

APRW -51

Haematology and Serum Biochemical Profile of Kalahari Red Goats Reared in South-West Nigeria

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Abstract

The aim of this study was to determine the biochemical and haematological parameters of Kalahari Red goats reared in the tropical environment in IFSERAR, FUNAAB. The study was carried out on fifty animals of both sexes using parasitological techniques. The goats were fed concentrate feeds and grazed on sown pastures of *Chloris gayana* and *Stylosanthes amata*. Water was given *ad-libitum*. The serum biochemical analysis was determined using Randox^R analysis kits. The sex of each animal was noted and recorded. The PCV, Hb, RBC, WBC, neutrophils, lymphocytes, monocytes, eosinophils and basophils were determined as haematological parameters while Total protein, Albumin, Globulin, Sodium, Potassium, Calcium and Phosphorus were determined in serum analysis. Data generated were analysed in a General Linear Model (GLM) using SAS 9.1 statistical package in a one-way-analysis of variance (ANOVA). According to the results, there was no significant ($p>0.05$) difference in all the haematological parameters determined across sex. There were significant ($p<0.05$) differences in Total protein and Albumin across sex of which the mean values were higher in the female goats. The value of the mean total protein in the female goats was 5.93 ± 0.88 while the value was 5.31 ± 0.23 in the male goats. It can be concluded that sex did not have any influence on the haematology but had association on only the protein component of the serum biochemistry. This result obtained can be used as a reference value for Kalahari Red goats reared in the tropics and under similar nutrition.

Keywords: Red goat, *Chloris gayana*, *Stylosanthes amata*, haematology profile

Introduction

Evaluation of haematological parameters or attributes serves as an index of general physiology, nutrition and health status of animals. The haematological profile of goat may be influenced by several physiological factors especially the age, sex, breed, nutrition and also management and stress (Schalm *et al.*, 1975; Tambuwal *et al.*, 2002). The Kalahari Red Goats are ideally suited to the harsh and outstretched conditions of large parts of South Africa (SA). In SA they are bred in harsh conditions, arid and semi-desert areas. To prevail under these conditions, animals must be sun-resistant and hardy, fit to walk over a long distance in the harsh environment in search of food and water. The Kalahari Red goat breed is native to South-Africa (Simela and Merkel, 2008). The breed is highly productive, has good mothering ability, excellent growth rate and chevron conformation (Campbell, 2003). These animals were imported into Nigeria by the Federal University of Agriculture Abeokuta (FUNAAB). These animals have been found to be hardy and are adapting to the hot humid zone of the South-West Nigeria in the tropics (Tukur *et al.*, 2014). Their hardiness has made them to show some level of tolerance to diseases and pest in the IFSERAR Farm environment.

The haematological and biochemical indices reflection of the effects of diets on the animals in terms of the type and amount of feed ingested and were available for the animals to meet its physiological, biochemical and metabolic necessities (Ewuola *et al.*, 2004). Also, the level of anti-nutritional element or factors present in the feed influences the haematological and biochemical values (Akinmutimi, 2004). No work has been done on haematological values of Kalahari Red goats reared in the hot- humid tropical zone.

Therefore, this study was focused on the haematological and serum biochemical values of Kalahari Red goats of both sexes reared in South – West Nigeria. The data generated will also serve as a guide to the productivity evaluations in Kalahari Red goats in this zone.

Materials and Methods

The study was carried out at the IFSERAR Farm in Opeji. Fifty Kalahari Red goats were sampled which included both male and female. The goats were reared semi-intensively. They were housed from the evening to early morning in the goat pens and were released to go and graze at about 10:00AM on pasture paddocks sowed with *Chloris gayana* and *Stylosanthes amata*. Before the animals were released into the paddocks in the morning, they were fed with concentrate rations and this was repeated in the evenings after grazing on their return to the pens. Water was provided *ad-libitum*.

