

## SERUM BIOCHEMICAL PROFILES OF PULLET CHICKS FED BAMBARA NUT OFFAL AND MAIZE OFFAL BASED DIETS

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### ABSTRACT

A seven (7) week study was carried out to determine the serum biochemical profiles of pullet chicks. Ninety day old pullet chicks were randomly divided into five treatments of 18 birds per treatment. Each treatment was replicated three times with six birds per replicate. The five treatments T1, T2, T3, T4, and T5 were fed five diets in which maize offal replaced maize at 0%, 25%, 50%, 75% and 100% respectively. Samples of the five experimental diets were analyzed for their proximate composition using the methods of AOAC (2000) On the last day of the experiment blood samples were collected for serological analysis. The experimental design was a completely randomized design (CRD). Data were subjected to a one way analysis of variance (ANOVA). Significant treatment means were separated using Duncan's multiple range test. with the aid of SAS 9.4, 2018 edition. The values for total protein, creatinine, cholesterol, alkaline phosphate and urea were not significantly ( $P < 0.05$ ) different. Values for glucose ranged from 180.35 – 190.00mg/dl and showed slight significance. It was concluded that inclusion of maize offal in diets for pullets up to 50% level had no adverse effect on serum biochemical profile of pullet chicks. Further research using other replacement levels as well as other classes and specie of poultry were recommended

**Key Words:** Replacement, Maize, Serum Biochemistry, feed Intake, Pullet Chicks

### INTRODUCTION

The consumption of poultry meat is on the increase and the meats nutritional quality depends on the composition of quality poultry feeds (Kafi *et al* 2017) Poultry are able to adapt to most areas of the world, have a rapid generation time and a high rate of productivity (Smith, 2001). Although, the contribution of poultry to human nutrition in the tropics is already appreciable, it is but a small fraction of what it could be under the present conditions. The greatest incentive to the domestic poultry owner is the fact that the birds find their own food and accommodation almost without any expenses to him and that every thing they produce from faecal fraction to eggs and flesh earn him a net profit.

The cost of conventional feed stuffs, which are the major sources of energy and protein in poultry diets,

have continued to rise (Ukah, 2004; Ocheja *et al* 2012; Eko *et al* 2020) due to their short supply. This has resulted in the high cost of poultry feeds, causing economic losses in poultry production in Nigeria. There is therefore, the need to continue to source for alternative sources of energy and protein that are not likely to face such competition and demand as the conventional feedstuffs. Such a feedstuff should not be food for man and should also have very limited or no industrial use and yet nutritionally adequate. ( Ocheja *et al.*, 2011)

To counter this increase in the price of conventional feedstuff and produce poultry products at affordable prices, the use of agro-industrial by-products in poultry feeding must be exploited in Nigeria. There is evidence in literature that the use of agro-industrial by products reduces the cost of feed as they attract little pricing ( Onuh, 2005). One of such readily available agro-industrial by-products is maize offal. According to Ukah,(2004) maize offal contains 13.92% crude protein, 7.20% crude fibre and 63.21% nitrogen free extracts while maize meal contains 10.82% crude protein, 4.27% crude fibre and 76.98% nitrogen free extracts.(Ocheja *et al* 2011). The use of unconventional should be backed by assessment of the health status of the animals because some are known to affect blood parameters.( Daramola *et al*, 2015) A readily available and fast means of assessing the clinical and nutritional health status of the animals in feeding trial may be the use of blood analysis.(Olabanji *et al* 2007)

From the forgoing blood constituent analysis is imperative considering the fact that many by – products are now used to feed poultry birds due to high cost of conventional feed stuffs

The search for cheaper feedstuff continue to be very central to the research efforts of animal nutritionists in the tropics because of the critical need to find alternative cheaper and yet safe feed ingredients that can replace the more conventional feedstuff in feeding animals

The aim of this study therefore was to evaluate the serum biochemical profile of pullet chicks fed maize and maize offal based diets

### MATERIALS AND METHODS

The feeding trial was carried out at the poultry unit of Kogi State University Livestock Teaching and Research Farm, Anyigba Kogi State (Lat. 7° 29' N and Long. 7° 11' E) in the Guinea

Savanna Zone . Kogi State has a bimodal rainfall with peak patterns occurring in July and September. The mean annual rainfall is 1,808 mm at Anyigba (Amhakhianand Osemwota 2012). The temperature shows some variation throughout the year. Average monthly temperature varies from 17°C to 36.2°C. Relative humidity is moderately high and varies from an average of 65-85% throughout the year (Amhakhianand Osemwota. 2012), with a clear distinctive wet and dry season. There is usually a short dry spell in August which is referred to as "August Break". While the dry season commences in November through early March.

