



## **Determination Sodium and Chloride in Feed of Camels and Goats under Open Range System at El- khuwei Locality, West Kordofan State, Sudan.**

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### **ABSTRACT**

This study was conducted at El-khuwei locality, west Kordofan, Sudan, during the flowering and seed setting stages 2011. The main objective of this study was to determine sodium and chloride in the feed of camels and goats at the flowering and seed setting stages. Sampling was done by locating 2km<sup>2</sup> each stage. Within each stage randomly selected 60 samples of feed camels and goats. The data was analyzed used a completely randomized design (CRD). SPSS (Statistical Package for Social Sciences) was used for the statistical analysis. The results indicated that stage effect were significantly difference (P<0.001) higher sodium Na (5.28 ppm) level and chloride Cl (0.03 ppm) level at flowering stage and least sodium Na (3.74 ppm) level and chloride Cl (0.01ppm) level at seed setting stage. It can be concluded that increased sodium and chloride at the flowering stage and decreased sodium and chloride at seed setting stage. It can be recommended that need for feed supplementation sodium and chloride concentrations of grazing animals with the mixture mineral deficient during the seed setting stage.

**Keywords:** Stages, Sodium, Chloride, Camels, Goats, Sudan

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### **INTRODUCTION**

Sudan is the second largest animal populations in Africa, there were 52.08 million sheep, 43.44 million goats, 41.76 million cattle and 4.62 million camels (MARF, 2011). Forage produced from natural pastures represents 86.6% of national animal feed requirements, and about 14% of the population is involved in livestock production activities on the rangelands. Animal production in the State is mainly practiced under traditional

extensive systems, depending on natural rangeland. The State is considered among the leading regions of Sudan in terms of animal and range resources. Rick (2007) reported that Na usually occurs with chlorine (Cl) as NaCl salt and it functions in amino acid and glucose transport and muscle contractions. Mineral lack in animals in many countries are caused by low or variable contents due to soil, seasons, maturity of plants and low digestibility; where mineral supplementations were

applied correctly (Poland *et al.*, 2001). Howard *et al.*, (1962) reported low sodium content in pasture in different regions of the world.

The basic nutritional requirements of animals and the ability of range plant to supply them are of great significance both to the range management. The justifications is to meet the sodium and chloride in feed needs of grazing livestock in order to maximize the production, so the important of the paper area consider livestock export point on west Kordofan, Sudan.

The main objective of this study was to determine sodium and chloride in the feed of camels and goats in the open range system in west Kordofan, Sudan.

#### **MATERIALS AND METHODS**

**Study area:** This study was conducted at El-khuwei locality, about 105 Km west of El Obeid town. MARF (2011) estimation animals per head were 419960 sheep, 26634 goats, 5279 cattle and 430 camels in El-khuwei locality. The site is naturally dominated by grasses namely Huskneet (*Cenchrus biflorus*), Shilini (*Zornia glochidiata*), Bigail (*Blepharis linarifolia*) and Aborakhus (*Andropogon gayanus*). The trees included Humied (*Sclerocarya birrea*), Higlig (*Balanites aegyptiaca*) and Sider (*Zizuphus spina-Christi*). The Shrubs include Kursan (*Boscia senegalensis*), Usher (*Calotropis*), Mereikh (*Leptadenia pyrotechnica*) and Arad (*Leptadenia pyrotechnica*) according to MARF (2009).

**Sampling and experimental study:** Sampling was done on two stages of plant maturity at flowering and seed setting in selected locations (2km<sup>2</sup> each), within each stage 60 camel and goats randomly selected and collected samples of feed. From those species that were most frequently grazed by camel and goats at this range. The parameters were estimated using the bite-count techniques, (Fadlalla and

Cook, 1985). The first camel and goat was followed for five times, and then the second one followed for another five minutes and so on for all camel and goats.

**Laboratory analysis:** Feed chloride (Cl) level was analyzed using atomic absorption spectrophotometer (Singh *et al.*, 2005). Sodium (Na) level was analyzed using flame photometer (AOAC, 1990).

**Statistical analysis:** The data were analyzed using a completely randomized design (CRD) with the effect of stages as the whole plots and effects of sampling as the sub-plots (Steel and Torrie, 1980). SPSS (Statistical Package for Social Sciences) was used for the statistical analysis. Statistical significance was tested at 0.05, 0.001 and 0.0001 level of probability using the software.

