

Blood serum biochemical factors of Baluchi sheep

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ABSTRACT

Baluchi sheep is one common and national livestock breed, which is associated with high resistant against disease, high growth rate and high twinning rate. Evaluation of serum biochemical parameters is an effective solution in the field of protection of animals against diseases, early detection and treatment of diseases and improvement in animal products. Gender and age are main effective factors in normal level of biochemical parameters. For this purpose, blood samples were taken from 60 Baluchi flock who were above one year old (15 male and 15 female) and below one year old (15 male and 15 female). Biochemical parameters were measured with an Auto Analyzer device and the collected data was analyzed using SPSS. The results not only determined normal level, mean and standard deviation of the biochemical parameters, but also showed the significant effect of age on serum levels of total protein, globulin and uric acid. Gender factor also caused significant changes in the level of blood urea nitrogen (BUN) and LDL.

KEYWORDS: biochemical parameters, serum, sheep, Baluchi breed

INTRODUCTION

Baluchi sheep is one of the most frequent breeds, which constitutes a large percent of total sheep population in Iran. This breed is raised in many parts of Iran, including Khorasan, Sistan and Baluchestan, Yazd and Kerman (Khanian *et al.*, 2007). This species has unique genetic characteristics such as high twinning rate, high growth rates, low rearing requirements, resistance to water shortage and high marching rate. This breed plays an important role in economy of ranchers and meets protein and dairy needs of society (Sheikhlou *et al.*, 2011). This is a meat-wool sheep breed (dual-purpose breeds) due to proper quality and quantity of wool (Motaghi Nia *et al.*, 2012). Investigation of serum biochemical parameters is an effective method to evaluate managerial, nutritional practices and diagnose and treat animal disease (Opara *et al.*, 2010). Various factors such as disease, nutrition, age, gender, rearing, height, season, temperature and physiological conditions can affect normal levels of serum biochemical parameters in animals (Mbassa and Poulsen, 2013). Serum biochemical parameters indicate pathophysiological status of the animals. Information on normal values of these parameters can improve diagnosis of diseases (Jenkins *et al.*, 1982). So far, normal biochemical parameters and effective factors in these parameters were studied in different breeds of cattle, goats and some sheep breeds such as Kurdish breed in Iran and Ghezelbreed in Iraq (Reza Khani *et al.*, 1991; Zende Del *et al.*, 2010; Mojabi *et al.*, 2000; Khan *et al.*, 2013). However, no laboratory studies were conducted on normal values of these factors in Baluchi sheep. Therefore, normal levels of serum biochemical parameters were measured and the impact of gender and age on these factors were studied in this study.

MATERIALS AND METHODS

Blood samples were taken from 60 apparently healthy Beluchiflock who were above one year old (15 male and 15 female) and below one year old (15 male and 15 female). The blood samples were taken using a 5-cc sterile syringe through the jugular vein. The samples were transferred to the tubes without anticoagulant and were transported to the laboratory of Biochemistry in School of Veterinary Medicine at University of Zabol. Blood samples were centrifuged at 3500 rpm for ten minutes in order to separate the serum components. Serum samples were transferred to microtubes and were kept at -20 ° C until measuring biochemical factors. Serum biochemical factors were measured by an Auto Analyzer (Selectra Prom Model made by Elitec Group in France). SPSS version 18 was used for data analysis. The effects of age and gender on biochemical factors were compared using two-way analysis of variance (ANOVA). Level of significance was considered less than 0.05.

RESULTS

The results of measurement of biochemical factors are presented in Table 1. The effects of age and gender on normal values of biochemical factors were presented in Tables 2 and 3. Total protein, uric acid and globulin levels were significantly affected by age. Serum concentration of these factors increased with age (P-value <0.005). BUN and LDL levels were also significantly influenced by gender (P-value <0.005).

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Table 1. Normal values of blood serum biochemical parameters of Baluchi sheep

Normal range	Mean ± SD	Biochemical factor
78.82±11.69	55.91-101.72	Glucose(mg /dl)
55.98±9.08	38.19-73.78	Cholesterol(mg /dl)
24.84±6.39	12.30-37.37	Triglycerides(mg /dl)
VLDL (mg/dl)	8.28±2.12	4.13-12.44
HDL(mg/dl)	39.90±6.10	27.94-51.86
2.66±0.29	2.08-3.23	Albumin(g /dl)
0.79±0.11	0.57-1.01	Creatinine(mg /dl)
AST (U/l)	134.49±24.02	87.41-181.57
ALT(U/l)	31.75±6.70	18.61-44.88
9.46-10.85	10.15±0.36	Calcium(mg /dl)
2-3.57	2.78±0.40	Magnesium(mg /dl)
3.69-5.55	4.62±0.47	Phosphorus(mg /dl)

