

# Hematological Parameters of three Strains of Local Cocks in Northern Nigeria

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**Abstract**— The study was conducted to determine the hematological parameters of three strains of the Nigerian indigenous cocks. A total of 15 sexually matured (14-18 month of age) breeders cocks comprising (5 normal feathered, 5 frizzled feathered and 5 naked neck) were used for the experiment. The study was conducted from October to December 2016 at the Teaching and Research Farm University of Maiduguri. Blood samples were collected from 9 breeder's cocks which were randomly selected 3 per genotype and used for hematological parameters examination. Hematological examination such as Packed Cell Volume (PCV), Red Blood Cell (RBC), Haemoglobin (Hb), White Blood Cell (WBC), Mean Corpuscular Haemoglobin concentration (MCHC), Mean Corpuscular Haemoglobin (MCH) and Mean Corpuscular Volume (MCV) showed significant ( $P < 0.05$ ) different among breeds. Lymphocyte (L) showed no significant ( $P > 0.05$ ) different between normal feathered and frizzle feathered but there is significant difference ( $P < 0.05$ ) with naked necked cock. Neutrophil (N) showed significant ( $P < 0.05$ ) different among the breed. Monocyte (M) and Eosinophil (E) showed no significant ( $P > 0.05$ ) difference between normal feathered and naked neck feathered, frizzle feathered and necked neck respectively but showed significant ( $P < 0.05$ ) difference between frizzle feathered and normal feathered respectively for M and E. the study concluded that variation in the hematological parameters between three strains of local chicken in Nigeria is due to difference in their genetic makeup.

**Keywords**— Haematology, Indigenous chicken, Strain.

## I. INTRODUCTION

In many species of birds especially chicken, normal values for hematological parameters were measured and a comprehensive data base was established of their blood profile. Comparative measurements for diverse species of birds could be lead to the different statement of immune system in these birds (Simaraks *et al.*, 2004; Pampori *et al.*,

2007; Iadokun *et al.*, 2008 and Melesse., 2011). The Nigerian indigenous chicken breeds have been reported to have many advantageous gene complexes that could be harnessed in the development of meat or egg type chicken suitable for use in the tropics (Machebe and Ezekwe, 2004). Among these major genes are the Naked necked, Frizzled and Normal feathered (Ibe 1998). In the other hand, many researchers have evaluated normal hematological parameter of industrial and commercial hybrid chickens (Melluzzi *et al.*, 1992; Taleb *et al.*, 2005). Information about hematological parameters of indigenous chickens are limited therefore, this study was carried out to evaluate the haematological parameters of three strains of indigenous chickens.

## II. MATERIALS AND METHOD

A total of fifteen (15) local breeder cocks which are sexual matured (14 – 18 months) of age, comprising three strains of indigenous cocks (5 Frizzle, 5 Normal feathered and 5 Naked Neck) were obtained from local farmers within Borno state and were used for the experiment. The study was conducted at the Teaching and Research Farm of the Department of Animal Science, University of Maiduguri, Borno state. Maiduguri is situated within the semi arid region of Nigeria which lies within the Sahel zone of West Africa. Borno state lies within latitude  $100^{\circ}$  and  $140^{\circ}$  N longitude  $110^{\circ} 30'$  and  $140^{\circ} 45'$  E. (NPC, 2006). The experimental birds were acclimatized for two weeks during which they were monitored and screened. Conventional management practice were observed throughout the study period. Blood samples were collected from the wing vein of the birds using a 2 ml disposable syringe and directly transferred into a labeled bottle containing EDTA Ethylenediamine tetra acetic acid) anticoagulant. It was immediately used for measuring the haematological parameters such as red blood cells (RBC), white blood cells (WBC), haemoglobin (HB), packed cell volume (PVC), Mean Corpuscular Volume (MCV), Mean

Corpuscular Haemoglobin (MCH), Mean Corpuscular Haemoglobin concentration (MCHC), Neutrophil (N), Lymphocytes (L), Monocyte (M), Eosinophil (E) and Basophiles (B). Data collected on blood were subjected to

one way analysis of variance (ANOVA) using SPSS statistical package version 16. Separation of significant means was done using the Duncan's Multiple Range Test (Steel and Torrie, 1980).

