Blood biochemical profile of Mecheri sheep of Tamil Nadu

Article · January 2003

CITATIONS
2

READS
8

5 authors, including:

Ak Thiruvenkadan
Tamil Nadu Veterinary and Animal Sciences University
107 PUBLICATIONS **471** CITATIONS
SEE PROFILE

Karikalan Karunanithi
SAI Technology
40 PUBLICATIONS **124** CITATIONS
SEE PROFILE

Indian Journal of Small Ruminants 9(1):74-76, 2003

Short Communication

BLOOD BIOCHEMICAL PROFILE OF MECHERI SHEEP OF TAMIL NADU

M. Rameshkumar, A.K. Thiruvenkadan, K.Ganeshkumar, K.Karunanithi and N. Bhuvaneswari
Mecheri Sheep Research Station,
Tamil Nadu Veterinary and Animal Sciences University,
Pottaneri -636 453, Tamil Nadu.

Manuscript received on 17.07..2002 and accepted on 11.09.2002

Key Words: Blood biochemical profile, Mecheri, Sheep

Mecheri sheep is one among the eight recognized sheep breeds of Tamil Nadu reared mainly for meat and the primary by-product is skin. Since blood biochemical parameters like blood glucose, protein, cholesterol and other biochemical constituents changes according to the type of feeding, age and sex of the animal, the study on blood biochemical profile of Mecheri sheep was carried out to document different biochemical constituents of this breed at different stages of growth under uniform feeding.

Study on biochemical profile was carried out in 36 animals of different age groups in both sexes. The animals were grouped into 3 categories. The animals below 6 months are categorized under group I, 6- 12 month under group II and above 12 month group III. Each group consisted of 6 animals on both sexes and they were maintained under uniform feeding and management conditions. Blood samples of 5 ml quantity was collected aseptically from the jugular vein in the early morning before feeding and the serum was separated. The serum glucose, total protein, albumin, globulin, total cholesterol, calcium, serum glutamate pyruvate transaminase (SGPT), serum glutamate oxaloacetate transaminase (SGOT) and lactate dehydrogenase (LDH) were estimated as per the procedures of Mukherjee (1988), Reinhold (1953), Wybenga and Pilleggi (1970) and King (1965). The data were subjected to standard statistical procedure as per the Snedecor and Cochran (1994).

The biochemical profile of Mecheri sheep is presented in Table 1. The glucose values ranged between 37.5 and 50.8 mg/dl in males and between 42.4 and 78.4 mg/dl in females. The complexity of energy metabolism complicates the selection of reliable indicator for energy status. Of the many metabolites used as a fuel for respiratory oxidation, glucose is usually considered predominant. Glucose is certainly vital for key functions such as brain metabolism and lactation. Leat (1974) reported that the normal plasma glucose concentration ranged between 55 and 72 mg/dl in sheep. Karim and Verma (2000) reported comparable value of 50.2 mg/dl in Malpura lambs. The females had higher glucose level than males in all the age groups. The glucose concentration varied significantly ($P<0.05$) between groups I and II and group I and III. In both males and females, the glucose value decreased with increase in age. A highly significant variation ($P<0.01$) is noted in both sexes between group I and III.

The protein ranged between 4.50 and 7.26 g/dl. The total protein value observed in group III was significantly ($P<0.01$) higher than group I and II in both sexes. The total protein concentration increased linearly with the age of the lambs. The total protein comprises mainly albumin and globulin and these two taken together indicate the actual protein status of the animal. Among them albumin gives a longer term measures of protein status. Globulin not only gives a guide to immunological status, but also helps in interpretation of abnormal albumin concentrations. A comparable value of 6.88 g/dl was reported in Nilagiri sheep (Ramprabhu and Dhanabalan, 1997) and 6.08 g/dl in Madras Red sheep (Viswanathan et al., 2000). The observed albumin level ranged between 2.50and 3.98g/dl. This is comparable to the results of Roil et al. (1974), Ramprabhu and Dhanabalan (1997) and Eswari et al. (2000) in grazing sheep. There was no significant difference between sexes in all age groups. The albumin level in group III was highly significant ($P<0.01$) when compared with group I and II in both sexes. The globulin level ranged from 1.83 to 3.26 g/dl. Comparable value of 3.26 g/dl was reported in Madras Red ewes (Eswari et al., 2000). In males, significant difference was noticed between group I and III and group II and III. The observed values between sexes for below 6 months and above12 months group was significant ($P<0.05$). The observed albumin globulin ratio was high in males of all age groups when compared to females except in above 12 months age group where the value observed in female was high. Within age groups the value observed in groups I and II in males and group I and III in females was significant.

Table 1. Blood biochemical profile of Mecheri sheep.

