



Surveying Study on the Differences of Some Blood Components between Goats Borne Single and Twin Kids

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Authors' contributions

This work was carried out in collaboration among all authors. Authors TD, SE and TE conceived the study and the design. Authors TE and TD carried out the field works and data analysis. Authors NAHE and TE drafted the manuscript. All authors were involved in revising the manuscript and approved the final version.

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ABSTRACT

Aim: this study was carried out to investigate the differences in some blood component between goats borne single and twin kids.

Study Design: The number of 77 Sudanese desert goats breed was used in this study. The goats were divided randomly into two groups. Group I consist of (37 does goats) have borne twin kids more than one time, group II consist of (40 does goats) have borne twin kids more than one time and haven't twin birth before.

Place and Duration of Study: Sample collection: south Darfur state – Sudan, and sample

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analysis: department of physiology and biochemistry, Faculty of veterinary science, Nyala -sudan between march 2019 and september 2020.

Methodology: blood samples were collected from goats under surveying study for measuring of hematological parameter (Red blood cells count (RBCs) in 10^6 cell/ μ l, packed cell volume (PCV) in %, Total white blood cells (WBCs) in 10^3 cell/ μ l, Differential leucocytes count (DLC) in %), and biochemical parameters (total protein, albumin, cholesterol and calcium levels).

Results: the present study revealed significant ($P \leq 0.05$) differences in PCV between goats borne single and twin kids while demonstrate insignificant ($P \geq 0.05$) differences in other hematological and biochemical parameters under study.

Conclusion: study found that there was no significant difference in parameters under study except for PCV

Keywords: Blood components; borne single; goats; twin kids.

1. INTRODUCTION

Goats in Sudan constitute a large part of the livestock population, Compared to other African countries, With an estimated number of 31 million goats (out of 365 million in whole Africa) that produced about 1.532 million tons of milk in 2013, Sudan was the largest producer of goat milk in Africa and the third largest producer in the world [1]. Goats in Sudan have an important contribution to food security by producing milk and meat. Beyond that, manure and skins provide a source of income for farmers [2]. Moreover, goats are highly adapted to different environments and are found in all production systems [3]. Desert goats are mainly raised for meat production especially in rural areas, and they also provide milk for family needs [4].

The functions of reproductive system generally in goats are controlled by hormones from hypothalamus, pituitary gland and ovaries, and final output depends on genetic and external environmental factors [5]. And this environmental factors include socio-sexual situation, photoperiod and nutrition [6,7,8].

There is a great variation in the haematological and biochemical parameters as observed between breeds of goats [9]. It is clear that a large number of factors, such as species status, breed, sex, age, nutrition, disease, and seasonal variations, can affect the pattern of these values [10,11]. There is great variation in the haematological and biochemical parameters observed between goat breeds [9,12].

2. MATERIALS AND METHODS

2.1 Study Area

This study was carried out in South Darfur state Sudan.

Animals: The number of 77 Sudanese desert goats breed was used in this study. The animals were rearing in open system in south Darfur state, apparently healthy on clinical examination and at lactation period.

Treatment: The goats under surveying study were divided randomly into two groups. Group I consist of (37 does goats) have borne twin fetus more than one time, group II consist of (40 does goats) have borne twin fetus more than one time and haven't twin birth before.

Blood collection: 5 ml of blood samples were collected from the jugular vein after aseptic technique, 2.5 ml was added to EDTA containers for analysis of RBCs, WBCs counting and PCV, the remaining 2.5 ml of blood samples was deposited into plain container for serum preparation and used for analysis of total protein, albumin, cholesterol and calcium levels.

2.2 Hematological Parameters Analysis

The hematological parameters were done according to [13]. Red blood cells count (RBCs) were done by hemocytometer using hayms solutions, the packed cell volume (PCV) was determined by hematocrit centrifuge and PCV reading scale, the Total white blood cells (WBCs) was counting by hemocytometer using Türk's solution, the Differential leucocytes count (DLC) was counting from blood smear stained by Giemsa stain using light microscope.

2.3 Biochemical Parameters Analysis

Total protein, albumin, cholesterol and calcium levels were analyzed photometry using spectrophotometer LabTech[®] India, and reagent Biosystem[®] Spain made. The process of measurement were done according to manufactured company Biosystem[®].

2.4 Statistical Analysis

The independent t-test was done using SPSS statistical program, version 20 for Windows (IBM SPSS Statistics 20 IL, USA). The results were expressed in the form of mean±standard deviation. The difference between the means of hematological and biochemical parameters in this study were considered statistically significant when the *P* value was less than 0.05.

