

FARKLI IRK SIĞIRLARDA BAZI SERUM ENZİM AKTİVİTELERİ¹

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Özet: Bu çalışmada Atatürk Üniversitesi Araştırma ve Uygulama Çiftliğinde soğuk iklim ve yüksek rakımda (2000 m) yetiştirilen 20 adet Holstein (10 adet dişi ve 10 adet erkek) ve 20 adet Brown Swiss (10 adet dişi ve 10 adet erkek) olmak üzere 40 adet hayvan kullanıldı. Ortalama yaşları 11-12 aylık olarak seçilen hayvanlar yaz mevsiminde merada beslendi. Kan serumlarında aspartat aminotransferaz (AST), alanin aminotransferaz (ALT), alkalen fosfataz (ALP), gamma-glutamil transpeptidaz (GGT), kreatin kinaz (CK), α -amilaz (α -AMY) ve laktat dehidrogenaz (LDH) enzimlerinin aktiviteleri otoanalizörde ticari kit kullanılarak analiz edildi. Yapılan istatistiki analizde incelenen enzim aktivite düzeylerinin birbirine yakın olduğu ve ırklar arasındaki farkın önemsiz olduğu bulundu.

Anahtar sözcükler: Holstein ve Brown Swiss Sığır, Serum, Enzim Aktiviteleri

Activities of the Some in Different Cattle Breed¹

Summary: In this study, a total of 40 cattle [20 Holstein cattle (10 males and 10 females) and 20 Brown Swiss Cattle (10 males and 10 females)] were taken. The animals were grown in the pasture of the Agricultural College Farm of Atatürk University at an altitude of 2000 m above sea level and at cold climatic conditions. The animal were grazed in the pasture in the summer. All the animals had an average age of 11-12 months. The activities of aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), gamma-glutamyl transpeptidase (GGT), creatine kinase (CK), α -amylase (α -AMY) and lactate dehydrogenase (LDH) in serum were analyzed on autoanalyzer by using commercial kits. In the statistical evaluation, the serum activities of the enzymes measured were similar in two groups and the differences were not statistically significant. There were no significant differences between the males and females. There were also no significant differences among in breeds regarding activities of enzymes.

Keywords: Holstein, Brown Swiss Cattle, Serum Enzymes Activities.

INTRODUCTION

The most commonly performed tests of tissue function are enzymes such as ALT, AST, LDH, GGT, CK, ALP and AMY. The quantitative analysis of certain plasma enzymes is of diagnostic significance¹⁻⁷. Two transaminases, ALT and AST, present in most mammalian tissues. Evaluating of results of hepatic enzyme testing is important, albeit sometimes confusing, part of primary care practice. Here are a few pointers on assessing the results of AST and ALT. AST is also found in skeletal muscle, myocardium, brain, and kidney in smaller amounts, so that damage to these areas may also cause an AST rise⁸⁻¹⁵. LDH catalyzes the interconversion for lactate and pyruvate in the presence of NADH. Elevated in all conditions accompanied by tissue necrosis, particularly those involving acute injury of the heart, red cells, kidney, skeletal muscle, liver, lung, and skin⁸⁻¹⁰. GGT is an extremely sensitive indicator of liver disease. Enzyme is present in liver, kidney, and pancreas and transfers C-terminal

glutamic acid from a peptide to other peptides or L-amino acids^{9,10}. CK splits creatin phosphate in the presence of ADP to yield creatine and ATP. Skeletal, heart and brain are rich in the enzyme. Elevated in the presence of muscle damage such as with myocardial infarction, trauma to muscle, muscular dystrophies, polymyositis, severe muscular exertion, and cerebral infarction. Skeletal muscle is characterized by isoenzyme CK-MM, myocardium by isoenzyme CK-MB, and brain by isoenzyme CK-BB⁸⁻¹⁰. AMY normally, small amounts of amyleasa, originating in the pancreas and salivary glands, are present in the blood. Inflammatory disease of these glands or obstruction of their ducts results in regurgitation of large amounts of enzyme into the blood and increased excretion via the kidney^{16,17}. ALP is present in high concentration in growing bone, in bile, and in the placenta. In serum, it consists of a mixture of isoenzymes not yet clearly defined. The isoenzymes may be separated by electrophoresis; ALP migrates faster than bone and placental ALP, which migrate together^{1,2,13-15}.

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The objectives of the present study were to establish the normal blood composition and reference values in relation to the above mentioned acquired characteristics and to compare the blood profile with other Turkey breeds and to learn about deficiencies and possible ways to improve their production.