Serum glucose (mg/dl)		
Age groups	Male	Female
Group I (Below 6 months)	52.50±8.77[a]	78.43±16.59[b]
Group II (6 to 12 Months)	40.99±5.63[bd]	42.42±6.71[d]
Group III (Above 12 months)	37.52±4.26[b]	46.61±8.17[d]
Total protein (g/dl)		
Group I (Below 6 months)	4.50±0.47[a]	5.04±0.15[b]
Group II (6 to 12 Months)	5.08±0.35[a]	5.08±0.35[ab]
Group III (Above 12 months)	7.26±0.23[b]	6.43±0.32[c]
Serum albumin (g/dl)		
Group I (Below 6 months)	2.68±0.11[a]	2.61±0.24[a]
Group II (6 to 12 Months)	2.52±0.38[a]	2.50±0.22[a]
Group III (Above 12 months)	3.98±0.50[b]	3.84±0.64[b]
Serum globulin (g/dl)		
Group I (Below 6 months)	1.83±0.15[a]	2.42±0.32[b]
Group II (6 to 12 Months)	2.56±0.26[b]	2.64±0.33[b]
Group III (Above 12 months)	3.26±0.36[c]	2.38±0.53[b]
Albumin Globulin ratio		
Group I (Below 6 months)	1.46±0.17[bc]	1.10±0.20[a]
Group II (6 to 12 Months)	0.99±0.19[a]	0.95±0.15[a]
Group III (Above 12 months)	1.23±0.25[ab]	1.79±0.49[b]
Serum Cholesterol (mg/dl)		
Group I (Below 6 months)	159.09±28.01	187.23±30.16
Group II (6 to 12 Months)	187.97±42.36	180.42±18.49
Group III (Above 12 months)	190.04±35.99	212.65±37.02
Total Calcium (mg/dl)		
Group I (Below 6 months)	7.04±0.67	9.93±4.62
Group II (6 to 12 Months)	6.95±1.50	7.96±1.21
Group III (Above 12 months)	7.38±1.72	7.53±0.57
Serum LDH (IU/L)		
Group I (Below 6 months)	168.91±3.66[a]	160.36±2.25[a]
Group II (6 to 12 Months)	254.14±6.72[b]	250.46±14.60[b]
Group III (Above 12 months)	301.22±5.05[cd]	268.21±11.94[bd]
SGOT (IU/L)		
Group I (Below 6 months)	43.0±3.0	36.0±5.0
Group II (6 to 12 Months)	59.0±1.0	41.50±6.5
Group III (Above 12 months)	28.50±4.5	28.5±9.5
SGPT (IU/L)		
Group I (Below 6 months)	4.0±0.01	2.5±0.5
Group II (6 to 12 Months)	7.5±1.50	3.5±0.5
Group III (Above 12 months)	5.5±0.50	2.0±1.0

Figures with unlike superscript differ significantly

The serum cholesterol level ranged between 159.09 and 190.04 mg/dl in males and between 180.42 and 212.65 mg/dl in females. Comparable results of 155.77 mg/dl were reported in Nilagiri sheep (Ramprabhu and Dhanabalan, 1997). No significant variation was noted between sexes as well as between different age groups.

The serum calcium level ranged between 6.95 and 7.38 mg/dl in males and 7.53 and 9.93 mg/dl in females. The values observed was not significant between sexes and within different age groups in both sexes. The females had higher calcium values than males in all the age groups. Calcium is the important macro-mineral mainly existing in plasma as ionised calcium and protein (albumin) bound calcium complexed with organic acid. A comparable value of 8.8 mg/dl was reported in sheep (Weaver, 1974). However, slightly higher value of 10.92 mg/dl was reported in Nilagiri sheep in monsoon season (Ramprabhu and Dhanabalan, 1997).

The serum LDH value ranged between 160.36 and 301.22 IU/L. No significant variation was

observed between sex groups. In both the sexes the LDH level increased with age. In males, significant increase in enzyme activity is observed with age while in females, the increase was significant between group II and III and II and I. Lactate dehydrogenase (LDH) is a hydrogen transfer enzyme that catalyses the oxidation of lactate to pyruvate.

The SGOT ranged between 28.50 and 59.0 IU/L and the SGPT level ranged between 2.00 and 7.50 IU/L. There was no significant difference between sexes in all the age groups. The males had comparatively high SGOT and SGPT activity in group II. The amino transferase constitutes a group of enzymes those catalyse the inter conversion of amino acid and oxoacids by transfer of amino groups. The SGOT and SGPT are the important amino transferase enzymes. These values were studied to assess the health of the liver which was apparently normal

REFERENCES

Eswari, S., Leela, V., Viswanathan, S. and Nayeem, M. (2000). A note on changes in serum protein, albumin and globulin levels during pregnancy and parturition in sheep. Cherion, 29: 160- 161.

Mukherj, K.L. (1988). Medical Laboratory Technology, Vol. II., Tata Mc Graw Hill Publishing Company Limited, New Delhi.

King, J. (1965). Practical Clinical Enzymology, Nostrand Co, London, pp. 91- 125.

Karim, S.A. and Verma, D.L. (2000). Blood metabolites and circulating mineral profile of lambs maintained under intensive feeding and grazing with supplementation. Indian Journal of Small Ruminants 6: 77- 81.

Leat, W.M.F. (1974). Variation in plasma glucose and free fatty acids concentration in sheep associated with season, pregnancy and lactation. Journal of Agricultural Science (Camb.) 82: 181- 184.

Ramprabhu, R. and Dhanabalan, P. (1997). A note on metabolic profile in Nilagiri sheep. Indian Journal of Veterinary Medicine 17: 10- 13.

Reinhold, J.G. (1953). Total protein, albumin and globulin. In: Reiner, M. (Ed.). Standard Methods of Chemistry. Vol. I, Academic Press, New York, pp.88.

Roil, M.R., Suckling, G.W. and Mattingley, J. (1974). Serum total protein and albumin levels in grazing sheep. New Zealand Veterinary Journal 22: 232- 236.

Snedecor G.W and Cochran W.G. (1994), Statistical methods (8th Edn.), IOWA state University press, Ames.

Viswanathan, V., S., Leela, V., Eswari, S. and Premkumar David, B. (2000). Correlation of thyroid hormones with total serum proteins and cholesterol during pregnancy in sheep. Cherion 29: 94- 96.

Weaver, A.D. (1974). Haematological and plasma biochemical parameters in adult male sheep. Veterinary Bulletin 44: 4776.

Wybenga, D.R and Pilleggi, R. (1970). A method of estimating cholesterol. Clinical Chemistry, 16: 980.