B</td>
<td>7.30±0.90</td>
<td>7.44±1.07</td>
<td>7.40±1.45</td>
<td>7.20±1.40</td>
<td>7.42±1.15</td>
</tr>
<tr>
<td></td>
<td>Group C</td>
<td>6.52±0.58</td>
<td>5.97±0.95</td>
<td>6.59±0.53</td>
<td>7.81±0.98</td>
<td>6.37±1.02</td>
</tr>
</tbody>
</table>

| Milk Protein        | Group A| 3.01±0.17    | 3.11±0.12    | 3.14±0.10    | 3.00±0.21    | 3.09±0.18    |
|                     | Group B| 3.04±0.15    | 3.10±0.10    | 3.11±0.18    | 3.12±0.16    | 3.10±0.19    |
|                     | Group C| 3.06±0.12    | 3.01±0.11    | 3.07±0.14    | 3.02±0.18    | 3.01±0.22    |

| Milk Urea Nitrogen  | Group A| 6.00±6.69    | 59.00±8.92   | 46.83±6.36   | 47.00±5.65   | 45.16±3.97   |
|                     | Group B| 52.00±8.17   | 62.33±9.04   | 53.16±4.50   | 61.33±5.04   | 61.83±6.04   |
|                     | Group C| 55.16±10.9   | 52.66±4.88   | 59.50±3.18   | 60.50±2.58   | 53.16±5.87   |

<table>
<thead>
<tr>
<th>Blood Urea Nitrogen</th>
<th>Groups</th>
<th>Before Trial</th>
<th>After 30 days</th>
<th>After 60 days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group A</td>
<td>50.57±12.10</td>
<td>33.40±6.68</td>
<td>30.28±10.38</td>
</tr>
<tr>
<td></td>
<td>Group B</td>
<td>56.55±17.70</td>
<td>28.40±10.23</td>
<td>30.35±7.94</td>
</tr>
<tr>
<td></td>
<td>Group C</td>
<td>57.38±8.79</td>
<td>38.79±13.24</td>
<td>29.70±7.26</td>
</tr>
</tbody>
</table>

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**REFERENCES**


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