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EFFECT OF GRADED LEVELS OF AFRICAN LOCUST BEAN MEAL (*Parkia biglobosa*) ON THE HAEMATOLOGICAL AND SERUM BIOCHEMISTRY OF BROILER CHICKENS

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ABSTRACT

The haematological and serum biochemistry response of broiler chickens fed to varying dietary levels of fermented African locust bean ({Parkia biglobosa) seed meal (FALBSM) was conducted. The trial was carried out for the period of 8 weeks using Completely Randomized Design (CRD) with four (4) treatments replicated three (3) times, the graded levels of fermented African locust bean meal administered were 0% (control), 7.5%, 15%, and 22.5% respectively. There were significant differences in the haemoglobin, red blood cell (RBC), mean corpuscular volume (MCV), mean corpuscular Haemoglobin (MCH), Neutrophils (%) and lymphocytes except packed cell volume (PCV) and white blood cell (WBC) count. The haemoglobin ranged 10.56 – 13.16, red blood cell (RBC) ranged 2.85 – 4.29, mean corpuscular volume of (MCV) ranged 103.46 – 122.77, mean corpuscular Haemoglobin (MCH) ranged 36.16 - 44.40, Neutrophils (%) ranged 34.62 – 45.52 and lymphocytes ranged 48.17 - 62.55. Significant difference was observed in total protein (TP), Alanine transaminase (ALT), Aspartate transaminase (AST) except cholesterol. Broiler chickens fed 22.5% fermented African locust Bean seed meal had the highest total protein (TP) 41.31U/I, Alanine transaminase (ALT) 31.05 U/I and Aspartate transaminase (AST) 30.00 U/I with least values obtained control diet. It can be concluded that fermented African locust bean (Parkia biglobosa) seed meal can be included in broiler chickens diet up to 15% level at starter phase and 22.5% at the finisher phase without any adverse effect on haematological and serum biochemical parameters.

Keywords: African Locust Bean Meal, Haemotology, Serum Biochemistry and Broiler Chickens

INTRODUCTION

Blood is an important aspect of physiological and pathological change in an organism and has been used in assessing the body's ability to respond to nutrition challenges (Nwogu *et al.*, 2007; Aguihe *et al.*, 2012). Hematological studies are essential in monitoring feed toxicity especially with feed constituents that affect the formation of blood (Aro and Akinmoyegun 2012). Locust bean pulp has a lot of beneficial nutritional properties such as edibility and non-toxicity (Akonia *et al.*, 2001 and Owoyele *et al.*, 2009). The yellow color of the pulp is an indication of the presence of phytonutrients such as vitamin A which is known to improve the broiler performance and immune function of broiler chicken under heat stress conditions (REF). The African locust bean tree is a leguminous plant that produces seed grain that is often cheaper and readily available in Northern Nigeria. African locust bean seed is rich in protein and is used as a flavor intensifier for soups and stew (Dike and Odunfa, 2003). The protein content of seed varies between 25 and 30% and has the potential to be utilized in livestock feeding (Olomu, 2011). Poultry production especially broiler chicken is one of the fastest ways of achieving adequate animal protein supply for the Nigerian populace due to their short generation interval and rapid growth rate (Bamgbose *et al.*, 2004). This is due to their genetic make-up when adequately nourished and managed (Uzegbu *et al.*, 2007). Feed is the most important input in profitable poultry production. It accounts for 70-80% of the total cost of production (Ogundipe, 1987; Kehide *et al.*, 2006). At present, the high cost of conventional feedstuffs has brought about the need to have alternative feedstuffs that can replace the expensive ones in order to reduce the cost of livestock production (Longe, 2006; Bamgbose *et al.*, 2011). Therefore, this

study evaluates effect of graded levels of african locust bean meal (*parkia biglobosa*) on the haematological and serum biochemistry of broiler chickens

MATERIALS AND METHODS

Location of the Study Area: This study was carried out at the Teaching and Research farm of Federal College of Animal Health and Production Technology, Vom in the Livestock Investigation Department (LID), National Veterinary Research Institute, Vom, Nigeria.

Source of African Locust bean (Parkia biglobosa) and birds: The African locust bean used for the experiment was purchased from a local market in Mangu Local Government Area of Plateau State, Nigeria. It was screened and winnowed to remove sand, chaff, and other foreign particles before processing into feed. One-hundred-and-twenty-day old broiler Chickens were obtained from a reputable hatchery in Ibadan, Oyo State.

Processing: The procedural method of fermentation as described by Omafuvbe *et al.,* (2004) was used to process the African Locust Bean in this study.

Experimental design and management of birds: A total of one hundred and twenty (120) broiler birds were randomly assigned into four (4) dietary treatments of 10 birds per replicate and 3 replicates in a treatment. Four experimental diets were formulated containing graded levels of African locust bean meal at 0%, 7.5%, 15% and 22.5%. The birds were housed in a deep litter pen; feed and water were provided *ad-libitum*. The experiment lasted for 8 weeks, at the end of which blood samples were collected from the experimental birds.

Data collection: A total number of 24 samples were collected from the experimental birds. Two birds were randomly selected from each replicate, hence a total of six (6) birds from each treatment. 2ml of blood sample was collected from the wing vein of the birds into bottles containing Ethylene diamante tetra-acetic acids (EDTA). Another 2ml of blood sample was collected into non (EDTA) free bottle for Serum biochemistry. All the bottle samples were analyzed for packed cell volume (PCV), Hemoglobin (Hb), Total protein (TP), MCHC, MCH, MCV, total cholesterol and liver function test.