MATERIALS and METHODS

In this study, a total of 40 cattle [20 Holstein cattle (10 males and 10 females) and 20 Brown Swiss Cattle (10 males and 10 females)] were taken. The animals were grown in the pasture of the Agricultural College Farm of Atatürk University at an altitude of 2000 m above sea level and at cold climatic conditions. The animals were grazed in the pasture in the summer. All the animals had an average age of 11-12 months. Blood was taken from the jugular vein and serum was collected. Activities of serum aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), gamma-glutamyl transpeptidase (GGT), creatine kinase (CK), α -amylase (α -AMY) and lactate dehydrogenase (LDH) were analyzed on autoanalyzer by using commercial kits. Statistical analysis was performed by the statistical package SPSS, version 6.0. Multiple comparison of the other data was done by using the Duncan test after one-way analysis of variance (ANOVA). In these tests, $p < 0.05$ was considered as statistically significant.

RESULTS and DISCUSSION

The activities of serum enzymes of Holstein cattle and 20 Brown Swiss Cattle breed obtained in this study are presented in Table 1. In the statistical evaluation, the serum activities of the enzymes measured were similar in two groups and the differences were not statistically significant. There were no significant differences between the males and females. There were also no significant differences among breeds regarding activities of enzymes. Batmaz H¹⁸ also reported non significant differences in serum ALT, AST and LDH activities in Holstein and Montofon cattle at 24-48 months of age. Bilal et al.¹⁹ reported that serum AST, ALT, GGT, LDH and ALP activities are 68.8 ± 4.3 , 27.9 ± 1.6 , 12.2 ± 0.7 , 1010 ± 60 and 96.2 ± 5.7 U/L in the Holstein cattle at 12-18 months of age, respectively. Cimtay and Sahin¹ reported that serum AST, ALT and ALP activities are 101.22 ± 3.36 , 42.44 ± 2.47 , and 92.96 ± 5.55 U/L in the Holstein cattle at 12-24 months of age, respectively. AL-

Shami²⁰ reported that serum AST, ALT, CK, LDH, GGT, and ALP 270 ± 20.1 , 15.1 ± 1.4 , 160 ± 10.07 , 250 ± 15.6 , 77.4 6.2 , and 253 ± 9 U/L in the Hassawi breed, respectively. There is no difference in each other. While these values were found same in enzyme activities, which were given different breed by researchers^{1,6,7,9,14,21-23}. It was found higher by researchers who showed normal enzyme activities in different breed. Some significant differences were also obtained in the blood activities of various enzymes in comparison to cattle in other breed cattle^{19,25-27}. The result could be attributed to different genetic, climatic, nutritional and environmental conditions. Otto et al.²⁸ reported that no significant differences were seen between the males and females in activities of serum enzyme of Angoni cattle. Srikanthakumar and Johnson²⁹ reported that no significant differences were seen in activities of serum enzyme of Holstein, Jersey and Australian Milking Zebu cows

Nutritional deficiencies, metabolic disorders and diseases, can be detected by analysis and monitoring of blood and other fluids¹⁴⁻¹⁷. This, however, requires the establishment of normal reference values. Evaluation and interpretation of the results obtained depend on the reference values for each animal species, in different regions and under existing environmental conditions. Since the animals used in this study showed no clinical signs or pathological symptoms, they were considered healthy and the data obtained can serve as reference values for future use of these animals in veterinary medicine and animal production^{14,15}.

Table 1. Enzyme activities in the serum of cattle (U/L)

Tablo 1. Sığırlarda serum enzim aktiviteleri (U/L)

	Holstein Cattle				Brown Swiss Cattle				P
	Male (n=10)		Female (n=10)		Male (n=10)		Female (n=10)		
	X	SEM	X	SEM	X	SEM	X	SEM	
AST	103	13	93	13	101	13	93	13	NS
ALT	37	6	37	6	35	6	37	6	NS
GGT	17	3	16	3	16	3	16	3	NS
LDH	997	86	1022	86	997	86	1022	86	NS
AMY	122	15	118	15	122	15	118	15	NS
ALP	176	27	163	27	176	27	163	27	NS
CK	180	15	188	15	180	15	188	15	NS

X: Arithmetic Mean; Mi: Minimal; Ma: Maximal;

SEM: Standard Error of Mean; NS: No Significant

AST: Aspartate aminotransferase

ALT: Alanine aminotransferase

ALP: Alkaline phosphatase

AMY: α -Amylase

CK: Creatine kinase

LDH: Lactate dehydrogenase

GGT: Gamma-glutamyl transpeptidase

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