INFLUENCE OF SEASON AND PHYSIOLOGICAL STATES OF ANIMALS ON PLASMA UREA NITROGEN PROFILE OF CROSSBRED DAIRY CATTLE AT 1700 M ALTITUDE

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ABSTRACT

Influence of season and physiological states of animals were determined on plasma urea nitrogen profile of crossbred dairy cattle (HF x Sahiwal) at 1700m altitude from mean sea level in Central Himalayas. Non-pregnant heifers (NPH) showed the highest PUN during both summer and winter seasons, whereas high yield early lactating cows (HYELC) and pregnant heifers (PH) the lowest PUN during summer and winter season respectively. Significant seasonal variations (P<0.01) in PUN were recorded which in turn resulted in significantly higher (P<0.01) overall group mean during summer as compared to the winter season.

Serum urea nitrogen, an important component of metabolic profile tests, has been found to show the wide variation among the animal's population (Payne et al., 1973). Its levels have been found to be influenced by physiological states of animals (Gopal Krishna Rao et al., 1981; Flores et al., 1990; Mansfeld et al., 1996) and season (Rowlands et al., 1974; Ghergariu et al., 1984; Rajcevic et al., 1995; Mansfeld et al., 1996). However, such studies have not been carried out in hills and high altitude area. Present study was, therefore, undertaken to record plasma urea nitrogen in crossbred dairy cattle under various physiological states and its seasonal variations which could be applied as an adjunct in diagnosis.

Blood samples from one hundred and twenty apparently healthy crossbred dairy cattle (HF x Sahiwal) under different physiological states viz. non-pregnant heifers (NPH, in the age group of 12-15 months), pregnant heifers (PH, under 4-6 months of pregnancy), empty dry cows (EDC), pregnant lactating cows (PCS, under 4-6 months of pregnancy), medium yield early lactating cows (MYELC, between 4-8 weeks of lactation yielding 8-12 l/day) and high yield early lactating cows (HYELC, between 4-8 weeks of lactation yielding 13-18 l/day) were collected using double oxalate as an anticoagulant during May-June (Summer season -S1) and December-January (Winter season -S2) and plasma separated. Meteorological observations were recorded during the course of this study (Table 1). Concentrate mixture fed to these animals during both the seasons consisted of yellow maize 30%, wheat bran 40%, mustard oil cake 28%, vitamin and mineral mixture 1% and common salt 1%.

Table 1: Meteorological observations recorded at 1700m altitude

<table>
<thead>
<tr>
<th>Meteorological parameters</th>
<th>Seasons</th>
<th>Annual mean</th>
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<tbody>
<tr>
<td></td>
<td>S1</td>
<td>S2</td>
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<tr>
<td>Temperature (°C)</td>
<td></td>
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<tr>
<td>Minimum</td>
<td>13.49±1.71</td>
<td>1.69±0.22</td>
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<tr>
<td>Maximum</td>
<td>27.52±0.28</td>
<td>14.46±0.28</td>
</tr>
<tr>
<td>Humidity(%)</td>
<td>66.16±1.15</td>
<td>79.27±0.88</td>
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<tr>
<td>Total rainfall (mm)</td>
<td>263.60</td>
<td>137.80</td>
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The estimation of PUN was done using the method of Richter and Lapointe (1962) and the data analysed according to the method of Cochran and Cox (1977).

A wide variation in PUN values was recorded in the present study (Fig. 1). The analysis of variance revealed a non-significant difference between PH and NPH during the season $S_1$. However, both the groups showed significantly higher values ($P<0.01$) in comparison to lactating groups (PLC, MYELC, HYELC) which did not show significant difference in PUN among them. Group NPH also showed higher PUN ($P<0.01$) in comparison to EDC. The values during the season $S_2$, followed the order of HYELC < MYELC < PLC < EDC < PH < NPH whereas during the season $S_2$, NPH and HYELC showed significantly higher PUN as compared to PH at 1% and 5% level respectively. PUN values in this season followed the order of PH < EDC < PLC < MYELC < HYELC < NPH.

The annual means of PUN revealed significant variation in group NPH as compared to PLC and HYELC ($P<0.05$). The values were found in order of PLC < HYELC < EDC < PH < MYELC < NPH.

The higher values of PUN in NPH during both the seasons and also on comparison of annual means didn't reflect the protein intake of these animals through feed as reported by Manston et al., (1975) and this finding is in contradiction to Shaffer et al., (1981) who observed increased urea nitrogen with advancing age. In hills increased urea nitrogen levels in NPH might be associated with some other factors, which need further investigations. The higher PUN levels during summer season as recorded in the present study, might be due to increased catabolism of endogenous protein. This observation is in corroboration with those of Rowlands et al., (1974, 1975), Ghergariu et al., (1984) and Mansfeld et al., (1996).

REFERENCES