#### **RESULTS AND DISCUSSION**

**Feed sodium:** Stages effect were significantly difference ( $P < 0.001$ ), higher sodium Na (5.28- 3.74ppm) concentration in feed was found that at flowering stage than that at seed setting stage respectively Table 1. Khan *et al* (2009) reported that feed sodium concentration varied from 1.33 to 1.53 % during different stages, our research investigated that there is no need of supplementations to ruminants at this farm. Our findings were corroborated with the findings of earlier researchers who found similar values of forage sodium (Khan *et al*, 2009) in different regions of the world. Sodium deficiency in ruminants is documented in the semi-arid region of Punjab, Pakistan and can be overcome by regular supplementation throughout the year (Khan *et al.*, 2009). It has been reported that with the passage of time mineral status in legumes and grasses decreased as the plants mature (Gonzalez *et al.*, 2006); higher sodium 1.53% concentration of forage was found at rainy period compared to

lower Na 1.33% concentration of forage found at the dry period.

**Table 1: Feed sodium and chloride during the flowering and seed setting stages**

Minerals		Growth stages			
		Flowering	Seed	Means	SE±
Sodium (ppm)	Na	5.28 <sup>a</sup>	3.74 <sup>b</sup>	4.51	0.28**
Chloride (ppm)	Cl	0.03 <sup>a</sup>	0.01 <sup>b</sup>	0.02	0.00**

a, b Values with the same raw bearing different superscript vary significantly at P <0.05, \* = significant (P < 0.05), \*\* = high significant (P < 0.001) and \*\*\* = highly significant (P < 0.0001).

**Feed chloride:** Stages effect were significantly difference (P<0.001) higher feed chloride Cl (0.03-0.01ppm) level at flowering stage and least at the seed setting stage respectively (Table 1). The higher feed chloride concentration at flowering stage and least concentrations during the seed setting stage was above the requirement of ruminants. With maturity, mineral concentration declines due to a natural dilution process and the translocation of minerals to the root system Khan *et al* (2009). Similar reports to those studies. This is in agreement with McDowell *et al.*, (2000) who reported seasonal was influenced by interactions with the other factors in minerals contrasts between stages. It can be concluded that higher sodium and chloride at the flowering stage and least at seed setting stage. It can be recommended that need feed supplementation sodium and chloride concentrations of grazing animals with the mixture mineral deficient during the seed setting stage.

#### REFERENCES

Anonymous (1990). *Official Methods of Analysis of the Association of Analytical Chemists*. (14<sup>th</sup> Ed.). Arlington, Virginia, U.S.A.

Fadlella, B. and Cook, R.H. (1985). Design and implementation of in-herd/on-range trials: use of sentinel herds. In: *Research Methodologies for Livestock on-farm Trials*.

Gonzalez-V, E.A., Hussey, M.A. and Ortega-S, J.A. (2006). Nutritive

value of desman thus Associated with Klein grass during the establishment year. *Rangeland Ecology & Management*, **58**: 308-314.

Howord, D.A., Burden, L.M. and Lampkin, G.H. (1962). Variation in the mineral and crud- protein content of pastures at Mugua in the Kenya highlands. *Journal of Agricultural Science*, **59**:251 - 256.

Khan, Z.I., Ahmed, K., Ashraf, M., Valeem, E.E. and McDowell, L.R. (2009). Mineral status of forage and its relationship with that of plasma of farm animals in Southern Punjab, Pakistan. *Pakistan Journal of Botany*, **41**: 67-72.

MARF (2009). Ministry of Animal Resource and Fisher, report. North Kordofan, Sudan.

McDowell, L.R. and Valle, G. (2000). Major minerals in forages. In: *Forage Evaluation in Ruminant Nutrition* (Givens, D.I., Owen, E., Oxford, R.F.E. and Omed HM (eds). pp: 373. CAB International, Wallingford, UK. Transfer of Magnesium from soil and forage to grazing goats 2133.

MARF (2011). Ministry of Animal Resource and Fisher. Statistical Bulletin for Animal Resources, Issue- No. 20.2011. Khartoum, Sudan.

- MARF (2005). Ministry of Animal Resource and Fisheries, Animal Population Report, Khartoum-Sudan. December 20, 2006 from <http://sullontx.tamu.edu/publication/ACF275/pdf>.
- Poland, W.W., Grings, E., Karn, J. and Manske, L., (2001). Mineral concentration and availability of forages for grazing livestock in the Northern Great Plains. ickinson Research Centre. Annual Report.
- Rick, M. (2007). Minerals. Small Ruminant Series. Uvalde. Texas Agricultural Extension Service. Retrieved on
- Singh, D., Chhonkar, P.K. and Dwivedi, B.S. (2005). Manual for soil, water, plant and fertilizer analysis. Westville Pub., New Delhi, India. pp. 117-142.
- Steel, R.G.D. and J.H. Torrie (1980). *Principles and procedures of Statistics: A Biometrical Approach* (2<sup>nd</sup> Ed.). McGraw Hill Book Co. New York.

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