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EFFECT OF BREED AND SEX ON SOME MACRO-MINERAL VALUES IN HEALTHY SUDANESE SHEEP

(With 2 Tables)

By

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SUMMARY

This work was undertaken to determine the effect of breed and sex on some blood serum electrolytes and macro-mineral values in Sudanese sheep, and to add to the present reference values for these parameters. The blood samples were taken from two Sudanese Sheep breeds viz. Desert Sheep (56) and Nilotic Sheep (44); 52 males and 48 females. Serum level of Na, K, Ca, Mg, and P were estimated. Breed had no significant effect on the studied parameters while sex showed a significant effect on them. The overall means and range of the investigated values were calculated, compared and discussed with other researchers' results in sheep.

Key words: Sudanese sheep, breed, sex, macro-minerals.

INTRODUCTION

In the Sudan, four main types of sheep were identified in relation to physical features and ecological distribution viz. Sudan Desert sheep, Sudan Nilotic, Arid Upland and Equatorial Upland. Serum macro-mineral profile have been used for the assessment of the animal nutrition, health, and for fluid therapy; because macro-minerals play important role in livestock metabolic activity, body homeostasis, growth, reproduction, production, at all their physiological status (Swenson 1993 and Muna *et al.*, 2000). Imbalance or deficiency of minerals causes a lot of economical losses in the Sudan as any where in the world. A lot of research was done regarding the blood mineral values of Sudanese Sheep (Idris *et al.*, 1976; Wahbi and Idris, 1977 and Abudamir *et al.*, 1980). However, a comparison of these parameters among the different Sudanese sheep breeds and

between males and females is scarce. The objectives of this study were to study some macro-mineral profile of healthy Sudanese Sheep with regard to breed and sex.

MATERIALS AND METHODS

1. Animals:

This study was undertaken during the wet hot season of the year 2010. It involved two breeds of Sudanese sheep viz. Sudan Desert sheep(56) and Sudan Nilotic sheep(44) of both sexes; belonging to the Animal Production Research Center Khartoum North. The animals were further divided into two groups' males (52) and females (48) irrespective of the breed. All the animals were apparently healthy on clinical examination, with average age range of 4-5 years; all the females were non pregnant and non lactating. The animals were housed in open pens and were fed a mixture of concentrates and roughage twice daily and water available all the time.

2. Blood Sampling and Analysis:

Blood samples, were taken in the morning. Two blood samples were taken from each animal at a weekly interval for two consecutive weeks. Blood samples were collected aseptically from the jugular vein into plain, clean dry test tubes for serum analysis. Sera were harvested by centrifugation of the blood at 2500 rpm. for 15 minutes then stored at -20°C for later analysis.

Colorimetric method was adopted for the determination of calcium (Ca), phosphorus (P) and magnesium (Mg) using a Spectrophotometer (Unicam-8625 UV). Serum sodium and potassium were determined by a flame photometer (Corning 400, England).

3. Statistical Analysis:

All the data were presented as means \pm standard error of the means. The data was analyzed by student t-test as described by Gomez and Gomez (1984). Overall range was calculated for each parameter.

RESULTS

The mean \pm the standard error of the means of serum Na, K, Ca, P, and Mg minerals in Nilotic and Desert sheep were presented in Table(1). The concentration of the studied parameters did not show any significant differences ($P < 0.05$) between the two breeds.

The serum values of Na, K, Ca, P, and Mg were significantly higher in the males than the females Table (2).

Table 1: Values of Serum Na, K, Ca, P, Mg in Two Healthy Sudanese Sheep Breeds.

Parameters	Desert sheep (n=56)	Nilotic sheep (n=44)	Overall (n=100)	Significance level
Na (mmol/l)	139.82±1.24 130-150	141.96±1.04 129-150	141.02±0.085	NS
K(mmol/l)	3.39±0.06 3.0-3.90	3.44±0.04 3.0-3.90	3.42±0.03	NS
Ca(mg/dl)	7.48±0.06 7.0-8.0	7.44±0.06 6.90-7.90	7.45±0.04	NS
P(mg/dl)	4.19±0.05 3.80-4.50	4.15±0.04 3.80-4.50	4.17±0.02	NS
Mg(mg/dl)	1.81±0.06 1.4-2.60	1.64±.06 1.0-2.1	1.71±0.05	NS

NS = Not Significant (P<0.05).

Table 2: Values of Serum Na, K, Ca, P, Mg in Male and Female Sudanese Sheep

Parameters	Male (M±SEand range)	Female (Mean±SEand range)	Level of significance
Na(mmol/l)	143.54±1.04 134 - 152	138.29±1.14 129 - 148	*
K(mmol/l)	3.55±0.04 3.1 - 3.9	3.27±0.04 3 - 3.6	*
Ca(mg/dl)	7.63±0.05 7 - 8	7.27±0.05 6.9 - 7.7	*
P(mg/dl)	4.3±0.03 4 - 4.5	4.05±0.03 3.8 - 4.4	*
Mg(mg/dl)	1.91±0.05 1.5 - 2.6	1.50±0.06 1 - 2	*

*Significant (P< 0.05)

Number of samples: males 52; females 48.

