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## Research Article

# COMPARATIVE STUDY OF CERTAIN HAEMATOLOGICAL AND BIOCHEMICAL PARAMETERS IN COMMERCIAL POULTRY AND INDIGENOUS CHICKEN FOUND IN DARJEELING HILLS, WEST BENGAL

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### ABSTRACT

In the present study comparative analysis between commercial poultry and Indigenous chicken variety has been made with respect to physico-chemical status, haematological and biochemical parameters. The blood profile is considered to be a reliable indicator of health. *The aim of the study* is to compare the haematological and biochemical profile of commercial poultry and Indigenous chicken variety found in Darjeeling Hills and to assess the impact of environmental, genetic and physiological parameters. *Material and methods:* Five healthy poultry chicken (cock, average age of 18 weeks) and five healthy indigenous chickens (cock, average age of 18 weeks) were selected for the experiment. Before the commencement of the experiment these chickens were housed in separate group with same type and quantity of food and water for three weeks. First birds were weighed, after which blood samples were collected from the wing (brachial) vein. *Results:* The Bleeding Time (BT) of Poultry and Indigenous variety of *Gallus sp.* is  $59.6 \pm 2.3$  and  $70.4 \pm 2.7$  respectively (Table 1), which is significantly different ( $t=6.089$ ,  $df=8$ , L.S 0.05,  $p=2.306$ ). The difference in Clotting Time (CT) of Poultry is  $31.2 \pm 2.58$  and of Indigenous variety is  $36.8 \pm 1.48$  and was also found to be significantly different ( $t=3.765$ ,  $df=8$ , L.S 0.05,  $p=2.306$ ). There is no significant difference in the haemoglobin content of the poultry and indigenous variety (Table 1). The total count (TC) of RBC of indigenous ( $3210 \times 10^3$ )  $\pm 169.0$  have found to be greater than the Poultry variety ( $2098 \times 10^3$ )  $\pm 97.76$ . The comparison of the Differential Count (DC) of WBC did not show significant differences other than monocytes where the difference is significant. The higher levels of RBC count in indigenous variety may be an adaptation to survive well in high altitude region (1000 to 3500m). There is varied difference between broiler and indigenous chickens in glucose levels in indigenous breed  $139.99 \pm 9.90$  mg/dl and in Poultry was found to be  $259.98 \pm 15.44$  mg/dl (Table 2) and Cholesterol levels poultry birds ( $468 \pm 7.582$ ) have significantly ( $P < 0.05$ ) much higher plasma cholesterol than the indigenous breed ( $208 \pm 5.708$ ). The effect of the environment and climatic condition is reflected in physiological state of the organism. With regards to the biochemical parameters, differences among values of some serum parameters have been registered.

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## INTRODUCTION

The comparative study of haematological and biochemical profile is important with respect to health status, diagnostic, management and economical concerns. In the present study comparative analysis between commercial poultry and Indigenous chicken variety has been made with respect to physico-chemical status, haematological and biochemical parameters. Poultry birds are of immense importance to the food industry for its meat and egg products, it efficiently addresses the food security and nutrition problem of the world. Due to the ever increasing food demand, the poultry industry is under stress to meet the food security in recent times. The

demand for genetically improved and commercially viable poultry birds has been more popular in current poultry business. In all this, the importance of commercially less profitable indigenous chicken is losing its ground, as farmers prefer the commercially superior poultry variety. The comparative study of haematological and biochemical profile of poultry and indigenous chicken gives us an insight into the impact of environmental, physiological parameter. The differences and similarities in the comparative study results may pertain to rearing, feeding and management techniques.

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## MATERIALS AND METHODS

**Selection of Chicken:** Five healthy poultry chicken (cock, average age of 18 weeks) and five healthy indigenous chickens (cock, average age of 18 weeks) were selected for the experiment. Before the commencement of the experiment these chickens were housed in separate group with same type and quantity of food and water for three weeks. First birds were weighed, after which blood samples were collected from the wing (brachial) vein, 2ml of blood for serum biochemical tests and 1 ml of blood was collected separately in vials along with 2mg of EDTA (ethylene-diamine tetra acetic acid) for haematology. (Bermudez, A.J. and B. Stewart-Brown, 2008) Serum was separated from rest of the clotted blood for estimation of different biochemical parameters namely glucose, protein, cholesterol, using standard protocol.

