

## The Serum Zinc and Copper Values of the Morkaraman and Tuj Sheep Grown Up in The Pasture Conditions in and Around Kars

Necati KAYA, Necati UTLU

Department of Biochemistry, Faculty of Veterinary Medicine, Kafkas University, Kars-TURKEY

Bekir Sami UYANIK

Department of Biocnemistry, Faculty of Medicine, Celal Bayar University, Manisa-TURKEY

Ayla ÖZCAN

Department of Biochemistry, Faculty of Veterinary Medicine, Kafkas University, Kars-TURKEY

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**Abstract:** This study was performed on 100 sheep, of which 50 were Morkaraman and 50 were Tuj, grown up in the pasture conditions in and around Kars. The serum zinc and copper values of the animals were analysed with Atomic Absorbtion Spectrophotometre. The serum zinc and copper values were respectively determined as;  $40.56 \pm 5.6$  µg/dl,  $80.10 \pm 7.49$  µg/dl in Morkaramans and,  $38.72 \pm 5.32$  µg/dl,  $75.04 \pm 6.58$  µg/dl in Tujs. There were no significant differences between the value of zinc and copper statistically.

**Key Words:** Serum zinc, copper, Morkaraman and Tuj sheep.

### Kars ve Çevresinde Mera Şartlarında Yetişen Morkaraman ve Tuj Koyunların Serum Çinko ve Bakır Değerleri

**Özet:** Bu çalışma, Kars ve çevresinde mera şartlarında yetişen 50'si Morkaraman ve 50'si Tuj olmak üzere 100 adet koyun üzerinde yapıldı. Hayvanların serum Zn ve Cu değerleri Atomik Absorpsiyon Spektrofotometre ile analiz edildi. Morkaraman koyunlarda serum Zn ve Cu değerleri sırasıyla  $40.56 \pm 5.61$  µg/dl,  $80.10 \pm 7.49$  µg/dl, Tuj koyunlarda ise,  $38.72 \pm 5.32$  µg/dl,  $75.04 \pm 6.58$  µg/dl olarak saptandı. İstatistikî analiz sonucunda bu iki ırk arasında Zn ve Cu değerleri farkının ( $P>0.1$ ) düzeyinde anlamsız olduğu bulundu.

**Anahtar Sözcükler:** Serum çinko, bakır, Morkaraman ve Tuj koyunları.

### 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 hawing a role in various functions of organism, is a trace elements 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), alcali phospatase(10), carbonic anhidrase(10-12), lactat dehidrogenase, 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. Polyfenol oxidase which has a role in the synthesis of melanine include 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 paraketotic 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.

This study was performed with the aim of determining the serum zinc and copper values in the Morkaraman and Tuj sheep widely grown in and Kars and determining whether there is any differences in the parameters from this point of view.

**Material and Methods**

In this study, 100 blood serum, belonging to 50 Morkaraman and 50 Tuj sheep aging between 2-2.5, growing in the pasture conditions were used as a material. The villages from where the samples were taken, and the number of sheep were shown in Table 1. The serum were extracted from the blood taken, and kept in the deep freezer in -20°C, until they are analysed. The zinc and copper analyses in the serum was made with Atomic Absorbtion Spectrophotometre(A.A.S, Perkin-Elmer Model 107) at the Biochemistry department of the Medicine Faculty of Atatürk University. The values found were evaluated by “t test” (23).

**Results**

The average value of blood serum zinc and copper of Morkaraman and Tuj races are given in Table 2.

The difference between the races according to the obtained values are found meaningless (p>0.1) from the statistical point of view.

