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Studies on Normal Haematological and Biochemical Parameters of Hassawi Cattle Breed in Saudi Arabia

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Abstract: This study includes the normal values of haematological and biochemical parameters in 21 apparently healthy Hassawi cattle. The mean haematological values were as follow, the PCV was $35.1 \pm 1.1\%$, RBC was 7.2 ± 1.1 ($\times 10^{12} l^{-1}$), Hb was 12.0 ± 1.4 ($g dl^{-1}$) and WBC was 14.6 ± 2.3 ($\times 10^9 l^{-1}$), Neutrophiles were $58 \pm 2.0\%$ and Lymphocytes were $30 \pm 1.2\%$. Few monocytes, eosinophiles and basophiles were observed. The serum levels of total protein, albumin, glucose, cholesterol, triglyceride, urea, creatinine, sodium (Na), potassium (K), chloride (CL), calcium (Ca), phosphorus (P), Iron (Fe), Creatinine Kinase, Lactic dehydrogenase, Aspartate transaminase, Alanine transaminase, Alkaline phosphatase, γ - Glutamic transaminase were also investigated. The haematological and biochemical values obtained were found within the normal ranges reported by other workers in other breed of cattle.

Key words: Hassawi cattle, haematological, biochemistry, Saudi Arabia

Introduction

Hassawi cattle are a local breed which exists in eastern region of Saudi Arabia. It is a mix of *Bos indicus* and *Bos taurus*. A phenotypic characterization of this breed has comprehensively being studied by Mohammed (1997). The breed is known of being heat tolerant with good appetite even during hours of high temperature, resistant to the diseases in the region and with good mothering ability. Moreover the breed is characterized with high reproductive performance (Mohammed, 1997). The breed is reared in small number in mixed farm, mainly for milk and meat production. The complete dependence on the exotic breeds for milk and meat production endangers the existing of this breed. This could be observed in the considerable decline in the number of breed recorded in the Annual Report of the Ministry of Agriculture (Year Book, 1990). information on the normal haematological and biochemical values are lacking, such profiles are useful for assessment of health, nutritional status and diagnosis of diseases. This study was undertaken as a part of a series of investigations on Hassawi breed, to make available basic informations on the haematology, some serum biochemical values of apparently healthy Hassawi cattle breed.

Materials and Methods

Hassawi cattle were used in this study. This constituted 12 adult females and 9 males. Clinical examination revealed the good health status of these animals. The animals were

kept in clean and hygienic environment in a private farm. Feed available for these animals consisted of different types of grasses and shrubs such as alfa-alfa hay, Rhodes, *Spartaria verticillata*, *Convolvulus arvensis* and *Phragmites australis* and supplemented with dates. Blood samples were collected from jugular vein, by vacutainer apparatus in two test tubes, one containing EDTA and the other for serum preparation. Blood in EDTA was used for determination of packed cell volume (PCV) by Hawksley micro haematocrit centrifuge; hemoglobin (Hb) concentration by Cyanmethaemoglobin method; red (RBC) and white (WBC) by Coulter counter (model Fri, USA) and differential WBC count by Haemo-Scan differential cell counter. Mean cell volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) were obtained by calculation. Glucose was determined by the use of Boehringer kit by GOD perid method. Metabolites and enzyme activities were estimated spectrophotometric ally (RA50 chemistry analyzer, Ames, Bayer Diagnostics) using commercial kits. Minerals were determined by atomic absorption spectrophotometry (Shemaduz, Japan).

