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# Assessment of serum values of copper in ewes

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## ABSTRACT

*The most common reason to assess the trace mineral status of ruminants is because performance is below expectation. Accordingly, the assessment is done to determine the presence or prevalence of nutrient deficiencies (or toxicities) within a population. Assessment also is done to evaluate efficacy of dietary supplementation or to compare available supplements. The aim of this study was to assessment of serum values of copper in sanjabian ewes in ilam province of Iran. In this study, 200 blood serum, belonging to 200 sanjabian sheep aging between 2-2.5, growing in the pasture conditions were used as a material in autumn and winter. The sera were extracted from the blood taken, and kept in the deep freeze in -20°C, until they are analyzed. The copper analyses in the serum were made with spectrophotometric method by Randox kit. The values found were evaluated by "t test". Based on data and t-test results revealed that copper serum mean value in autumn and winter were  $0.325 \pm 0.01$  and  $0.928 \pm 0.61$  ppm respectively which is suggests that there is a significant difference among copper serum levels in two season ( $p < 0.001$ ). It has been thought that this study will fulfill an important gap, because of not to be present the normal value of serum copper belonging to the sanjabian races. It is known that the excess and insufficiency of trace elements cause some disorders and decrease in production. So in order to search the effects of these substances, the normal values should be known.*

**Key words:** serum, copper, ewes, Ilam province, Iran.

## INTRODUCTION

The living things, obtain the mineral substances of their body from air, water and soil on behalf of blants, depending on the conditions of the climate. Thats why the health of the organism is related to the soil on which it lives and the geological structure of the soil (1). Since the trace elements are in lots of biomolecules such as hormon and enzyme and have an important role on

growing, they should be found in the food of human being and animals (2, 3, 4). The zinc having a role in various functions of organism is a trace element which is very important in the diagnosis of the diseases (5-8). It was also recorded that it has some effect on the activity of insulin, GH, TSH, LH, FSH, ACTH (8), in addition to its effect on the some enzyme such as; leucine amino peptidase (9), alkali phosphatase (10), carbonic anhidrase (10-12), lactate dehydrogenase, ribonuclease (10). The copper value in the blood serum differs, depending on the age of the animal, pregnancy and the absence of the copper in the diet (13). The symptom of zinc and copper are associated with the enzyme defeats.

Polyphenol oxidase which has a role in the synthesis of melanine includes copper. The Acromatrichia is seen in the absence of melanin (14, 15). Smith et al.(15), indicated that the effects of zinc and copper on growing is due to on the mineralization of the bone and zinc has an active role on the metabolism of vitamin A and protein and zinc are needed in the blood for the mobilization of vitamin-A in the liver. Vural (16), reported that, zinc has a role on the vitamin-C, metabolism and if there is high zinc in the diet, it increases the concentration of plasma of vitamin-C.

It is also reported that zinc and copper also limit the deposition of iron as ferritin by affecting the absorption of iron (3,9). It is suggested that no ingestion of trace elements or in sufficiency of them, may be led to affects on animals and serious problems which may result with death (4,6). The insufficiency of trace elements, especially zinc and copper, stimulates the catabolism of protein, limits the biosynthesis of protein by making differences on the nucleic acid metabolism and as a reslt of this effects, the regeneration and growing of the tissue is affected (4,5,17-21).

Cin et al. (21), revealed that the feather is rough and mixed, and growing is less than the control group, in calves fed with feed including insufficient zinc. A group of researchers (9,22) reported some diseases that are seen with the paraketototic skin and the differantion of the colour of the skin and the dropping of skin around eyes, was related to the samples of the plant including insufficient zinc and copper that was given to the sheep.

The aim of this study was to assessment of serum values of copper in ewes in ilam province of Iran.

## **MATERIALS AND METHODS**

In this study, 200 blood serum, belonging to 200 sanjabian sheep aging between 2-2.5, growing in the pasture conditions were used as a material in autumn and winter. The sera were extracted from the blood taken, and kept in the deep freeze in -20°C, until they are analyzed. The copper analyses in the serum were made with spectrophotometric method by Randox kit. The values found were evaluated by “t test” (23).

