

Macro-mineral profile of assam non-descript sheep (*Ovis aëris*)

M. Ayub Ali*, Hemen Das*, L. Inaotombi Devi**, P. Kirthika*, Prava Mayengbam*,
M.C. Lallianchunga*, Lalnuntluangi Hmar***

*Department of Physiology & Biochemistry, ***Department of Livestock Production and Management, College of Veterinary Sciences & Animal Husbandry, Central Agricultural University, Selesih-796014, Mizoram, India. ** RIPANS, Aizawl, Mizoram, India.

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Abstract

The present study was carried out to determine the blood macromineral profile of Assam local sheep grazing in similar pasture. For the investigation, plasma sample was taken for assessing the level of Ca, P, Mg, Na, K, and Cl, which were found to be 10.9 ± 0.18 (mg/dl), 7.6 ± 0.27 (mg/dl), 2.6 ± 0.04 (mg/dl), 146 ± 1.5 (mmol/l), 4.5 ± 0.16 (mmol/l) and 113 ± 1.9 (mmol/l), respectively. The findings may be of use for physiological characterization of the indigenous sheep breed of Assam. It may also aid in assessing the health as well as supplementation of mineral mixture for proper maintenance of health and optimization of productive performance of the sheep. However, a comprehensive study is warranted on this aspect to evolve the correlations between blood concentrations of these macroelements and productive performance of this breed.

Introduction

Reference values are of great importance for the correct interpretation of biochemical data (Van Ryssen and Bradfield, 1992). Standard serum chemical parameters provide information that serves as the basis for the diagnosis, treatment, and prognosis of diseases. The major and trace minerals have been recognized as essential for the maintenance of normal metabolic states and productivity in animals (Yokus and Cakir, 2006). In animals, a large number of factors such as species, type or race, sex, age, nutritional and health status affect serum chemistry and mineral levels (Garcia *et al.*, 2000; Yokus *et al.*, 2006). Hence, there is the need of the database for physiological values of species and breed specific biochemical profile of different farm animals. Further, the knowledge of normal values of biochemical constituents of different animals are of academic as well as of practical importance for clinical and experimental interpretations (Pandey *et al.*, 2006). In the present investigation, attempt was made to determine the physiological values of some important macor-minerals in Assam local sheep (*Ovis aëris*).

Materials and Methods

A total of 10 clinically healthy Assam local non-descript sheep reared in the Livestock Farm, College of Veterinary Sciences & Animal Husbandry, Central Agricultural University, Selesih, Aizawl, Mizoram was randomly selected for the study. Approximately ten (10) ml of blood samples were collected aseptically once from each of the experimental animal via jugular vein puncture into sterile vials containing K_3 EDTA (1 mg/ml of blood). Subsequently, the plasma was separated from the blood samples by centrifugation at 3000 rpm for 20 min. All the parameters viz. sodium (Na), potassium (K), chloride (Cl), calcium (Ca), phosphorus (Pi) and magnesium (Mg) were analyzed in the plasma. The plasma electrolytes were estimated by using diagnostic kits from M/s Crest Biosystems, India by following standard protocols viz. Na by colorimetric method (Maruna, 1958 and Trinder, 1951), K by colorimetric method (Sunderman and Sunderman, 1959; Terri and Sesin, 1958), Cl by Thiocyanate method (Schoenfeld and Lewellen, 1964), Ca by OCPC method (Bagainski, 1973; Gitelman, 1967), Pi by Molybdate U.V. method

Corresponding Author: Hemen Das, Department of Physiology & Biochemistry, College of Veterinary Sciences & Animal Husbandry, Central Agricultural University, Selesih-796014, Mizoram, India.

E-mail: hemenvet@rediffmail.com

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(Gomori, 1942), and Mg by Calmagite method (Gindler and Heth, 1971) by using a UV-Vis Spectrophotometer (Chemito-Spectroscan 2600).

The data obtained were statistically analyzed using one-way ANOVA as per the method of Snedecor and Cochran (1994).

Results and Discussion

Minerals are an important component of animal diets and are required by organisms to utilize other nutrients in the diet (Szefer and Nriagu 2007). In free grazing animals, minerals derived from natural feedstuffs are often inadequate and require supplementation to satisfy animal requirements (Sowande et al 2008). The amounts of nutrients, including minerals, in the forages greatly vary depending on soil, plant species and management factors (Haenlein 1991). Of the nutritional inadequacies, mineral deficiencies have adverse effect on both animal production and health (Schillhorn van Veen and Loeffler 1990). The concentration of plasma electrolytes viz. plasma Na, K, Cl, Ca, Pi and Mg are presented in Table 1.

The calcium and phosphorus are two important and most abundant minerals and play multiple roles for optimum growth, productivity and maintenance of good health in animals. Due to the abundance of these minerals in the body, it is important to understand their normal level and how to meet requirements to ensure that deficiencies and toxicities are not a concern. A dietary calcium, phosphorus ratio between 1:1 and 2:1 is assumed to be ideal for bone formation and growth. The level of calcium and phosphorus in Assam local sheep were found to be 10.9 ± 0.18 mg/dl and 7.6 ± 0.27 mg/dl, respectively; which was slightly in higher side than goat (Yatoo et al., 2013). The level of magnesium in sheep was recorded to be 2.6 ± 0.04 mg/dl, which was relatively lower than goat and cow. Nonetheless, the mean value of serum calcium in ewes in the present study is comparable to those mentioned by Edmundo et al (1982), Hooda (1992) and Sudhan et al (1996). However, the value is higher than those reported by Tajane et al (1990), and lower than those reported by Kaneko (1997), Karim (2000) and Sharma (2004). The mean value of serum phosphorus is comparable to those mentioned by Edmundo et al (1982), Tajane et al (1990). However, the value is lower than those reported by Hooda (1992), Sudhan et al (1996), Sharma (2004) and Kaneko (1997). The mean value of plasma magnesium is lower than those mentioned by Edmundo et al (1982), Hidroglou et al (1987), Hooda

(1992), Sudhan et al (1996), Kaneko (1997) and Sharma (2004).

The mean values of sodium, potassium and chloride of Assam local sheep was found to be 146 ± 1.5 , 4.5 ± 0.16 and 113 ± 1.9 , respectively.

The mean value of serum sodium is comparable to those mentioned by Kelly (1984) and Sharma (2004). However, the value is lower than those reported by Tajane (1990) and Hooda (1992). The mean value of serum potassium is lower than those reported by Kelly (1984), Tajane (1990) and Hooda (1992). The mean value of serum chloride is comparable to those reported by Kelly (1984) and Sharma (2004).

Present study thus reports the physiological level of some important minerals in Assam local sheep (*Ovis aëris*). The data generated during the current investigation may be useful as reference values for the scientific community as this is the first study of its kind in this indigenous breed of sheep. Further, it may assist the clinicians to assess health status of the sheep as well as in differential diagnosis of clinical conditions.

Table 1: Macro-minerals in blood of Assam local sheep

Mineral (s)	Concentration
Calcium (mg/dl)	10.9 ± 0.18
Phosphorus (mg/dl)	7.6 ± 0.27
Magnesium (mg/dl)	2.6 ± 0.04
Sodium (mmol/l)	146 ± 1.5
Potassium (mmol/l)	4.5 ± 0.16
Chloride (mmol/l)	113 ± 1.9

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