

EFFECT OF STRAIN ON HAEMATOLOGICAL INDICES OF PULLET CHICKENS FED VARYIED DIETARY LEVELS OF BITTER LEAF MEAL

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ABSTRACT

An eight-week experiment was conducted to investigate the effect of strain on haematological indices of pullet chickens. One hundred and forty (144) one-week pullet chicks (72 Isa brown and 72 FUNAAB Alpha) were procured and housed separately according to strain in deep litter system. Each strain was replicated nine (9) times with eight (8) birds per replicate. The birds were given pullet mash compounded at the farm's mill with 20% crude protein and 2621 Kcal/kg metabolizable energy. Feed and water were supplied ad libitum while standard management practices were strictly observed. At the end of the eight weeks' experimental period, blood samples were collected for haematological analysis. Data were analyzed using Fit Model of JMP Pro 15 to determine the effect of strain at 5 % level of probability. The results indicated that Hb had significant ($p < 0.05$) difference among the two strains, while other haematological indices (PCV, RBC, MCV, MCH, MCHC and WBC) were not significantly ($p > 0.05$) affected. This study concluded that FUNAAB alpha and Isa brown strains of chickens did not differ in their haematological indices measured except in haemoglobin where FUNAAB alpha had a higher mean value.

Keywords: Strain, Deep Litter, Pullet chicks, Haematology

INTRODUCTION

Intensive selection and crossbreeding programs over the years have led to the development of new breeds of chickens in Nigeria including Shika Brown and FUNAAB Alpha breeds. This achievement has contributed to increased meat and egg production without sacrificing adaptation to tropical environment prominent for heat stress and infectious diseases (Ilori *et al.*, 2016).

According to Sam *et al.* (2023), investigation of normal blood indices of chickens are essential in diagnosing the various pathological and metabolic disorders. Changes in the constituent compounds of blood can be used to determine systemic relationships and physiological adaptations in the body of animals to environmental, nutritional and or pathological factors (Saulawa *et al.*, 2012). Blood values in chicken are influenced by sex, age, breed, climate, geographical location, season, nutritional status (Islam *et al.*, 2004).

Therefore, the aim of this study was to investigate the effect of strain on haematological indices of pullet chickens.

MATERIALS AND METHODS

Study Location

This study was carried out at the Livestock Teaching and Research Farm, Prince Abubakar Audu University, Anyigba. Anyigba is located in the Derived Savannah zone of Nigeria on latitude 7°15 and 7°29N of the equator and longitude 7°11 and 7°32E of the Greenwich meridian with an average altitude of 420metres above sea level. Daily temperature range is 25°C-35 °C while annual rainfall ranges from 1400-1500 mm (Aderibigbe *et al.*, 2022).

Experimental Animals and Management

One hundred and forty (144) one week pullet chicks (72 Isa brown and 72 FUNAAB Alpha) were procured from two accredited hatcheries in Oyo State, Nigeria and assigned to three treatments (antibiotic group, 1 % bitter leaf meal and 2 % bitter leaf meal) consisting of three replicates of eight birds each, in a 2×3 factorial arrangement of a completely randomized design. The chicks were brooded on deep litter system in separate pens on strain basis using charcoal pot and electric bulb alternatively to supply heat. Feed and water were given *ad libitum* accompanied by standard management procedures. The antibiotic treatment was Oxytetracycline hydrochloride administered at 1g/ 4 litres of water according to the manufacturer's instruction.

Data collection and Analysis

At the end of the eight weeks' experimental period, blood samples were collected from the wing vein of one bird per replicate with the aid of needle and syringe for haematological analysis. A 2.0 ml sample of blood from each chicken was collected and transferred into a set of bottles with anti-coagulant for

haematological analysis. The values of packed cell volume (PCV), Haemoglobin (Hb) count, Red blood cell (RBC) count and White blood cell count (WBC) were analyzed according to Lamb (1991). Mean corpuscular volume (MCV), Mean corpuscular haemoglobin (MCH) and Mean corpuscular haemoglobin concentration (MCHC) were calculated. The data collected were subjected to T-test using Fit Model of JMP Pro 15 to determine the effect of strain at 5 % level of probability.

RESULTS AND DISCUSSION

Table 1 presented the effect strain on haematological indices of FUNAAB alpha and Isa brown pullet chickens. The study revealed significant strain effect ($p < 0.05$) on haemoglobin concentration while other indices such as packed cell volume (PCV), red blood cells (RBC), mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC) and white blood cells (WBC) were not significantly different ($p > 0.05$). These findings contradict previous research of Akinyemi *et al.* (2024) and Adewole *et al.*, (2021) who reported that genetic factors contribute to differences in haematological indices among chicken strains.

The highest haemoglobin value was observed for FUNAAB alpha pullet chickens (12.27 g/dl). In contrast, the Isa brown had lower haemoglobin levels suggesting that the different genotypes had different haemoglobin concentrations for oxygen consumption. This result is consistent with the findings of Anizoba *et al.* (2024) and Sam *et al.* (2024) who reported significant strain differences in haemoglobin values of broiler chickens. Haemoglobin is responsible for carrying oxygen in the blood. Inadequate intake of oxygen and protein decreases haemoglobin (Hb) concentration which indicates anaemia (Muhammed and Oloyede, 2009).

The values of PCV, RBC and HB observed for FUNAAB alpha strain was within the normal range reported by Benergee (2008) however, these values observed for the Isa brown strain were below the normal range. In contrast, the white blood cell count observed for Isa brown was within the normal range while the FUNAAB Alpha strain had abnormally high white blood cells counts compared to the normal range reported by Bounous and Stedman, (2000). MCV values for both strains were within the normal range however, MCH and MCHC values obtained for both strains were higher than the normal range as reported by Benergee (2008). Adeyemo *et al.* (2018) recounted that weight, age, sex, diet type, strain and climate are factors which cause variation in the haematological indices of chickens.

Table 1: Effect of strain on haematological indices of pullet chickens fed varied dietary levels of bitter leaf meal

Parameter	Isa Brown	FUNAAB- Alpha	SEM	LOS
PCV (%)	12.73	29.07	5.64	NS
Hb (g/dl)	5.30 ^b	12.27 ^a	2.24	*
RBC ($\times 10^6 \text{ mm}^3$)	1.29	2.52	0.52	NS
MCV (fl)	114.30	113.63	14.52	NS
MCH (pg)	49.70	48.67	0.72	NS
MCHC (g/dl)	43.60	42.96	1.15	NS
WBC ($\times 10^3 \text{ mm}^3$)	23.73	56.78	13.71	NS

a,b,c Means in the same row with different superscripts are significantly different ($p < 0.05$), SEM = standard error of mean, PCV=packed cell volume, Hb=haemoglobin, WBC = White blood cell, MCH: mean corpuscular volume; MCHC: mean corpuscular haemoglobin concentration, LOS=level of significance, NS=not significant

CONCLUSION AND RECOMMENDATION

In conclusion, this study showed that FUNAAB alpha and Isa brown strains of chickens did not differ in their haematological indices measured except in haemoglobin where FUNAAB alpha had a higher mean value.

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