**Haematology:** The estimation of Haemoglobin content in blood was done using Sahli's Haemoglobinometer following standard protocol. Differential count (DC) of white blood cell count were done by making a thin monolayer blood film, air dried and stained with Giemsa-Wright's stain for leucocyte differential count (Tavres-Dias & de Moraes, 2007) The Bleeding Time (BT) was measured by determining the time required (in seconds) for bleeding to stop from subcutaneous vessels by standard incision. The clotting Time was measured by the time (in seconds) to measure coagulation of blood. Total (RBC) count was determined by a manual method using Neubauer's hemocytometer.

**Biochemical Test:** Estimation of glucose from the plasma of poultry and indigenous fowl was done by following Enzopack Kit and the estimation of serum protein was performed following Folin-Lowry method (1953). The absorbance (O.D. value) measured using digital colorimeter (Model- AE – 11m, Erma Inc, Tokyo, Japan) The serum cholesterol were determined following standard protocol.

### Statistical Analysis

The haematological and biochemical values were collected, analyzed and the data were expressed as mean  $\pm$  standard deviation. For statistical analysis of the results two-tailed student test were used. The level of significance was taken at less than  $P < 0.05$  (SAS Institute, 1985).

## RESULT

The Bleeding Time (BT) of Poultry and Indigenous variety of *Gallus sp.* is  $59.6 \pm 2.3$  and  $70.4 \pm 2.7$  respectively (Table 1), which is significantly different ( $t=6.089$ ,  $df=8$ ,  $L.S$  0.05,  $p=2.306$ ). The difference in Clotting Time (CT) of both the variety is  $31.2 \pm 2.58$  and  $36.8 \pm 1.48$  (Table 1) and was also found to be significant ( $t=3.765$ ,  $df=8$ ,  $L.S$  0.05,  $p=2.306$ ). There is no significant difference in the haemoglobin content of the poultry and indigenous variety (Table 1). The total count (TC) of RBC of indigenous ( $3210 \times 10^3$ )  $\pm 169.0$  have found to be greater than the Poultry variety ( $2098 \times 10^3$ )  $\pm 97.76$ . The comparison of the Differential Count (DC) of WBC did not show significant differences other than monocytes where the difference is significant. The Comparative account of the biochemical study showed a significant difference ( $P < 0.05$ ) in the Cholesterol and glucose level in serum of poultry and indigenous variety (Table 2). The result of protein content in

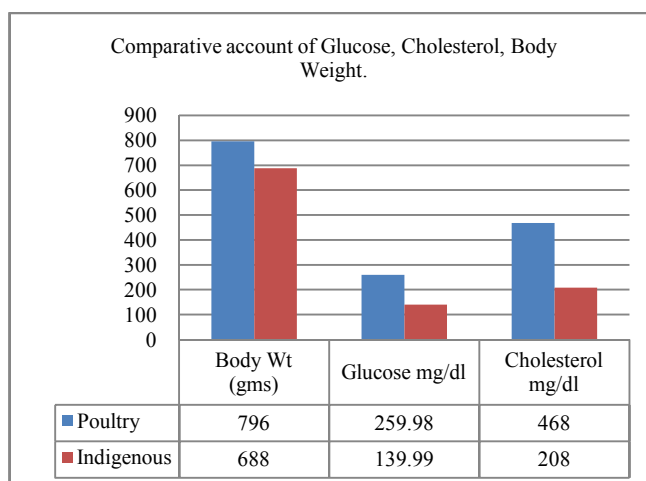
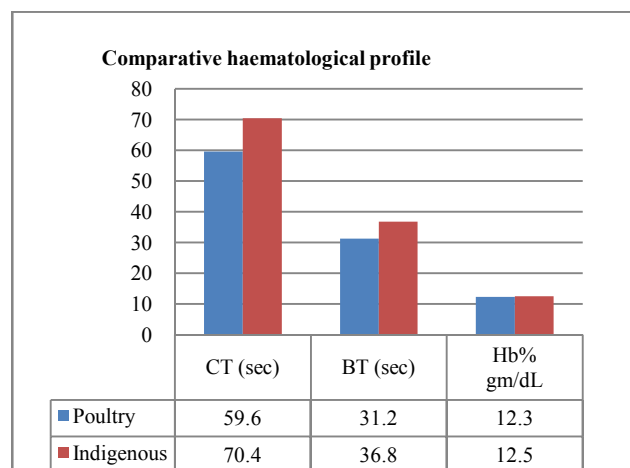
poultry chicken  $1.88 \pm 0.13$  and indigenous chicken  $1.66 \pm 0.06$  showed considerable difference (Table 2)

