T.C.
ULUDAĞ ÜNİVERSİTESİ
VETERİNER FAK. DERGİSİ
Sayı: 3, Cilt: 11, 1992

Plasma Copper Levels of Five Different Breeds of English Sheep

Nihat MERT* Asuman GÜLER** Meltem ÇETİN***
Canan OĞAN****

SUMMARY

Trace elements in animal feeding are the most popular research topics in Veterinary Science. Copper has many important biological functions and the levels of copper in body fluids are affected by different factors such as seasons, breeds and some ions. In this study five different breeds of English sheep, 56 Dorset, 32 Hampshire, 25 Lincoln, 18 Blackface, 11 Border, total 142 sheep were used as research materials. Blood samples were taken and plasma were separated. The plasma copper analysis were done by Atomic Absorption Spectrophotometer. The amount of average plasma copper were; % 52.80 mcg, % 51.90 mcg, % 48.08 mcg, % 46.6 mcg and % 53.05 mcg for Dorset, Hampshire, Lincoln, German Blackface and Border, respectively. Obtained values were low when they were compared with Turkish native sheep breeds. This study was the one of the pioneer research for these genotypes in our country.

Key words: Copper, sheep, English Breeds of sheep, blood.

---

* *Doç. Dr.; U.Ü. Vet. Fak., Biyokimya Anabilim Dalı, Bursa, Türkiye.*
** *Doç. Dr.; U.Ü. Tıp Fak., Biyokimya Anabilim Dalı, Bursa, Türkiye.*
*** *Yard. Doç. Dr.; U. Ü. Vet. Fak., Biyokimya Anabilim Dalı, Bursa, Türkiye.*
**** *Yüksek Kimya Müh.; U.Ü. Veteriner Fak., Biyokimya Anabilim Dalı, Bursa, Türkiye.*

ÖZET

Beş Farklı Irktaki İngiliz Koyunlarının Plazma Bakır Düzeyleri

Veteriner Hekimliğinde en popüler araştırma konularından biri hayvan beslemesinde iz elementlerin önemidir. Bakır bazı önemli biyolojik fonksiyonlara sahiptir ve vücut sıvılarındaki bakır seviyeleri mevsimler, ırklar ve bazı iyonlar gibi değişik faktörler tarafından etkilenir. Bu çalışmada 56 Dorset, 32 Hampshire, 25 Lincoln, 18 Blackface, 11 Border olmak üzere beş farklı ırktan toplam 142 İngiliz koyunu araştırma materyali olarak kullanıldı. Kan örnekleri alınarak plazmalar ayrıldı. Plazma bakır analizleri Atomik Absorpsiyon Spektrofotometre ile yapıldı. Ortalama plazma bakır düzeyleri Dorset, Hampshire, Lincoln, German Blackface ve Border ırkı koyunlarda sırasıyla % 52.80 mcg, % 51.90 mcg, % 48.08 mcg, % 46.6 mcg ve % 53.03 mcg bulundu. Bildirilen değerler yerli koyun ırklarıyla karşılaştırıldığında düşük olarak tesbit edildi. Sunulan çalışma yurdumuzdaki bu genotipler için bir öncül araştırma niteliğindedir.

INTRODUCTION

Copper is an essential element in living organisms. It is involved in the central nervous, bone metabolism, heart function and necessary functioning of enzyme system, as a component of various body pigment and hemoglobin production[1]. The levels of copper in body fluids and organs can be changed by different factors such as other trace elements, ions, dietary proteins, and breeds of animal. Environment and season are also important for serum Cu levels.

In sheep, the levels of Cu in blood change with breeds. Different breeds of sheep (native or foreign originated) have different Cu levels[2.3.4]. Mo and S influence the Cu requirement. The Cu requirement of sheep is lower than cattle for growth and health[5]. Whole blood Cu concentrations reflect the dietary Cu status of animals. For sheep and cattle the normal range of plasma is 0.6-1.5 mcg/ml[1].

In the presented research it was aimed to determine the plasma levels of five different breeds of English sheep raise in Bandırma Sheep Breeding Research Center.

MATERIALS AND METHOD

Five different breeds of English sheep, Dorset, Hampshire, Lincoln, Blackface and Border, were used as research materials. The blood samples from 56 Dorset, 32 Hampshire, 25 Lincoln, 18 Blackface, 11 Border, total 142 sheep

2-3 years old, were taken, plasma were separated. Copper analysis were done on the type of H 1550 Atomic Absorption Spectrophotometer with Graphite tube (Rank Hilger Westwood Margate Kent CT 9). All glass materials were soaked in nitric acid (2 mol/l) for 24 hours, then rinsed with doubly deionized water about ten times. Standart curve method was used for plasma Cu analysis.

RESULTS

The plasma Cu levels of sheep were shown in Table I. All breeds have similar Cu levels. The range was between % 46-53 mcg.

Table: I
The Plasma Copper Levels of Five Different Breeds of English Sheep

Breed	n	Plasma Cu % mcg
Dorset	56	52.8
Hampshire	32	51.9
Lincoln	25	48.08
Blackface	18	46.6
Border	11	53.03

DISCUSSION

English sheep raised for meat have low plasma Cu levels when were compared with Turkish native breeds (Table: II).

Table: II
Plasma Cu Levels of Different Breeds of Sheep

Breed	Plasma Cu % mcg	Literature no
Merino	115.42	2
Dağlıç	50.01	3
İmroz	101.79	3
Kıvırcık	75.00 - 78.40	4
Finnish landrace	35.20	6
F. landrace x Merino	69.40	6
Akkaraman	80.80	7
Awassi	72.87	Mert N. (not published)
Morkaraman	59.21	Mert N. (not published)

Plasma copper levels are affected by different factors. Age, season and environment, pregnancy are the main parameters. Different authors have reported that age was not affect Cu levels significantly[2,6] but, it was interesting that breed differences affect plasma copper levels.

REFERENCES

1. McROWELL, L.R., CONRAD, J.H., ELLIS, G.L., LOOSLI, J.K.: Minerals for grazing ruminants in Tropical Regions, Florida Extension Bulletin, pp. 30-33 (1983).
2. MERT, N., ANTAPLI, M., ÜREN, A., TANRIVERDİ, M.: Plasma zinc, copper and manganese levels of infertile flocks in the Marmara Region in Turkey, Proceedings of the Third International Congress on Trace Elements in Health and Disease at Adana (Turkey), March 31-April 8 (1989).
3. SERPEK, B.: Koyun kan serumlarında bakır ve seruloplasmin konsantrasyonları üzerinde çalışmalar, Doktora tezi (1980).
4. SINA, M., MILLER, T.E.: Biyokimya yönünden Türkiye'deki koyunların kan analizleri ve bilinen bazı hububatlarda meralardaki izelementler üzerinde bir çalışma, Pendik Vet. Bak. Arş. Enst. Derg., 3, 126-148 (1968).
5. MILLS, C.F., DALGARNO, A.C., WENHAM, G.: Biochemical and pathological changes in tissues of Friesian cattle during the experimental induction of copper deficiency, Brit. J. Nutr., 35, 309 (1976).
6. HAYTER, S., WIENER, G., FIELD, A.C.: Variation in the concentration of copper in the plasma of finnish landrace and Merino sheep and their crosses with references to reproductive performance and age, Anim. Prod. 16, 261-269 (1973).
7. TÖRE, R., ŞENDİL, C., CAN, R., ASI, T.: Koyunların deneysel kronik bakır zehirlenmesinde bazı klinik, hematolojik ve biyokimyasal bulgular, İst. Üniv. Vet. Fak. Derg., 2, 47-69 (1978).