Blood samples were collected from the Jugular vein using the Vacutainer kits into EDTA bottle for haematology and into plain bottles for serum biochemical analysis aseptically and also ensuring the welfare of the animals. Packed cell volume (PCV) was determined using a Micro-Haematocrit Centrifugation technique. The blood was drawn into capillary tubes, one for each sample, and spun for 5 minutes at 3000 revolutions per minute (rpm). The packed cell volume was read in percentage using a PCV Reader. The red blood cell (RBC) and total white blood cell counts were obtained using Neubauer Chamber. The Haemoglobin concentration was determined by calculation from the values of the PCV. The differential blood counts were determined as a proportions of different types of leucocytes (WBC) on the blood smear and were expressed in percentages. The serum biochemical analyses were carried out using RANDOX[®] KITS following the manufacturer's protocol.

Data generated were subjected to analysis of variance (ANOVA) in a General Linear Model (GLM) design using SAS 9.1 Statistical package in a one-way ANOVA. Means were separated using Duncan Multiple Range Test in the same package. Significant values were further expressed graphically in a descriptive statistics to show their trends.

Results and Discussion

The association of sex on haematological parameters measured are shown in Table 1. There was no significant difference ($p>0.05$) in the values of all measured haematological parameters between the males and the females according to Table 1. The association of sex on the serum biochemical parameters measured is shown in Table 2. There was a significant difference ($p<0.05$) in the total protein and albumin concentrations between the sexes. But there was no significant difference in the globulin, sodium, calcium, potassium and phosphorus. The mean total protein concentration (g/dl) in the males was 5.31 ± 0.23 while the value in the females was 5.93 ± 0.88 . The value was significantly ($p<0.05$) higher in the females than in the males.

Table 1: The Association of sex with haematological parameters of the Kalahari Red goats

Sex	PCV (%)	HB (g/dl)	RBC ($\times 10^{12}/L$)	WBC ($\times 10^{12}/L$)	N (%)	L (%)	M (%)	E (%)	B (%)
Male	26.42 ± 0.83	8.76 ± 0.27	11.08 ± 0.34	8.28 ± 0.36	47.76 ± 0.77	47.17 ± 0.80	0.63 ± 0.10	4.21 ± 0.16	0.04 ± 0.41
Female	24.80 ± 0.92	8.15 ± 0.27	10.44 ± 0.39	7.65 ± 0.47	50.30 ± 1.57	45.10 ± 1.54	0.40 ± 0.16	4.20 ± 0.29	0.00 ± 0.00
HB=Haemoglobin; RBC=Red Blood Cell; WBC=White Blood Cell; N=Neutrophil; L=Lymphocyte; M=Monocyte; E=Eosinophil; B=Basophil									

The mean albumin concentration (g/dl) in the males was 3.10 ± 0.17 while the value was 3.15 ± 0.07 in the females. The value was significantly ($p<0.05$) higher in the females than in the males. There was no significant difference ($p>0.05$) in all the other serum parameters measured. Sex had no significant influence ($p<0.05$) on all the measured haematological parameters. Sex had no influence on the Packed Cell Volume in this present study. This report is similar to that of Egbe-Nwiyi *et al.* (2000) of which sex had an influence on the packed cell volume (PCV) in percentage. There was not significant ($p>0.05$) difference in the values of Haemoglobin concentration (Hb) between the sexes in this present study which is also similar to the report of Egbe-Nwiyi *et al.* (2000). Sex had no significant influence ($p>0.05$) on the red blood cell (RBC) count in this present study. This report is dissimilar to that of Egbe-Nwiyi *et al.* (2000).

Table 2: The association of sex with serum biochemical parameters of Kalahari red goats

Sex	Total Protein (g/dl) *	Albumin (g/dl)*	Globulin (g/dl)	Sodium (mEq/L)	Potassium (mEq/L)	Calcium (mg/dl)	Phosphorus (mg/dl)
Male	5.31 ^b ±0.23	3.10 ^b ±0.17	2.24±0.22	134.00±3.51	2.78±0.18	7.49±0.50	7.84±0.60
Female	5.93 ^a ±0.88	3.51 ^a ±0.07	2.44±0.11	131.57±1.88	3.00±0.10	7.42±0.26	8.67±0.27

* Significant difference at p<0.05

Conclusion

It can be concluded that sex did not have any influence on the haematology but had association on only the protein component of the serum biochemistry. This result obtained can be used as a reference value for Kalahari Red goats reared in the tropics and under similar nutrition.

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