



Minerals Profile of Adult Ewes and Lambs Grazed Natural Pasture

Maisaa Ghany Taher , Zahid Ismael Mohammed
University of Diyala, College of Medicine, Diyala , Iraq
Corresponding author Email: zahidma1977@yahoo.com

ORCID: <https://orcid.org/0000-0002-6327-3677>

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Abstract

Minerals are inorganic substances that develop the mineral component of the body, they are essential for the correct growth and the functioning of the body and are split into two different groups that are established on the amounts required by the animals' body. This study achieved during the chilly season (December 2021-February 2022) to demonstrate Phosphorus (P), Potassium (K), Calcium (Ca), and Magnesium (Mg) concentrations in serum of ewes grazed naturally in Diyala Province. Forty serum samples from ewes and lambs were got randomly from many regions of Alwajehia twon. Analysis, showed increased mineral levels in serum samples significantly ($P \leq 0.05$) from lambs than in adult ewes, especially Ca and p concentrations. Also, this study demonstrated higher levels Ca and p in serum of female compared with male lambs while levels of K was greater significantly in male than female lamb. The current study concluded that pre-lambing phase considers very crucial period that has impact on optimal reproductive performance in ewes after lambing. Good management by enhancing nutrition is crucial to avoiding many mineral levels disorders.

Keywords: Minerals, ewes, Blood, pasture.

Introduction

The minerals can be classified in two categories, macro-minerals, these could be essential 0.1% in the feed, and second type which needed in diet in small quantiles (part per million (ppm) and called micro-minerals. The calcium (ca), sodium (Na), phosphorus(P), chlorine (Cl), potassium (K), Sulphur (S) and magnesium (Mg) consider as Macro elements. However, minerals include copper, manganese, iodine, selenium, iron, cobalt, zinc, and molybdenum categorized as Micro elements. Any deficiencies of these elements in diets can developed many production and reproduction

disorders (1).Many different factors such as plant, soil, pasture, maturity stage and weather can impact on levels of minerals in feed and forage. Any deficiency of these elements in feed supplements should be treated and involved enough macro- and micro-minerals to avoid any production disorders (2).There are many differences in feeding intake habits in small ruminants. Goats would like to consume huge feedstuffs compared with ewes, practically during extensive stations (3).Catabolism of macro elements had significant difference of organization of physiological and healthy status



during gestation and lactation period. All small ruminants need minerals for public health reproduction, lactation, a growth, and take part the construction part of enzymes and regulate many essential biochemical reactions (4,5). The needing of minerals especially of Ca increases as soon as period of lactation in these animals. The Ca mobility from bones and reabsorption from the gastrointestinal system develops huge concentrations according to body hemostasis (6). The quantity and quality available pasture and good balanced diet enriched by many different of vitamins and minerals additives (7). The basic conditions for micro- macro minerals in physiological profile in small ruminants serum during post parturition is variable associated with milk production (8) , season, parity, the number of lambs (9 ,10) , public

health status (11), weather region (12 ,13). Early detection for chemical parameters in blood of ewes and goats is so crucial to demonstrate metabolic disorders and early diagnosis for different clinical diseases before and after birth (14). Biochemical parameter results are needed for debate. Moreover, many different factors like sex, age of animals, species, breed, physiological status like lactation or pregnancy, also feed intake by animals could effect of explanation of biochemical test results (14). Anyway, there are few studies and knowledge about mineral nutrition of sheep and lambs in Iraq. Based on these reasons this study designed to determine concentration of many macro minerals in blood of healthy ewes and lambs that naturally feeding by grazed pasture .

Materials and methods

Animals:

This study was achieved at Diyala Province of Iraq, during the winter 2021 (cold season). The survey included Al - Wajehia areas of Diyala. The area was characterized by cold weather in Winter season. The about temperature in this area was about 5°C- 15°C. Forty healthy ewes (1.5-2.5 years) and their lambs (local breed) were selected randomly . Ewes were grazed the grass in whole day and kept in sheltered in a barn built at night were supplied with hay.

Sampling: The blood was taken from the jugular vein after sterilization the site of sampling by using disposable sterilized syringes. Blood specimens were kept in sterilized tubes free from the anticoagulant (gel tube), then serum isolated by centrifugation (3000 rpm) for 10 minutes. All blood sampling was taken early in the morning before the

animals were allowed to graze. serums were collected and analysis directly.

Test : Five milliliters (5 ml) of serum was mixed with 4 ml of nitric acid and perchloric acid (1:1), then the volume was adjusted to 25 ml with distilled water [15].

Macro elements in the serum Ca, K, P and Mg, were analyzed depended atomic absorption spectrophotometer [16]. Minerals tests were done in the laboratories of Veterinary Medicine College in University of Diyala .