### III. RESULTS

Table.1: Haematological parameters in three strain of indigenous chicken

Breeds	RBC ( $\times 10^9/L$ )	WBC ( $\times 10^{12}/10L$ )	HB (g/dl)	PCV (%)	MCV (fl)	MCHC (g/dl)	MCH (pg)	L (%)	N (%)	M (%)	E (%)
Normal feather	5.07 <sup>c</sup>	5.66 <sup>b</sup>	11.33 <sup>b</sup>	36.66 <sup>c</sup>	7.20 <sup>b</sup>	31.24 <sup>b</sup>	22.39 <sup>b</sup>	50.66	30.66	10.33	8.33
Frizzled feather	5.08 <sup>b</sup>	2.40 <sup>c</sup>	11.26 <sup>c</sup>	40.00 <sup>a</sup>	7.93 <sup>a</sup>	28.47 <sup>c</sup>	22.21 <sup>c</sup>	50.66	30.33	9.33	9.66
Naked necked	5.35 <sup>a</sup>	6.21 <sup>a</sup>	12.36 <sup>a</sup>	38.33 <sup>b</sup>	7.16 <sup>c</sup>	32.52 <sup>a</sup>	23.12 <sup>a</sup>	50.00	30.00	10.33	9.66
SEM	0.13	1.15	0.34	1.09	2.70	0.94	0.27	0.52	0.66	1.22	0.83

a, b, c Means within the same column carrying different superscripts differ significantly ( $P < 0.05$ )

The results of hematological parameters of three strain of local chicken (Normal feather, Naked neck and Frizzled feather chicken) are presented in Table 1. The parameters considered are RBC, WBC, Hb, PCV, MCV, MCHC, MCH, L, N, M and E among the breeds. There is a significant variation in hematological parameters across breeds in PCV, HB, RBC, MCHC, and MCH in this study. The naked necked cock had the highest value in RBC ( $\times 10^9/L$ ) and WBC ( $\times 10^{12}/10L$ ) than normal feathered and frizzle feathered cock. These results agreed with the report of Ajayi *et al.* (2014). Hb (g/dl) of naked neck cock indicated highest value of 12.36g/dl, this value is higher than the result obtained by Sharmin *et al.* (2004). The variation in result might be due to management practice or environment which the bird are exposed to. The PCV valued (40%) of frizzles feather cock obtained from this study revealed higher value than the result obtained by Ajayi *et al.* (2014) and Sharmin *et al.* (2004). Although the result showed no significant ( $P > 0.05$ ) different. The MCV (fl) mean value obtained in this research is lower than the result obtained by (Ajayi *et al.*, 2004; Sharmin *et al.*, 2004; Ihekthemer *et al.*, 2006). The variation might be due to season or environment. MCHC (g/dl) value obtained from this experiment agreed with Ajayi *et al.* (2014), naked necked with highest valued of 32.52, followed by normal feathered cock and frizzle feathered cock with corresponding mean values of 31.24 and 28.47 respectively. MCH (pg) the mean value obtained was not significant ( $P > 0.05$ ) different among the strain used for this study,

although the mean value for all the breed was lower than the result obtained by Ajayi *et al.* (2004) and sharmin *et al.* (2004). The lymphocyte (L) showed no significant different ( $P > 0.05$ ) between the normal feathered and frizzle feathered while it showed significant ( $P < 0.05$ ) different in naked necked cocks. Neutrophil (N) of the normal feathered cock revealed the highest value followed by the frizzled feathered and naked neck cock respectively with the corresponding mean value of 30.66%, 30.33% and 30.00% respectively. Monocyte (M) of the normal feathered and naked necked cock showed the highest values followed by the frizzle feathered with corresponding mean values of 10.33% and 9.33% respectively. Eosinophil (E) of frizzle feathered and naked necked cock has the highest values of 9.33%, while the normal feathered cock showed lower value of 8.33%.

### IV. DISCUSSION

The haematological parameters of chicken are significance to reflect inherent genetic differences amongst the breeds of chicken (Agaie and Uko, 1998). The variation in the haematological parameters between strains in some situation might be due to season, species, immune system, and poor nutrition especially protein deficiency (Oladele *et al.*, 2001; Adejumo, 2004). The variation in this study might be due to strains and genotype differences since all the cocks are exposed to the same environment. El-Safty *et al.*

al. (2006) reported the superiority of the naked neck gene in PCV compared to that of the fully feathered. The author further stated that this could be a boost to the growth and productive life of the former. Haematological and serum biochemical values could be utilized in crossbreeding programmes in order to produce individuals that are fit and more productive (Ladokun *et al.*, 2008). Genetic differences exist in all farm animals which lead to variability in the reproductive and performance abilities of animals both within, and between breeds. Differentiating this variability could be a basis for selection and subsequent genetic improvement of farm animals. Biochemical polymorphism study is one way of delineating genetic variation in animals (Egena and Aloa, 2012). This information may aid selection of superior animals within and between breeds for genetic improvement of desired traits (Bibinu *et al.*, 2016). Since the main goal in animal breeding is to select individuals that have high breeding values for traits of interest as parents to produce the next generation and to do so as quickly as possible (Dekker, 2012). Haematological parameters might be used as a tool for selection.

## V. CONCLUSION

The study concluded that haematological parameters variation in this study might be due to gene in local breed of chicken. This will aid in planning breeding programme for selection of economic traits.

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