**Table 1** Comparative study on Haematological profile of Poultry and Indigenous adult-chickens in Darjeeling

Parameters	Poultry	Indigenous
Body weight (gm)	$796 \pm 70.21$	$688 \pm 54.03$
Bleeding Time (seconds)	$59.6 \pm 2.3$	$70.4 \pm 2.7$
Clotting Time (seconds)	$31.2 \pm 2.58$	$36.8 \pm 1.48$
Haemoglobin (Hb% gm/dL)	$12.3 \pm 1.14$	$12.5 \pm 0.58$
Neutrophil (%)	$17.8 \pm 2.58$	$11.4 \pm 2.3$
Eosinophil (%)	$4.6 \pm 1.14$	$2.0 \pm 0.44$
Basophil (%)	$0.8 \pm 0.44$	$0.2 \pm 0.44$
Lymphocytes (%)	$30.8 \pm 1.92$	$29.8 \pm 2.28$
Monocytes (%)	$16.2 \pm 1.92$	$40.8 \pm 1.92$
Total Count (TC) RBC	$(2098 \times 10^3) \pm 97.76$	$(3210 \times 10^3) \pm 169.0$

**Table 2** Comparative study on certain Biochemical profile of Poultry and Indigenous adult-chickens in Darjeeling

Parameters	Poultry	Indigenous
Plasma Glucose (mg/dl)	$259.98 \pm 15.44$	$139.99 \pm 9.90$
Plasma Cholesterol (mg/dl)	$468 \pm 7.582$	$208 \pm 5.708$
Protein (g/dl)	$1.88 \pm 0.13$	$1.66 \pm 0.06$



## DISCUSSION

The blood profile is considered to be a reliable indicator of health. Haematological and biochemical parameters in indigenous chickens in various regions of the world differ from each other (Simaraks, S *et al.*, 2004; Pampori, Z.A. and S.Igbal, 2007; Ladokum, A.O., *et al.* 2008; Islam, M.S., *et al.* 2004;

Aengwanich, W. and A. Tanomtong, 2007.). The comparative study of haematological and biochemical profile is important with respect to health status, diagnostic, management and economical concerns. Therefore, it is important to investigate blood profile of indigenous birds in order accurately interpret health status (Aengwanich, W. and A. Tanomtong, 2007; Kral, P. and P. Suchy, 2000) The information can be useful in understanding and developing new genetically improved variety. The leucocytes (WBC) differential count was almost similar in indigenous and Poultry varieties except for monocytes. There is a significant difference in total count (TC RBC) of Poultry ( $2098 \times 10^3$ )  $\pm 97.76$  and indigenous ( $3210 \times 10^3$ )  $\pm 169.0$ . The higher levels of RBC count in indigenous variety may be an adaptation to survive well in high altitude region (1000 to 3500m), which is generally considered to be cold and harsh climatic condition.

