

Establishment of physio-biochemical profile in Burgur cattle

P. SUMITHA¹, K.LOGANATHASAMY, MANJU G. PREEDAA¹ AND V. PANDIYAN¹

Members of the Research Forum

Associate Author :

¹Department of Veterinary
Biochemistry, Madras Veterinary
College, CHENNAI (T.N.) INDIA

Abstract : The present study was carried out to establish normal physio-biochemical profiles in hilly breed of BURGUR cattle. Blood samples were collected from 3-4 years old, 10 lactating cows in and around the regions of BURGUR hills. Haematological parameters such as red blood cells (RBCs), white blood cells (WBCs), hemoglobin concentration (Hb), packed cell volume (PCV), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC), and differential leukocyte count were assessed from whole blood collected with anticoagulant. Blood samples were collected without anticoagulant and serum was separated and used for biochemical profile analysis such as glucose, total protein, albumin, uric acid, blood urea nitrogen (BUN), creatinine, cholesterol, triglyceride, calcium, inorganic phosphorus, magnesium, sodium, potassium, chloride, alanine transaminase (ALT), Aspartate transaminase (AST), alkaline phosphatase (ALP). Physio-biochemical parameters in BURGUR cattle were in normal range except calcium ion concentration which was lower in comparison with other cattle breeds. This study documents the physio-biochemical profile of BURGUR cattle.

Key words : BURGUR cattle, Hilly breed, Physiological, Biochemical parameters

How to cite this paper : Sumitha, P., Loganathasamy, K., Preedaa, Manju G. and Pandiyan, V. (2015). Establishment of physio-biochemical profile in burgur cattle. *Vet. Sci. Res. J.*, 6(1) : 42-45.

Paper History : Received : 23.01.2015; Revised : 06.03.2015; Accepted : 15.03.2015

AUTHOR FOR CORRESPONDENCE :

K. LOGANATHASAMY

Department of Veterinary
Biochemistry, Madras Veterinary
College, CHENNAI (T.N.) INDIA
Email: loganathasamy@tanuvas.org.in

INTRODUCTION

Burgur, cattle breed reared extensively in and around Burgur hills, Bhavani Taluk Erode District of Tamil Nadu. Burgur cattle is known for its power of endurance and speed in trotting, better adaptability to environment, poor nutrition and longevity (Ganapathi *et al.*, 2013). The dependence on the exotic breeds for milk and meat production endangers the existing of this breed (Ganapathi *et al.*, 2009). Information on normal haematological and biochemical values are lacking such profiles are useful for evaluation of managemental practice, nutritional and physiological status of animal and diagnosis of health condition (Osman and AL-Busadah, 2003; Radostitis *et al.*, 2006; Jezek *et al.*, 2006; Mir *et al.*, 2008). To the best of our knowledge, this seems to be the first report of normal haematological and biochemical indices of Burgur cattle breed. So, this study will document the haematological and biochemical comprehensive reference values of Burgur cattle breed.

RESEARCH METHODOLOGY

Animals :

Blood samples were collected from 3-4 years old, 10 lactating cows in and around the regions of Bargur hills, which were at rest, undisturbed or under least excitement. On clinical examination all animals were healthy and not suffering from any disease or malnutrition.

Haematological analysis :

Whole blood samples were collected from jugular vein puncture in a dry, clean vacutainer containing disodium salt of EDTA as anticoagulant. Immediately after blood collection, the capped tubes containing the anticoagulant and the blood samples were inverted gently to mix.

Haematological parameters such as red blood cells (RBCs), white blood cells (WBCs) were counted by using haemocytometer (Coles, 1986). Hemoglobin concentration (Hb) was manually estimated (Campbell, 1995). Packed cell volume (PCV %) was determined according to Howlett *et al.* (2002). Mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) were calculated as described by Campbell (1995). Blood smear were immediately prepared from EDTA blood samples and stained with Leishmann stain and 200 leukocytes were differentiated microscopically in smear prepared from each animal.

Biochemical analysis :

Blood samples were collected without anticoagulant from jugular vein in a clean, dry tubes. Serum was separated by centrifugation (2500 rpm, for 15 mins) and stored at -20° C until analysis.

Serum biochemical parameters included glucose, total protein, albumin, uric acid, blood urea nitrogen (BUN), creatinine, cholesterol, triglyceride, calcium, inorganic phosphorus, magnesium, sodium, potassium, chloride, alanine transaminase (ALT), Aspartate transaminase (AST), alkaline phosphatase (ALP) were estimated as per the protocol described in the standard diagnostic kits (Agappe diagnostics) using CECIL CE 2021 UV spectrophotometer. Globulin concentration was determined by difference between total protein and albumin.

RESULTS AND DISCUSSION

The Mean±SE, ranges of haematological (Hb, PCV, MCH, MCV, MCHC, TEC, TLC, DLC) and biochemical (ALT, AST, ALP, total protein, Albumin, Globulin, Glucose, Cholesterol, Triglyceride, creatinine, BUN, uric acid, sodium, potassium, chloride, calcium, inorganic phosphorus, magnesium) parameters in blood of Bargur cattle are given in Table 1 and 2, respectively.