Ethical approval: The researchers obtained ethical approval from the research Ethical Approval Committee of the College of Veterinary Medicine, University of Diyala.

Statistical analyses: All data of this study were tested statistically by Paired t-test and unpaired t- test were applied to compared among the means and (P-value \leq 0.05) was considered statistically significant (17).



Results

The results were showed Calcium (ca), adult ewes but serum level of K was rise in phosphor (p) and magnesium (Mg) were lambs than ewes without any significant increasable ($P \leq 0.05$) in lambs compared with differences at ($P > 0.05$) (Table 1).

Table 1: The impact of age on concentration of Ca, K, P and Mg (mg/ 100ml) in serum of ewes and their lambs (M \pm SD)

| Minerals | Lambs | Ewes |
|----------|-------------------|-------------------|
| Ca | 6.23 \pm 0.44 a | 5.68 \pm 0.77 b |
| P | 2.53 \pm 0.6 a | 1.95 \pm 0.6 b |
| K | 6.12 \pm 0.5 | 5.22 \pm 0.8 |
| Mg | 1.48 \pm 0.7 a | 1.17 \pm 0.3 b |

Different letter horizontally denotes significant differences ($P \leq 0.05$) among groups

The impact of sex on the levels of Ca, P, K, p and Mg in lambs were listed (Table 2), that showed Ca levels increased significantly ($P \leq 0.05$) in female lambs compared with male lambs while K concentration was ($P \leq 0.05$) decreased in female lambs compared with male lambs. Phosphor (p) levels were significantly dropped in female lambs compared with male lambs. Moreover, Mg concentrations are similar in male and female lambs, although Mg levels seem to decrease in ewes.

Table 2: Impact of sex on concentration of Ca, K, P and Mg (mg/ 100ml) in serum of lambs (M \pm SD)

| minerals \ sex | Male | Female |
|----------------|-------------------|-------------------|
| Ca | 4.96 \pm 0.71 b | 5.86 \pm 0.28 a |
| P | 1.98 \pm 0.3 b | 2.55 \pm 0.2 a |
| K | 6.32 \pm 0.42 a | 5.64 \pm 0.33 b |
| Mg | 1.67 \pm 0.5 a | 1.61 \pm 0.3 a |

Different letter horizontally denotes significant differences ($P \leq 0.05$) among groups

Discussion

The mineral levels in blood of ewes were at marginal deficient concentration. This results may have happened because sever lack of minerals in forage and soil (18). This study records minerals levels in lambs was higher than in serum of adult ewes was agreed with findings that report by (19 ,20 ,21) depending on good nutrition provided for lambs than the grazed adults . addition, P level was high ($P \leq 0.05$) in lambs than in ewes that match study

by (21).In Deficiencies of minerals usually occur within specific geographical regions. Soil types and climatic conditions will determine the types and amounts of minerals available for absorption by the pasture plants and other local plant species. However, there are many secondary factors that will contribute to the expression of potential mineral problems. These include: time of the year (stage of plant growth); amounts and types of ferti lizer used;



introduction of improved pasture species; short term climatic factors (recent rainfall and temperature); distance from the ocean; and amounts and types of supplementary feeding. These factors influence the supply of minerals to grazing sheep.

Our finding of impaction of sex of animals on mineral levels in serum are disagreeing with (9) who recorded K and Ca blood concentrations in ewes were not affected by sex.

Sex of the sheep affects mineral requirements through differences in growth rates and physiological functions. Rams grow faster than ewes and so require a greater daily supply of minerals; pregnant and lactating ewes require more minerals to meet body demands than non-pregnant females at maintenance. The Ca and Mg consider most common macro-minerals, problematic in ewes, because no Mg sources are maintained in body, it should the owner pay attention and add these minerals to diet to avoid risk of hypomagnesaemia. The Ca balance in late gestation period in animals is crucial to avoid developing hypocalcaemia. period before lambing considers one of the common essential points in ewes' calendar and could play a vital role in successful lambing period. Good balancing of diet is crucial to avoid the

consequences of underfeeding on both ewe and lamb health, and avoid overfeeding, which can be costly (9). Nice planning considers the essential step to avoid problems from arising, and strategic monitoring could assist and identify when intervention is required, so productivity of the flock in both the short and longer term is maximized (22).

Conclusions

This study concluded that the mineral diet of small ruminants are at the marginal deficient level in some crucial minerals. This levels could change abruptly to severe deficient concentrations at any time and could developed dropping in essential minerals particularly at cool weather due to decrease in the concentrations of common important minerals in winter forages which are considered as the main cause for poor animal production.

Conflict of Interest: there is no conflict of interest.

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