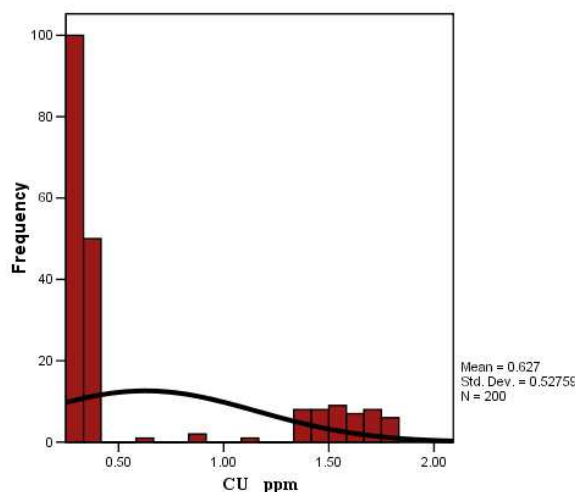
## **RESULTS**

According to the table and diagram 1, mean value of copper was 0.627 ppm in understudying animals while minimum and maximum levels were 0.30 and 1.81 ppm respectively. In this study,

25% of all was less than 0.324, 25% was between 0.324-0.333, 25% was between 0.333-0.541 and 25% was more than 0.541 ppm.

**Table 1: Frequency distribution of serum copper levels**

Serum value	No.	Mean	SD	Min
Cu	200	0.627	0.527	0.30



**Diagram 1: Frequency distribution of serum copper levels**

Based on data, of 200 animals, serum copper value in 151 animals (75.5%) was less than 0.7 ppm, 3 of them (1.5%) had between 0.7-1.2 ppm and 46 of them (23%) had more than 1.2 ppm.

#### ***Comparisons of copper serum mean value by season:***

Based on data showed in table 2 and t-test results revealed that copper serum mean value in autumn and winter were  $0.325 \pm 0.01$  and  $0.928 \pm 0.61$  ppm respectively which suggests that there is a significant difference among copper serum levels in two season ( $p < 0.001$ ).

**Table 2: Comparisons of copper serum mean value by season**

Season	No.	Mean	F	p-value	t	Df
Autumn	100	$0.325 \pm 0.01$	1838.39	0.000	9.84	99.07
Winter	100	$0.928 \pm 0.61$				

## **DISCUSSION AND CONCLUSION**

Ozan (24), in his study, examining the zinc and copper levels between the healthy group of sheep and the group dropping its spring wool found that, the blood serum zinc level average of the healthy group was  $27 \pm 0.63$  and the copper level was  $33.72 \pm 0.77$   $\mu\text{g}/100$  ml and in the spring wool dropping group, it was respectively  $14.45 \pm 0.25$  and  $63.5 \pm 1.17$   $\mu\text{g}/100$  ml. This may be due to the conditions of the environment and the climate and especially the trace element consistency of the soil and to the various races of the sheep.

It is reported that the level of plasma copper in sheep shows differences according to the level of the copper and antagonists (Pb, CaCO<sub>3</sub>, Zn, Mo, S) in the norishment, environment and seasons, drought and rain, and pregnancy (25). Lorentz and Gibb (26), reported that the plasma copper concentration should be more than 50 µg/dl normally, concentrations below this signals hipocuprosis.

Çamas(27), reported that the serum copper concentration in normal Akkaraman sheep  $95.22 \pm 1.52$  µg/100 ml. Sina and Miller (28), determined in their studies that serum copper value in the Dağlıç sheep is 60, in Imroz sheep 99, in Kivırcık sheep 73, in Merinos sheep 48 µg/dl. Sina (29), also determined the average copper value in Kivırcık sheep 93 µg/dl in on other study. It is also reported that the average copper concentration in Akkaraman sheep was  $80.8 \pm 1.41$  µg/dl(30). Serpek (31) in one of his studies determined the serum copper concentration in Dağlıç, Imroz, Kivırcık and Merinos sheep respectively as,  $59.01 \pm 2.37$ ,  $101.79 \pm 2.02$ ,  $83.40 \pm 1.83$  and  $79.02 \pm 2.19$  µg/dl.

It has been thought that serum copper concentration differs according to the environment.

Antaplı (32), in one of his studies the plasma zinc concentration in Merinos sheep 32,5-150 µg/100 ml.

It has been thought that this study will fulfill an important gap, because of not to be present the normal value of serum copper belonging to the sanjabian races. It is known that the excess and insufficiency of trace elements cause some disorders and decrease in production. So in order to search the effects of these substances, the normal values should be known. With this study determining the normal values of the copper element which have great importance on the growing of the animals in and around Kars that have a wide potential of stockbreeding, and finding that there aren't any great differences in sanjabian races, led to thought that this study will be useful in the diagnosis of lots of diseases and can light the way to the further coming studies.

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