The haematological parameters in Bargur cattle showed similarities with other cattle breeds (Reece, 2004) and same trend was observed for biochemical profiles in Bargur cattle (Kaneko *et al.*, 2008) except for calcium ion

Table 1 : Results of haematological parameters

Haematological parameters	Unit	Range	Mean±se
Haemoglobin	g/dl	8.00 -18.00	13.40 ± 1.12
Packed Cell Volume	%	28.49 -57.00	41.93 ± 3.10
MCH	pg	13.23 -20.54	18.18 ± 0.97
MCV	fL	41.89 -63.33	57.20 ± 2.56
MCHC	g/dl	23.39 -33.79	31.80 ± 0.97
Total erythrocytic count	×10 ⁶ /mm ³	5.50 -9.00	7.29 ± 0.34
Total leukocytic count	×10 ³ /mm ³	13.80 -17.88	15.76 ± 0.44
Neutrophils	%	29-48	40.30 ± 1.68
Lymphocytes	%	49-64	56.00 ± 1.29
Monocytes	%	1-4	2.20 ± 0.39
Eosinophils	%	1-2	1.00 ± 0.30

Table 2 : Results of serum biochemical profiles

Biochemical parameters	Unit	Range	Mean \pm SE
Enzymes			
Alanine transaminase (ALT)	U/L	20.94 - 31.41	26.17 \pm 1.56
Aspartate transaminase (AST)	U/L	52.35 - 162.28	99.99 \pm 10.94
Alkaline phosphatase (ALP)	U/L	99.00 - 247.50	188.93 \pm 19.03
Protein			
Total protein	mg/dl	6.26 - 8.54	6.82 \pm 0.23
Albumin	mg/dl	2.52 - 3.03	2.77 \pm 0.05
Globulin	mg/dl	3.45 - 5.94	4.05 \pm 0.24
Metabolites			
Glucose	mg/dl	37.68 - 57.60	49.34 \pm 1.86
Cholesterol	mg/dl	106.38 - 231.91	155.53 \pm 11.84
Triglyceride	mg/dl	20.08 - 53.27	35.89 \pm 3.05
Creatinine	mg/dl	1.00 - 1.73	1.35 \pm 0.08
Blood urea nitrogen	mg/dl	26.44 - 46.80	34.10 \pm 1.86
Uric acid	mg/dl	1.69 - 3.32	2.28 \pm 0.15
Electrolytes			
sodium	mmol/l	65.45 - 152.11	111.71 \pm 9.96
Potassium	mmol/L	3.44 - 5.01	4.29 \pm 0.15
Chloride	mmol/L	85.01 - 95.37	89.36 \pm 1.15
Minerals			
Calcium	mg/dl	4.63 - 5.68	4.97 \pm 0.11
Inorganic phosphorus	mg/dl	3.93 - 7.14	5.17 \pm 0.35
Magnesium	mg/dl	3.53 - 4.50	3.92 \pm 0.12

concentration (4.63 - 5.68 mg/dl) which is lower than normal calcium ion concentration (8.0-12.0 mg/dl) which might be due to low dependence of this breed for milk and meat and other productive performances.

LITERATURE CITED

- Campbell, T.W. (1995).** *Avian haematology and cytology*, 2nd Ed. Iowa state University Press, Ames.
- Coles, E.H. (1986).** *Veterinary Clinical Pathology*. 4th Ed. Saunders Comp. Philadelphia.
- Ganapathi, P., Rajendran, R. and Subramanian, A. (2009).** Distribution and population status of Bargur Cattle. *The Indian Veteri. J.*, **86** (9) : 971-972.
- Ganapathi, P., Kumar, V. and Rajesh, N.V. (2013).** Production and reproduction performance of endangered Bargur cattle under the field condition in Tamil Nadu. *Internat. J. Food, Agric. & Veteri. Sci.*, **3**: 207-209.
- Howlett, J.C., Bailey, T.A., Samour, J.H., Naldo, J.L. and D'aloia, M. (2002).** Age-related hematologic changes in captive-reared houbara, white-bellied and rufouscrested bustards. *J. Wildlife Dis.*, **38** (4) : 804-816.
- Jezeq, J., Klopccic, M. and Klinkon, M. (2006).** Influences of age on biochemical parameters in calves. *Bulletin Veterinary Institute, Pulawy*, **50**: 211-214.
- Kaneko, J.J., Harvey, J.W. and Bruss, M.L. (2008).** *Clinical biochemistry of domestic animals*. 6th Ed. Academic Press, Elsevier, Burlington, USA.
- Littlewood, R.W. (1936).** *Livestock of Southern India*. Government of Madras, Madras.
- Mir, M.R., Pampori, Z.A., Iqbal, S., Bhat, J.I.A., Pal, M.A. and Kirmani, M.A. (2008).** Haemato-biochemical indices of cross bred cows during different stages of pregnancy. *Internat. J. Dairy Sci.*, **3** (3) : 154-159.

Osman, T.E.A. and Al-Busadah, K.A. (2003). Normal concentrations of twenty serum biochemical parameters of she camels, cows and ewes in Saudi Arabia. *Pak. J. Biological Sci.*, **6** (14) : 1253-1256.

Radostitis, O.M., Gray, C.C., Hinchcliff, K.W. and Constable, P.D. (2006). *Veterinary medicine*. 10th Ed. Elsevier Sciences Ltd., USA.

Reece, W.O. (2004). *Duke's physiology of domestic animals*. 12th Ed. Comstock Publishing Associates, USA.

★ ★ ★ ★ ★ ⁶th Year of Excellence ★ ★ ★ ★ ★