

BLOOD SERUM BIOCHEMICAL PARAMETERS OF SISTAN NATIVE CHICKEN (KHAZAK CHICKEN)

Mehdi Jahantigh

1. Department of Clinical Sciences, Faculty of Veterinary Medicine and Special animal research institute, University of Zabol, Zabol, Iran, Email: jahantighm@gmail.com

ABSTRACT

Khazak chicken is a native laying hen often bred in Sistan region, Iran. Successive droughts, disease, and lack of attention to this valuable species have resulted in its significant reduction. Biochemical parameters play an important role in the diagnosis, treatment, and control of diseases in birds. In this study, blood samples were collected from 32 adult birds (15 cocks and 17 hens) and their serum biochemical parameters were measured. The data were analyzed using SigmaStat-3.5. The calculated parameters included glucose (cock: 238.78 ± 13.7 mg/dL, hen: 246.64 ± 9.48 mg/dL), cholesterol (cock: 143.81 ± 11.9 mg/dL, hen: 210.26 ± 31.77 mg/dL), triglycerides (cock: 197.35 ± 45.36 mg/dL, hen: 352.12 ± 78.81 mg/dL), magnesium (cock: 2.10 ± 0.15 mg/dL, hen: 2.14 ± 0.18 mg/dL), phosphorous (cock: 6.38 ± 0.95 mg/dL, hen: 6.14 ± 0.79 mg/dL), calcium (cock: 5.28 ± 0.54 mg/dL, hen: 5.71 ± 0.73 mg/dL), albumin (cock: 2.07 ± 0.21 g/dL, hen: 2.76 ± 0.28 g/dL), total protein (cock: 4.12 ± 0.41 g/dL, hen: 4.81 ± 0.39 g/dL), and uric acid (cock: 5.48 ± 0.83 mg/dL, hen: 4.83 ± 0.66 mg/dL). No significant difference was observed between the genders.

KEYWORDS: biochemical parameters, blood serum, Khazak chicken

INTRODUCTION

Khazak chicken is an indigenous hen of Iran which lives in Sistan region, southeastern Iran. It is bred as a valuable native laying species in the Institute of Specific Animals of the University of Zabol (Alipanah *et al.*, 2013). The bird has short legs and lightweight. It produces 130 eggs per year and its hatchability is between 70-80% (Zaboli *et al.*, 2013). Biochemical parameters provide valuable information about the physiological and habitat conditions of animals for disease assessments (Hernandez *et al.*, 1990). Age, gender, diet, bondage, physical condition, and environmental changes are factors which affect the normal values of these parameters (Villegas *et al.*, 2002). The application of this technique for diagnosis and treatment of poultry diseases is limited because of the lack of appropriate references for these parameters. Therefore, it is better to determine normal values of these parameters for each region's native species. Biochemical parameters have been studied in limited species of native birds in Nigeria, Thailand, and Kashmir (Simaraks *et al.*, 2004; Pampori and Iqbal, 2007; Isidahomen *et al.*, 2011). But there is no valid reference about biochemical parameters in Khazak chicken, thus it was tried in this study to determine the normal values of biochemical parameters in Khazak chicken.

MATERIALS AND METHODS

In this study, 32 healthy adult birds (15 cocks and 17 hens) were selected. Five milliliters blood was collected from the wing vein, and transferred into anticoagulant-free tubes which were then centrifuged at 3500 rpm for ten minutes to separate the serum. Serum samples were transferred into microtubes using micropipette (Owen, 2001). The biochemical parameters of glucose, cholesterol, triglycerides, total protein, albumin, calcium, magnesium, phosphorus, and uric acid were measured with the kits of Pars Azmoon Company using Selectra proM autoanalyzer. The obtained data were analyzed with SigmaStat-3.5 statistical software through calculating the mean \pm SEM.

RESULTS AND DISCUSSION

The results of biochemical parameters in Khazak chicken are presented in Table 1. No statistically significant difference was observed in blood biochemical parameters between the two genders.