3. RESULTS AND DISCUSSION

The results of the hematological parameters for goats borne single and twin are shown in Table 1. There was a significant ($p < 0.05$) increase in PCV of goats borne single kids compared to the goats borne twin kids, and significant ($p < 0.05$) increase in WBCs counting and Basophils ratio of goats borne twins kids compared to the goats borne single kids, and there was insignificant ($p \geq 0.05$) differences in RBCs number, Neutrophils, Lymphocyte, Monocytes and Eosinophils ratios between goats borne single kids and goats borne twins kids. The PCV value was highest in goats borne single kids ($34.05 \pm 5.86\%$) than the PCV value goats borne twin ($31.57 \pm 8.33\%$), these values of PCV in this study were concenter in the normal range for goats [13], and also agreed with the finding of [14] in Northern Nigeria goats. The RBCs number in goats borne single kids ($8.22 \pm 3.93 \times 10^6/\mu\text{l}$) was lower than RBCs number ($9.16 \pm 3.21 \times 10^6/\mu\text{l}$) in goats borne twin kids, these values were regard within normal range for Sudanese Desert goats obtained by [14]. The WBCs values ($14.78 \pm 5000 \times 10^3/\mu$) in goats borne single also having lower value comparable with the WBCs values ($18.13 \pm 9500 \times 10^3/\mu$) in goats borne twin kids. The results of WBCs values in the present

study was regard higher in than that values of WBCs obtained in Sudanese Desert goats by [15]. Also the result of WBCs values in this study were agree with the finding of [14] in female of Northern Nigeria goats. The ratios of Neutrophils (%), Lymphocytes (%), Eosinophils (%) and Monocytes (%) in this study were considered within the normal range for goats [13], and also similar to that obtained in the Sudanese female Desert goats by [15]. The ratio of Monocytes (%) was regard higher than reference range of goats [13], and this result was agreed with the finding of [15] in the Sudanese Desert goats.

The results of the biochemical parameters for goats borne single kids and goats borne twin kids were shown in Table 2. They was insignificant ($P \geq 0.05$) difference in Total protein value between goats borne single kids and goats borne twins kids in spite of grossly differences in parameters values, the increased value of total protein in goats borne single may attributed to high intake of grains, dehydration, or high temperature [16]. The result of T.protein in goats borne twin kids was similar to that obtained by [12] in west African Dwarf goats. The value of Albumin was insignificant ($P \geq 0.05$) between goats borne single kids and goats borne twins kids. These values albumine were considered within the normal range of albumin for goat serum that obtained in West African Dwarf goats by [12].

The Cholesterol value was insignificant ($P \geq 0.05$) between goats borne single kids and goats borne twins kids. These values in the present study was considered higher than those values which obtained by [14] in breeds goats of Northern Nigeria and the obtained of [17] in Croatian spotted goats of different age.

Table 1. Mean ± SD Hematological parameters of goats bearing single and twin

Parameters	Single bearing goats	Twins bearing goats
PCV(%)	34.05±5.86	31.57±8.33
RBCs($\times 10^{12}/\text{L}$)	8.22±3.93	9.16±3.21
WBCs($\times 10^3/\text{L}$)	14.78±5000	18.13±9500
Neutrophils(%)	30.29±12.29	34.48±14.02
Lymphocytes(%)	57±13.12	54.3±13.18
Monocytes(%)	5.74±3.50	5.96±5.68
Eosinophils(%)	6.26±7.34	3.87±3.58
Basophils(%)	0.74±1.01	1.83±1.87

Table 2. Mean ± SD biochemical parameters of goats bearing single and twins

Parameters	Single bearing goats	Twins bearing goats
Total Protein	9.62 ± 0.89	6.23 ± 0.75
Albumin	3.71 ± 0.59	3.90 ± 0.65
Cholesterol	78.36 ± 15.62	70.64 ± 12.98
Calcium	12.54 ± 1.28	11.08 ± 2.49

The result of Calcium in this study was insignificant ($P \geq 0.05$). These values of the present study was regard higher than those obtained by (Daramola, 2005) in young West African Dwarf goats and [17] in Croatian spotted goats of different age.

4. CONCLUSION

In conclusion, our study demonstrated significant differences in PCV between goats borne single and twin kids while did not demonstrate any significant differences in other hematological or biochemical parameters under study.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

ETHICAL APPROVAL

Animal Ethic committee approval has been taken to carry out this study.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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