Statistical Analysis: All data collected were subjected to analysis of variance (ANOVA) as described by Steel and Torrie (1984) using (MINI-TAB Version 2016 software). Where applicable, significant differences between means were separated using the Least Significant Difference option in the same software.

RESULTS

Table 1 showed the haematological parameters of Broiler Chickens fed graded levels of fermented African locust bean seed meal. There were significant differences in the haemoglobin, red blood cell (RBC), mean corpuscular volume of (MCV), mean corpuscular Haemoglobin (MCH), Neutrophils (%) and lymphocytes except packed cell volume (PCV) and white blood cell (WBC). The haemoglobin ranged 10.56 – 13.16, red blood cell (RBC) ranged 2.85 – 4.29, mean corpuscular volume of (MCV) ranged 103.46 – 122.77, mean corpuscular Haemoglobin (MCH) ranged 36.16 - 44.40, Neutrophils (%) ranged 34.62 – 45.52 and lymphocytes ranged 48.17 -62.55 except packed cell volume (PCV) and white blood cell (WBC).

Table 1: Hematological parameters of Broiler Chickens fed graded levels of fermented African locust Bean seed meal

Parameters	T1 0%	T2 7.5(%)	T3 15(%)	T4 22.5(%)	SEM
PCV (%)	30.21	31.41	31.07	33.11	4.98
Haemoglobin	10.56^{b}	10.98^{b}	11.21^{b}	13.16^{a}	1.01
RBC (x10/1)	2.85^{b}	3.41^{a}	4.29^{a}	3.30a	0.99
WBC (X10/1)	3.5	3.9	3.47	3.21	1.15

MCV (FI)	103.46[a]	110.99[a]	122.77[b]	110.40[a]	8.67
MCH (Pg/Cell)	36.16[a]	38.80[a]	43.77[b]	44.40[b]	2.5
Neutrophils (%)	38.00[a]	41.22[b]	34.62[a]	45.52[b]	3.28
Lymphocytes	54.24[b]	54.23[b]	62.55[a]	48.17[c]	2.18

Note: abc-mean within a row with different superscripts are significantly different (P<0.05).

Table 2 shows the serum biochemistry parameters of broiler chickens fed graded levels of fermented African locust Bean seed meal. Significant difference was observed in total protein (TP), Alanine transaminase (ALT), Aspartate transaminase (AST) except cholesterol. Broiler chickens fed 22.5% fermented African locust Bean seed meal had the highest total protein (TP) 41.31U/I, Alanine transaminase (ALT) 31.05 U/I and Aspartate transaminase (AST) 30.00 U/I with least values obtained control diet.

Table 2: Serum Biochemistry parameters of Broiler Chickens fed graded levels of fermented African locust Bean seed meal

Parameters	**T1 (%)**	**T2 7.5(%)**	**T3 15(%)**	**T4 22.5(%)**	**SEM**
Total protein (U/I)	31.77[c]	37.35[b]	38.55[b]	41.31[a]	2.99
ALT (U/I)	22.04[b]	28.01[a]	28.00[a]	31.05[a]	4.52
AST (U/I)	22.00[b]	28.00[a]	28.00[a]	30.00[a]	3.23[a]
Cholestrol (Mg/di)	2.60	2.70	2.63	2.09	1.18

Note: abc-mean within a row with different superscripts are significantly different (P<0.05).

DISCUSSION

WBC, MCV values are within the normal range of chickens reported by Suunchin *et al.,* (2004). The mean corpuscular and mean corpuscular Haemoglobin were high for T1, T3, andT4 compared to others. Iheukwuuemere *et al.,* (2006) reported that changes in haematological parameters reflect the physiological status of animals. From the result of packed cell volume (PCV), the values obtained fell within the range of 31.0-48.6% which was reported by Mitruka and Rawusley (1997), 33-50%, Iheukwuemere *et al.,* (2006) and 33.50%, Togun and Oseni, (2007). The packed cell volume levels of broiler chickens in all the treatments were apparently due to the nourishment of the diets on the performance of broiler chickens. The result was in agreement with the findings of Telek (1983), who reported that PVC concentration indicates the nutritional status of the diet. The haematological indices showed an increase in PCV, Hb, RBC, and WBC in broiler-fed FALB-based diets in this study was similar to findings of Ari and Ayanwale (2012) that feeding broilers with fermented African locust beans meal improve their health performance. The variation in the serum profiles of the experimental birds in which the Alanine transaminase (ALT) and Aspartate transaminase were decreased in the control diet (P<0.05) to the fermented African locust bean meal showed that the FALB can be fed at 10% to broiler without a deleterious effect., while a higher level of AST indicated the presence of toxin or poisons in the heart and liver. AST is found in appreciable quantities and forms in the heart and liver. It is the serum enzyme that shows the functioning of the heart and liver when hepatic cells are damaged. ALT (Alanine transaminase and Aspartate transaminase) was depressed in the different diet indications that the liver and heart are working normally without toxicity (Allelo and Mays, 1998). Higher values indicated toxicities (Iyayi, 2001). ALT is found principally in the liver with only small amongst being present in other organs. When there is liver damage, the serum or plasma level of both AST and ALT is raised tremendously. The lower value in cholesterol indicates effective utilization of different meals and this concurred with the result of Osho *et al.,* (2016) in broiler chickens.

CONCLUSION

Considering the results obtained from this study, it can be concluded that fermented African locust bean seed meal *(Parkia biglobosa)* can be included in broiler chickens diet up to 15% level at starter phase and 22.5% at the finisher phase without any adverse effect on performance, haematological and serum biochemical parameters.

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