Table 1. The villages, and the race and number of sheep which sample were taken.

| The name of the village and the neighbourhood | The race of the sheep | The number of samples |
|-----------------------------------------------|-----------------------|-----------------------|
| Kümbetli                                      | Morkaraman            | 7                     |
| Dikme                                         | Morkaraman            | 10                    |
| Benli Ahmet                                   | Morkaraman            | 6                     |
| Cumhuriyet                                    | Morkaraman            | 6                     |
| Çakmak                                        | Morkaraman            | 9                     |
| Atatürk Mah.                                  | Morkaraman            | 3                     |
| Subatan Mah.                                  | Morkaraman            | 5                     |
| Halit Paşa Mah.                               | Morkaraman            | 2                     |
| Paşaçayırı Mah.                               | Morkaraman            | 2                     |
| Taşköprü(Çıldır)                              | Tuj                   | 8                     |
| Taşbaşı(Çıldır)                               | Tuj                   | 8                     |
| Çanakısu(Çıldır)                              | Tuj                   | 8                     |
| Bozyiğit(Çıldır)                              | Tuj                   | 8                     |
| Göldalı(Çıldır)                               | Tuj                   | 6                     |
| Gönüalan(Çıldır)                              | Tuj                   | 5                     |
| Fakülte Çiftliği                              | Tuj                   | 7                     |

Table 2. The average value of blood serum zinc and copper (µg/dl).

| The race of the sheep | The number of the samples | Zn    |      | Cu    |      |
|-----------------------|---------------------------|-------|------|-------|------|
|                       |                           | X     | SD   | X     | SD   |
| Morkaraman            | 50                        | 40.56 | 5.61 | 80.10 | 7.49 |
| Tuj                   | 50                        | 38.72 | 5.36 | 75.04 | 6.58 |

**Discussion**

In this study, serum samples were used due to the easiness of obtaining of the samples, preparing for the analysis and keeping factors. The zinc and copper analyses were used, since it necessiate few samples and reagent, response quickly and it is more sensitive and thrustworthy (3,5).

In this study which was aimed to search for, the Morkaraman and Tuj sheep growing in and around Kars to see whether there were any differences between the races and to find the normal values of zinc and copper elements which have great importance on the growing of the animals, the serum zinc values of Morkaraman and

Tuj sheep were determined respectively;  $40.56 \pm 5.61$  and  $38.72 \pm 5.32$   $\mu\text{g}/\text{dl}$ , the average copper value was  $80.10 \pm 7.49$  and  $75.04 \pm 6.58$   $\mu\text{g}/\text{dl}$ .

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,  $\text{CaCO}_3$ , 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  $\mu\text{g}/\text{dl}$  normally, concentrations below this signals hipocuprosis. Since the copper value  $80.10 \pm 7.49$  and  $75.04 \pm 6.58$   $\mu\text{g}/\text{dl}$  in Morkaraman and Tuj are respectively. It is thought that there are not any diseases occurring because of the lackness of copper in the environment. This situation is also observed in cases coming to the clinics.

Çamaş(27), reported that the serum copper concentration in normal Akkaraman sheep  $95.22 \pm 1.52$   $\mu\text{g}/100$  ml.

Sina and Miller (28), determined in their studies that serum copper value in the Dağlıç sheep is 60, in İmroz sheep 99, in Kivırcık sheep 73, in Merinos sheep 48  $\mu\text{g}/\text{dl}$ . Sina (29), also determined the average copper value in Kivırcık sheep 93  $\mu\text{g}/\text{dl}$  in on other study. It is

also reported that the average copper concentration in Akkaraman sheep was  $80.8 \pm 1.41$   $\mu\text{g}/\text{dl}$ (30).

Serpek (31) in one of his studies determined the serum copper concentration in Dağlıç, İmroz, Kivırcık and Merinos sheep respectively as,  $59.01 \pm 2.37$ ,  $101.79 \pm 2.02$ ,  $83.40 \pm 1.83$  and  $79.02 \pm 2.19$   $\mu\text{g}/\text{dl}$ . Since the copper values of the Tuj and Morkaraman grown in the same region were not different. 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  $\mu\text{g}/100$  ml.

It has been thought that this study will fullfill an important gap, because of not to be present the normal value of serum zinc and copper belonging to the Tuj and Morkaraman 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 zinc and copper elements 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 between Tuj and Morkaraman races, led to thought that this study will be useful in the diagnosis of lots of diseases and can light the way to the furthercoming studies.

*Correspondance author: Necati UTLU*

*Atatürk Üniversitesi,*

*Sağlık Hizmetleri Meslek Yüksekokulu*

*25040 Erzurum-TURKEY*

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