Results and Discussion

The haematological results obtained are shown in Table 1. The PCV was $35.1 \pm 1.1\%$, RBC was 7.2 ± 1.1 ($\times 10^{12} l^{-1}$), Hb was 12.0 ± 1.4 ($g dl^{-1}$) and WBC was 14.6 ± 2.3 ($\times 10^9 l^{-1}$), Neutrophiles were $58 \pm 2.0\%$ and Lymphocytes were $30 \pm 1.2\%$. Few monocytes, eosinophiles and

Table 1: Mean and standard deviations (SD±) of haematological values for Hassawi cattle

| Parameter | Means | Standard deviations |
|---|-------|---------------------|
| PCV % | 35.1 | ±1.1 |
| Hb (g dl ⁻¹) | 12.0 | ±1.4 |
| RBC (X 10 ¹² l ⁻¹) | 7.2 | ±1.1 |
| MCV (-L) | 46.2 | ±1.2 |
| MCH (Pg) | 14.9 | ±1.3 |
| MCHC (g dl ⁻¹) | 32.2 | ±1.1 |
| WBC (X10 ⁹ l ⁻¹) | 14.6 | ±2.3 |
| Neutrophiles % | 58 | ±2.0 |
| Lymphocytes | 30 | ±1.2 |
| Eosinophiles | 8.3 | ±1.1 |
| Monocytes | 3.1 | ±0.3 |
| Basophiles | 0.7 | ±0.03 |

Table 2: Mean (±SD) serum biochemical values of Hassawi cattle

| Serum metabolites | | Serum minerals | |
|--|----------------|---------------------------|----------------|
| Parameter | Concentrations | Parameter | Concentrations |
| Total protein (g dl ⁻¹) | 7.4±0.62 | Na (meg l ⁻¹) | 135.0±18 |
| Albumin (g dl ⁻¹) | 3.4±0.08 | K (meg l ⁻¹) | 4.2±0.1 |
| Glucose (mg dl ⁻¹) | 82.1±2.1 | CL (meg l ⁻¹) | 116.0± 8 |
| Cholesterol (mg dl ⁻¹) | 78.0± 3 | Mg (meg l ⁻¹) | 2.3±0.2 |
| Triglyceride (mg dl ⁻¹) | 80.1±11 | Ca (meg l ⁻¹) | 10.2±0.6 |
| Urea (mg dl ⁻¹) | 24.1±2.1 | P (mg dl ⁻¹) | 4.7±0.2 |
| Creatinine (mg dl ⁻¹) | 1.3±0.01 | Fe (mg dl ⁻¹) | 82.0±7.1 |
| Serum enzyme activities µt l ⁻¹ | | Concentrations | |
| Creatinine kinase | | | 160±10.07 |
| Lactic dehydrogenase | | | 250±15.6 |
| Aspartate transaminase | | | 270±20.1 |
| Alanine transaminase | | | 15.1± 1.4 |
| Alkaline phosphatase | | | 253± 9.1 |
| γ- Glutamic transaminase | | | 77.4 6.2 |

basophiles were observed. Comparing the present haematological results with studies in other breeds of cattle (Radostitis *et al.*, 2000; Welchman *et al.*, 1988 and Earley and Fallon, 1998, 1999a and b) it could be concluded that Hassawi breed showed similar picture of blood values. As to the minor deviations in WBC observed in this study, variations in climatic conditions, nutrition and health status should be considered.

The serum biochemical values of Hassawi breed obtained in this study are presented in Table 2. These includes, serum metabolites, serum minerals and serum enzymes. The means of biochemical values obtained were within the normal range recorded for other breeds of cattle (Radostitis *et al.*, 2000; Earley and Fallon, 1999a; Dubreuil and Lapierre, 1997 and Stary, 1980). The increase in glucose concentration could be attributed to the nutritional status of the animals and the time of sampling as these animals were fed green fodder and hay

supplemented with dates. Generally most of serum values obtained were within the maximums limits of the range of biochemical values of cattle quoted by Radostitis *et al.* (2000).

This may indicate the good health and nutritional status of this breed. In addition, the breed is heat tolerant, resistant to many diseases in the area and has a good reproductive performance (Mohammed, 1997). In the absence of a systemic institutional policy to improve and conserve them, the Hassawi cattle will become extinct and a potentially valuable genetic material will be lost for ever unless further studies are performed to indicate these reproductive and productive merits.

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