Normal blood glucose levels in most birds range from 200 to 450 mg/dL of blood serum. In birds, the a serum level of less than 80 mg/dL is considered hypoglycemia which occurs in severe starvation or malnutrition, protein-rich diet, chronic liver disease, and septicemia. Hyperglycemia is caused by stress, drug therapy with glucocorticoids, and hyperthermia (Mojabi, 2000). Serum glucose levels of Khazak chicken was close to those of Kashmir native chicken (cock: 227.83 ± 6.07 mg/dL, hen: 227.43 ± 4.93 mg/dL) (Pampori and Iqbal, 2007). The level of cholesterol was higher in hens than cocks, similar to Kashmir native chicken (cock: 116.33 ± 4.90 mg/dL, hen: 141.02 ± 5.36 mg/dL), because

cholesterol can increase in female birds during construction and formation of egg yolk (Pampori and Iqbal, 2007; Ritchie *et al.*, 1994). The level of calcium in Khazak chicken was lower than the native chickens of Kashmir (cock: 10.79±0.50 mg/dL, hen: 12.01±0.47 mg/dL) and Thailand (cock: 10.3±0.8 mg/dL, hen: 10.1±1.5 mg/dL), and similar to these species, there was no significant difference between the genders (Pampori and Iqbal, 2007; Simaraks *et al.*, 2004).

Table 1: Mean ± SEM of serum biochemical parameters in Khazak chicken

| Parameter | Cock | Hen | Total | P-value |
|----------------------|--------------|--------------|--------------|---------|
| Glucose(mg/dL) | 238.78±13.70 | 246.64±9.48 | 242.95±8.06 | 0.634 |
| Cholesterol(mg/dL) | 143.81±11.93 | 210.26±31.77 | 179.11±18.50 | 0.174 |
| Triglyceride(mg/dL) | 197.35±45.36 | 352.12±78.81 | 279.57±48.28 | 0.623 |
| Total protein(mg/dL) | 4.12±0.41 | 4.81±0.39 | 4.49±0.28 | 0.232 |
| Albumin(mg/dL) | 2.07±0.21 | 2.76±0.28 | 2.44±0.19 | 0.065 |
| Calcium(mg/dL) | 5.28±0.54 | 5.71±0.73 | 5.50±0.46 | 0.645 |
| Magnesium(mg/dL) | 2.10±0.15 | 2.14±0.18 | 2.12±0.12 | 0.777 |
| Phosphorus(mg/dL) | 6.38±0.95 | 6.14±0.79 | 6.24±0.60 | 0.940 |
| Uric acid(mg/dL) | 5.48±0.83 | 4.83±0.66 | 5.14±0.52 | 0.534 |

In most birds, phosphorus is 2-6 mg/dL of blood, and it is increased in renal disease in birds. Gastrointestinal diseases that are associated with phosphorus deficiency result in reduced serum phosphorus in birds (Mojabi, 2000). Total protein in Khazak chicken is same as pheasant (4.19±0.75 g/dL), but less than Kashmir native chicken (cock: 3.99±0.18 g/dL, hen: 4.97±0.16 g/dL) (Kececi and Col, 2001; Pampori and Iqbal, 2007). Albumin levels were higher than bustard (1.92±0.25 g/dL) and close to pheasant (2.55±0.50 g/dL) (Mostaghni, 2004; Kececi and Col, 2001). Uric acid is the main product of nitrogen catabolism in birds (Simaraks *et al.*, 2004). Normal levels of uric acid for most birds range from 2 to 15 mg/dL of blood serum. Hyperuricemia occurs in prolonged starvation, gout, and renal disease (Mojabi, 2000). Uric acid was higher in Khazak chicken than pheasant (3.77±1.40 mg/dL) and lower than Kashmir native chicken (cock: 6.31±0.33 mg/dL, hen: 6.21±0.40 mg/dL) (Pampori and Iqbal, 2007; Kececi and Col, 2001). Age, diet, and laying period can affect the concentration of uric acid in birds (Simaraks *et al.*, 2004; Ritchie *et al.*, 1994).

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