Table 2. The effect of age on biochemical factors of Baluchi sheep

P-value	Above one year	Under one year	Biochemical factors
7.70±0.43	8.30±0.83	<0.05	Total protein(g /dl)
5.10±0.3	5.60±0.75	<0.05	Globulin(g /dl)
<0.05	0.70±0.22	1.16±0.42	Uric acid(mg /dl)

Table 3. The effect of gender on biochemical factors of Baluchi sheep

P-value	Female	Male	Biochemical factors
	BUN (mg/dl)	13.10±3.43	17.13±4.19 <0.05
	LDL(mg/dl)	29.10±6.07	33.20±6.38 <0.05

DISCUSSION

Blood glucose levels are higher in Baluchi sheep breed compared to Pakistani and Ghezel sheep breeds (Mojabi *et al.*, 2010; Kiran *et al.*, 2012) but these factors are within normal range for glucose as cited in literature (Kabir and Pazdezh, 2002). Various factors such as nutrition, endocrine system, breed, season and excitement can affect normal level of blood glucose (Samadieh and Ghodisian, 1979). Increased blood glucose levels can be due to breed characteristics, activities and diet. Lipids help with digestion, provide energy and constitute cell membranes. Therefore, any significant changes in lipid plasma levels can lead to a Clinical Disorder (Anonymous, 2006). Cholesterol levels in Baluchi breeds is lower than Libyan, Pakistani and Iraqi sheep breeds (Khan *et al.*, 2013; Stimo, 2014; Kiran *et al.*, 2012). Stress is one effective factor in blood cholesterol levels. Triglyceride levels in Baluchi sheep is higher than Iraqi breeds while lower than Libyan breeds (Khan *et al.*, 2013; Stimo, 2014). Calcium, magnesium and phosphorus levels in Baluchi sheep are consistent with those measured in Kurdish sheep in Iraq (Khan *et al.*, 2013). Studies on breeds of sheep, deer and cattle showed that age is one of the main effective factors in serum levels of total protein, albumin and globulin (Mojabi *et al.*, 2000; Reza Khan *et al.*, 1991; Baric Rafaj *et al.*, 2011). In other words, serum protein levels increased with age (Corenellius and Kaneko, 1971). In this study, the levels of total protein and globulin significantly increased with age. Such factors as hunger, liver disease, protein deficiency and improper nutritional conditions decreased serum albumin levels (Mojabi, 2000). Total albumin level may increase in case of dehydration (Samadieh and Ghodisian, 1979). In this study, albumin levels were compatible with other reports (Mojabi *et al.*, 2000; Stimo, 2014). Significant changes in serum albumin level were reported with increased age (Corenellius and Kaneko, 1971). However, age had no significant effect on albumin level in this study. It was also found out that age and gender had no significant effect on albumin level in Libyan sheep breeds (Stimo, 2014). Creatinine is derived from breakdown of muscular phosphocreatine. Therefore, creatinine level can be changed under the influence of muscular activity. Creatinine is one of the most important indicators in protein metabolism and renal health (Samadieh and Ghodisian, 1979). Creatinine levels in this study were consistent with those levels obtained in Libyan sheep breeds (Stimo, 2014). ALT is a specific liver enzyme, which is used as an indicator in diagnosis of hepatic abnormalities. AST is found in many tissues, which is measured to detect muscular and hepatic disorders (Mojabi, 2000). In this study, AST serum levels were higher than Iranian Ghezel sheep breeds, which were consistent with those levels measured in Libyan and Pakistani sheep breeds (Mojabi *et al.*, 2000; Stimo, 2014; Khan *et al.*, 2013). In this study, ALT serum levels were higher than Iranian Ghezel and Libyan and sheep breeds. ALT serum levels measured in Baluchi sheep were consistent with those levels measured in Pakistani sheep breeds. In these studies, gender and age had no significant effect on enzymatic levels (Mojabi *et al.*, 2000; Stimo, 2014; Khan *et al.*, 2013). BUN is final product of protein metabolism, which is produced by the liver. Increased protein catabolism and decreased renal blood flow increased blood urea nitrogen (BUN). Serial BUN measurement may be useful in diagnosis of renal disease (Samadieh and Ghodisian, 1979). In this study, serum BUN levels were significantly higher in females than males. Uric acid is the major product of nitrogen metabolism. Age is one effective factor in serum level of uric acid (Mojabi, 2000). In this study, serum uric acid level significantly increased with age. LDL serum levels were also affected by gender and were higher in females than males. In Libyan sheep, LDL serum levels were significantly higher in females than males (Stimo, 2014), which confirmed results of the study.

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