The effect of the environment and climatic condition is reflected in physiological state of the organism. With regards to the biochemical parameters, differences among values of some serum parameters have been registered. There is a significant difference in glucose levels in Poultry  $259.98 \pm 15.44$  mg/dl and in indigenous breed was found to be  $139.99 \pm 9.90$  mg/dl (Table 2) and Cholesterol levels poultry birds ( $468 \pm 7.582$ ) have significantly much higher plasma cholesterol than the indigenous breed ( $208 \pm 5.708$ ). This result was similar to the report by Simaraks, who studied serum cholesterol content in Thai indigenous chicken (Simaraks, S., et al. 2004). The reason may be due to lack of physical restriction/mobility in poultry birds for lack of space than the indigenous variety which are reared in considerable open space. There is also a significant difference of the protein content in Poultry ( $1.88 \pm 0.13$ ) and indigenous ( $1.66 \pm 0.06$ ) variety. This information, beside of diagnostic and management purposes, can be use for developing new broiler strains that genetically resistant to poultry diseases [Shlosberg, A., et al 1996] as well as for genetic improvement programs of poultry and indigenous chicken [Ladokum, A.O., et al. 2008].

## CONCLUSION

In the present study it was concluded that the leucocytes (WBC) differential count was found to be similar in indigenous and Poultry varieties except for monocytes. A significant difference in total count (TC RBC) of Poultry ( $2098 \times 10^3$ )  $\pm 97.76$  and indigenous ( $3210 \times 10^3$ )  $\pm 169.0$  was registered. The higher levels of RBC count in indigenous variety may be an adaptation to survive well in high altitude region (1000 to 3500m), which is generally considered to be cold and harsh climatic condition. There is a significant difference in glucose levels in Poultry  $259.98 \pm 15.44$  mg/dl and in indigenous breed was found to be  $139.99 \pm 9.90$  mg/dl (Table 2) and Cholesterol levels poultry birds ( $468 \pm 7.582$ ) have significantly much higher plasma cholesterol than the indigenous breed ( $208 \pm 5.708$ ).

## References

1. Aengwanich, W. and A. Tanomtong. Blood cell Aengwanich, W. and A. Tanomtong. Blood cell Ranging-Red Jungle Fowl (*Gallus gallus*) in Northeastern, Thailand. J. Biological Sci. 2007; 4: 689-692.
2. Bermudez, A.J. and B. Stewart-Brown. Principles of disease prevention: diagnosis and control. In: Diseases of Poultry, 12th ed. Eds. Saif, Y.M. H.J. Barnes, J.R. Glisson, A.M. Fadly, L.R. McDougald, D.E. Swayne, Blackwell Publishing Professional, Ames. 2008; pp: 3-46.
3. Islam, M.S., N.S. Lucky, M.R. Islam, A. Ahad, B.R. Das, M.M. Rahman and M.S.I. Siddiui. Haematological parameters of fayoumi, Assil and local chicken reared in Sylhet region in Bangladesh. International J. Poultry Sci. 2004; 3: 144-147.
4. Kral, P. and P. Suchy. Hematological studies in adolescent breeding cocks. Acta Veterinaria Brno. 2000; 69:189-194.
5. Ladokum, A.O., A. Yakubu, J.R. Otite, J.N. Omeje, O.A. Sokunbi and E. Onyeji. Haematological and serum biochemical indices of naked neck and normally feathered Nigerian indigenous chickens in a sub humid tropical environment. International J. Poultry Sci. 2008; 7: 55-58.
6. Pampori, Z.A. and S. Iqbal. Haematological, seru chemistry and electrocardiographic evaluation in native chicken of Kashmir. International J. Poultry Sci. 2007; 6: 578-582.
7. SAS Institute, SAS User's Guide. Statistics. Version 6 edn. SAS Institute Inc. Cary, NC., 1985.
8. Shlosberg, A., M. Bellaiche, N. Zeitlin, M. Yaacobi and A. Cahaner. Haematocrit values and mortality from ascites in cold-stressed broiler from parents selected by haematocrit. Poultry Sci. 1996; 75:1-5.
9. Simaraks, S., O. Chinrasri and W. Aengwanich,. Haematological, electrolyte and serum biochemical values of the Thai indigenous chickens (*Gallus domesticus*) in northeastern of Thailand. Songklanakarin J. Science and Technol. 2004; 26:425-430.
10. Tavares-Dias, Moraes, F.R. Leukocyte and thrombocyte reference values for channel catfish (*Ictalurus punctatus* Raf.), with an assessment of morphological, cytochemical, and ultra-structural features. Veterinaria Clinical Pathology. 2007; 36:49-54.

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