

Levels of Certain Blood Nutrients in Grazing Non-pregnant, Pregnant and Lactating Marwari Ewes

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Abstract Blood serum levels of inorganic phosphorus, calcium, copper, sodium, potassium, urea nitrogen, total protein and blood glucose were measured in 16 month old Marwari ewes bred during autumn (September) or spring (March) and maintained exclusively on grazing. Serum phosphorus level was significantly decreased and calcium level increased during lactation as compared to pregnancy in March-bred ewes. In September-bred ewes, although the calcium level increased, the phosphorus level did not decrease during lactation. Sodium level decreased during pregnancy of ewes bred in March. Blood glucose level decreased during advanced pregnancy in both the seasons. Serum protein level decreased only in September-bred ewes. Blood urea nitrogen values were significantly lower in November, February and March (8 to 13 mg/100 ml) as compared to May, August and September (21 to 28 mg/100 ml) in both mated and non-mated ewes. The low level of urea nitrogen could be indicative of low protein status of the ewes, during the lean period.

Key words blood nutrients, lactation, pregnancy, ewes

Sheep in India are maintained exclusively on grazing. In the arid region, although adequate grazing areas are available, the grazing material becomes sparse during winter and summer. The blood levels of different nutrients may indicate the nutritional status of the grazing animals in different seasons. In the present experiment, the level of different nutrients in the blood serum of Marwari ewes bred during autumn (September) and spring (March) at their early pregnancy (8 weeks post-breeding), advanced pregnancy (last month of pregnancy) and lactation (1st month post-lambing) were measured.

Materials & Methods

A group of 6 ewes in the uniform age group of 16 months was taken randomly from among a flock of Marwari ewes, bred during September and March and confirmed for pregnancy on non-return basis. Alongwith the mated ewes, a group of 6 non-mated ewes was taken for comparison. All ewes were maintained exclusively on grazing on a natural rangeland, comprising of *Lasiurus indicus* and *Dactyloctenium indicum* grass cover with natural shrubs and bushes, viz., *Ziziphus*

nummularia, *Calligonum polygonoides*, *Aerva pseudotomentosa*, etc., from 8 a.m. to 5 p.m. daily at C.S.W.R.I., Arid Region Campus, Bikaner. Blood samples were collected from the jugular vein of the experimental animals before they were let out for grazing.

The methods adopted for estimation of various serum constituents were as follows: Fiske & Subba Row's for inorganic phosphorus, the Clark-Collip modification of the Kramer-Tisdall method for calcium, Reinhold method for total protein, Nelson-Somogyi method for blood glucose and the flame photometry method for sodium and potassium, as described by Oser (1965). Copper level was estimated using the method of Cartwright *et al.* (1945) and urea nitrogen was estimated by the diacetyl monoxime procedure, as described by Kolmer *et al.* (1969). The data were statistically analysed (Snedecor & Cochran 1968).

Results and Discussion

Inorganic phosphorus and calcium

In spring-bred ewes there was a significant decrease ($P < 0.01$) in phosphorus level in the

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Serum protein and urea nitrogen

The serum protein level was also significantly lowered ($P < 0.05$) during advanced pregnancy (7.0 mg/100 ml) of autumn-bred ewes. More *et al.* (1973) reported a decline in total serum protein with the advancement of pregnancy in different breeds of sheep. Klos (1990) supported the same and stated that the serum protein level also decreases during lactation. During other physiological stages, this value ranged from 7.5 to 8.0 g/100 ml. In non-mated ewes, the serum protein level during March and May was significantly lower ($P < 0.05$) than in August (8.6 g/100 ml). Hajra & Patnayak (1975) also reported higher values during this period of the year in ewes grazing on a *Cenchrus ciliaris* pasture. Wright *et al.* (1962) observed a direct relationship between levels of total plasma proteins with the protein content of the diet. The increased serum protein level, found during August in the present experiment, may also be attributed to increase in protein intake during this month (Mali *et al.* 1983). Reduction in total proteins of September-bred ewes, during advanced pregnancy, might be due to increased demand for proteins by the developing foetus, which is not met by grazing on natural pastures alone during this period. Additional supplementation of protein would therefore be necessary.

Urea nitrogen levels were significantly lower ($P < 0.01$) in November, February and March, as compared to May, August and September, both in mated and non-mated ewes. The low level of urea nitrogen may be indicative of low protein status of the animals. Kwiatkowski (1985) found a close relationship between the blood urea level and the protein intake in ewes. Swanson (1970) reported that normal level of blood urea nitrogen was 8 to 20 mg in sheep. Our results show very low levels of urea nitrogen (8 to 13 mg/100 ml) in certain months (November to March), whereas, during other months, the levels were more than 20 mg/100 ml. From the available literature and from the results of the present experiment, it appears that urea nitrogen levels of less than 15 mg/100 ml may indicate low protein status of the animals.

From the present studies, it may be concluded that, in general, the levels of blood serum nutrients in non mated ewes were higher than in the mated ewes. Advanced pregnancy caused more reduction in the levels of different blood serum nutrients in autumn-bred ewes, compared to spring-bred ewes. Reduction in levels of these nutrients, during advanced pregnancy, might be due to increased demand for these nutrients by the developing foetus, which is not met by grazing on natural pasture alone. Additional supplementation of the nutrients would, therefore, be necessary during advanced pregnancy.

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