Baseline Studies on Biochemical Profile of Nellore Sheep in the Hot and Humid Areas of Andhra Pradesh

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ABSTRACT

Nellore breed is the most commonly reared sheep in the state of Andhra Pradesh. The present study was conducted to report the effect of age and physiological status on few blood biochemical parameters of Nellore sheep breed from the hot and humid areas of Andhra Pradesh. The present study was conducted to estimate the blood biochemical parameters and its effect on physiological parameters in Nellore sheep. The results evidenced significantly higher RBC, Hb in pregnant group compared to others. Significantly higher PCV values were recorded in the 0-1 age group of animals. The total protein, creatinine were significantly higher in the lactating group compared to the other two. The albumin levels were found to be significantly higher in pregnant group. The cholesterol, calcium, phosphorus levels were found to be significantly higher in 0-1 year group and decreased in periparturient period. The study established baseline values of Nellore sheep in the hot and humid areas of Andhra Pradesh and therefore can be used as reference values for further studies on these species. Biochemical parameters are important indicators of the health condition and metabolic activity irrespective of the physiological status of the animals. lactating animals. The variations in hematological parameters is multifactorial some of which are altitude, feeding level, age, sex, breed, diurnal and seasonal variation, temperature and physiological status of animals. The baseline values obtained from this study across different physiological status and age groups could be used as a reference for further experimentation on sheep located in these areas.

Key words: Physiological status, hematological, biochemical, Nellore brown sheep

Small ruminants play a significant role in the socio economic and cultural livelihood of rural India, particularly sheep rearing is the backbone of the rural economy in India. Sheep with multi facet utility contribute significantly to Indian agrarian economy. Sheep rearing has been of advantage to these low and marginal farmers due to low initial investment, ease of rearing, and high feed conversion efficiency, adaptability, disease resistance and poor nutrition\(^3\). According to the 20\(^{th}\) Livestock Census\(^1\), there are 17.6 million sheep (23.7 %) being reared in Andhra Pradesh; which is the second largest state next to Telangana. This indicates that sheep rearing has been a major source of livelihood for the poor and marginal farmers in the state. Nellore brown is the native sheep breed originally from the Nellore district but now reared by most of the farmers across the state due to its high quality of mutton. Therefore, it is necessary to establish baseline values of this breed across different physiological states for better understanding of the health and thereby could improve its rearing even in the other parts of the state.

The hemato-biochemical parameters are key indicators of the physiological condition of the animals\(^4\). Biochemical parameters are important indicators of the health condition and metabolic activity in lactating animals\(^5\).

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Determination of serum biochemical profile is useful for evaluating the health condition and monitoring the nutritional and metabolic status of the animals. The metabolic changes not only occur in producing animals but also in fast growing young animals. In this context, studying the blood biochemical profile across different physiological states is of paramount importance. Hence, the present study was conducted to determine the influence of physiological status (young and growing, pregnant and lactating) in Nellore brown sheep in Krishna district of Andhra Pradesh.

**MATERIALS AND METHODS**

The present study was conducted on apparently healthy Nellore brown Sheep belonging to small farmers at Krishna District, Andhra Pradesh during the months of April-May. The animals (n=18) were divided into three groups of 0-1 yr, pregnant and lactating. Animals were maintained semi intensively with ad libitum green fodder and drinking water. Concentrate feed was provided as per the physiological status of the animals.

Blood samples were collected by jugular vein puncture and the serum was separated by centrifugation at 1500 rpm for 20 minutes, transferred into clean sterile cryo-vials and stored at -20°C until further analysis. All the biochemical parameters were determined spectrophotometrically using standard diagnostic kits. The haematological parameters such as total erythrocytic count (TEC), haemoglobin (Hb), packed cell volume (PCV) were estimated using Mindray haemoanalyzer BC 2800.

**Statistical analysis:** The data obtained on various parameters were statistically analyzed using one way analysis of variance. Multiple comparisons between the groups was performed by Duncan’s multiple range test. The level of significance was <0.05.

**RESULTS AND DISCUSSION**

The results of the hematobiochemical parameters studied have been mentioned in Figure 1 to 9. Determination of the haematobiochemical profile is used for evaluating the health conditions, to monitor the nutritional and metabolic conditions of the animals. Majority of the blood biochemical parameter values obtained in the present study were in accordance with the reference values reported by various authors.

The RBC count, Hb levels (Fig 1 & 2) were found to be significantly higher (p <0.05) in pregnant group. The PCV (Fig 3) were found to be significantly higher (p <0.05) in 0-1 year group. The total protein, creatinine (Fig 4 & 7) was significantly higher (p <0.05) in lactating group compared to the other two. Our results with respect to total protein were contrary to other reports. This could be due to physiological variations between the different breeds. The lower creatinine in suckling lambs might be due to increased GFR and lowered muscle mass.

The albumin levels (fig 5) were found to be significantly higher (p <0.05) in pregnant group compared to other groups. Plasma albumin levels decreased during the peri-partum period in dairy goats which further indicates that animals were exposed to oxidative stress during the peri-partum period.

The cholesterol, calcium, phosphorus levels (fig 6, 8 & 9) were found to be significantly higher (p <0.05) in 0-1 year group and decreased in periparturient period. The present study showed that the age factor also affected the serum cholesterol levels, which was similar to that observed in sheep breeds. More absorption of minerals occurs due to high rate of bone development, higher renal reabsorption and bone mobilization. Decreased serum calcium levels in late-pregnancy in ewes causes hypocalcaemia. The decreased levels of Ca, P in pregnant ewes indicated that stress of pregnancy and dehydration due to the high THI in the microclimatic condition might have
induced disturbances in the mineral profile. They observed metabolic response during pregnancy results from a higher lipid mobilization in response to high energy needs. The variations in the obtained results might be due to the different management, climatic conditions, and nutrition level of the animals.

CONCLUSION

The variations in haematological parameters is multifactorial some of which are altitude, feeding level, age, sex, breed, diurnal and seasonal variation, temperature and physiological status of animals. The baseline values obtained from this study across different physiological status and age groups could be used as a reference for further experimentation on sheep located in these areas.

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REFERENCES

1. 20th Livestock Census. (2020). All India report: ministry of agriculture, department of animal husbandry, dairying & fisheries, Krishi Bhawan, New Delhi, India.