DISCUSSION

It is known that the blood constituents are correlated with the nutrients content (Rasheed, 2004 and Mills, 1987). Comparing the macro-mineral concentration of the two breeds did not show any variation between the Desert and Nilotic Sudanese sheep; this can be attributed to

the fact that the studied animals were of similar age, fed the same ration, the blood samples were taken from the same point and at the same time of the day, and the animals were kept under similar environmental conditions; as all these factors were reported to have effects on the studied parameters (Beighle *et al.*, 1994). Also these two sheep breeds may have the same homeostatic mechanism which kept a similar concentration of the studied macro-minerals.

The serum concentration of Na, K, Mg, Ca and P of the Sudanese sheep under the study showed a significant intersex differences, this may be related to the females' stage of the reproductive cycle, differences in the animals physical activities and /or differences in their sex hormones. The Na serum values in the present study compares favorably with those obtained by Kaneko *et al.* (1997) and Stansilow *et al.* (2001). The same is true for Ca and P concentration when compared with the values reported early in Sudan Desert sheep (Idris *et al.*, 1976; Abu-Damir *et al.*, 1983). Higher mean values for K, Ca, P, and Mg than of the current study are reported by Swenson (1993), Kaneko *et al.* (1997) and Osman and Al-Busadah (2003). The discrepancy between the results of the current study and that of the previous researchers may be due to many factors known to affect the blood constituents such as age of the animals, feed, environmental conditions, the sampling technique and /or inter-laboratory variations. Nevertheless; all the studied parameters were within the normal range; and this is due to the wide range of these parameters in the blood.

Thus it seems that, the current investigation and the comparisons with other researchers work provided data on the normal concentration of some serum macro-minerals constituents of two Sudanese sheep breeds. This data can be used for both diagnostic and research purposes. Further work should be done to investigate these parameters in these animals at their natural habitat, and to study the effect of the season, age, feed, and physiological status of the animals on these parameters. The different Sudanese sheep breeds seem to be of value to use in research work.

REFERENCES

- Abu-Damir, H.; Tarttour, G. and Adm, S.E.I. (1983):* Mineral contents in Livestock in Eastern Sudan. *Tropical Animal Health and Production* Vol. 15: 15-16.
- Beighle, D.E.; Boyazoglu, P.A.; Hemken, R.W. and Serumaga-Zake (1994):* Determination of calcium, phosphorus and magnesium values in rib bones from clinically normal cattle. *Am.J.Vet.Res.*, 55: 85-89.

- Gomez, K.A. and Gomez, A.A. (1984):* Statistical Procedure for Agricultural Research 2nd ed. Willy and Sons, Inc.
- Idris, O.F.; Tartour, I.G. and Babiker, S.A. (1976):* Blood mineral status and hematological values in sheep in the Gezira Province of the Sudan. Tropical Animal Health and Production. Feb;8(1)pp13.
- Kaneko, J.J.; Harvey, J.W. and Bruss, M.L. (1997):* Clinical Biochemistry of Domestic Animals, 5th Edition. Academic Press San Diego, London, Boston, New York, Sydney, Tokyo, Toronto.
- Mills, C.F. (1987):* Biochemical and mineral status in animals: copper, cobalt, and zinc. J. of Anim. Sci. 65: 1702-17011.
- Muna, M.M. Ahmed; Siham, A. Khalid and Barri, M.E.S. (2000):* Macromineral profile of Nubian goats affected by the physiological state. Small Ruminants Research 38: 219-251.
- Osman, T.E. and Al-Busadah, K.O. (2003):* Normal concentration of twenty biochemical parameters of she-camel, cows, and ewes in Saudi Arabia. Pak. J. of Bio. Sci.6: 1253-1256.
- Rasheed, M.N. (2004):* Trace elements in camel tissues from a semi-arid region. EnvironmentalistJ. Part1573-2991 on ebsite: WWW.F:/trace%20 mineral-cmel.htm.
- Stanislaw, M.; Wieslaw, S.; Andrzej, D. and Andrzej, R. (2001):* Effect of pulsed electromagnetic field on hematological and biochemical blood indices and milk production in sheep. Electronic J of Polish Agri.Universites.Vol (4). Issue (2).
- Swenson, M. (1993):* In Dukes Physiology of Domestic Animals. 7th Ed. Pub. Comstock Publishing Associates, Ithaca, London.
- Wahbi, A.A. and Idris, O.F. (1977):* Hematological and biochemical studies on the blood of Desert sheep in the Sudan. Veterinary Conference in livestock in the Sudan. Sudan Veterinary Association-Khartoum: Sudan.