Ninety (90) day old pullet chicks were purchased and used for the feeding trial. The day old chicks were brooded using kerosene stove, metal hovers and electric bulbs as source of light in a deep litter house. The birds were randomly allotted to five treatment diets after brooding for three weeks. There were 18 birds in each treatments. Each treatment was replicated three times with each replicate having 6 birds . Feeds and water were provided *ad libitum*.

Health management practice included the administration of Vitalyte, Peneteryl, Keproceryl, Gumboro and Lasota vaccines, Antistress, Antibiotics and Vitamins and Mineral supplements were also administered during the period of brooding and rearing.

**2.3** There were five dietary treatments in which maize offal replaced maize at 0%, 25%, 50%, 75% and 100%

#### 2.4 Blood Sample Collection

The blood samples for haematological and serological studies were collected in sample bottles from the jugular vein of chick using needles and syringes. The blood samples for serological analysis were put in sample bottles containing ethylene diamine tetra acetic acid (EDTA) anticoagulant, the blood samples were centrifuged thus allowing the clear sample to be separated for testing.

The Serum was analyzed for creatume, urea, alkaline phosphate cholesterol and blood sugar according to the method of Baker and Silverton (1985) Uncoagulated blood samples were analysed for haematological parameters such as packed cell volume , haemoglobin concentration, red blood cell count, white blood cell count, mean corpuscular volume, mean corpuscular haemoglobin, mean corpuscular haemoglobin concentration

Samples of feeds were analyzed for their proximate composition using standard procedure (AOAC, 2000)

Data collected were subjected to a one-way analysis of variance (ANOVA) and significant differences between treatment means were tested using Duncan's Multiple Range Test (DMRT) contained in SAS version 9.4 (2018) edition.

**Table 1: Composition of Experimental Diets.**

Ingredients	Treatments				
	T1	T2	T3	T4	T5
Maize	60.00	45.00	30.00	15.00	0.00
Maize Offal	0.00	15.00	30.00	45.00	60.00
Bambara Nut Offal	37.00	37.00	37.00	37.00	37.00
Bone Meal	2.00	2.00	2.00	2.00	2.00
Table Salt	0.50	0.50	0.50	0.50	0.50
Premix	0.50	0.50	0.50	0.50	0.50
Total	100	100	100	100	100

## RESULTS AND DISCUSSION

### PROXIMATE COMPOSITION OF EXPERIMENTAL FEEDS

The Proximate composition of the experimental feeds are summarized in Table 2

The crude protein range of 20.50 – 22,00% , ether extracts range of 5.00 – 6.50^ and the Nitrogen free

extracts range of 59.25 – 60.52 % were adequate for the birds and meets NRC (1996) requirements for pullet chicks. The ash and fibre levels were within recommended levels. The values were at par with the report of Ocheja *et al* ( 2012)

**Table 2: Proximate Composition of Experimental Diets.(%)**

Ingredients	Treatments				
	T1	T2	T3	T4	T5
Crude Protein	20.50	20.80	21.30	21.80	22.00
Crude Fibre	6.50	6.70	6.90	7.25	7.45
NFE	60.52	60.35	60.29	59.60	59.25
Ash	5.00	5.30	5.70	5.90	6.25
Ether Extracts	4.70	4.50	4.30	4.20	4.01

\*NFE – Nitrogen Free Extracts

### Serum Biochemical Profile of Pullet Chicks fed Diets Containing Varying Levels of Maize and Maize Offal

This serum biochemical profile of pullet chicks fed diets containing varying levels of maize and maize offal diets is presented in Table 3.

All the serum biochemical parameters evaluated were not significantly ( $P < 0.05$ ) different across the treatment means, except the blood sugar which showed slight significance ( $P > 0.05$ ), all the serum biochemical values obtained were within normal ranges reported for pullet chicks by Blood *et al* (2007)

Abnormally high alkaline phosphatase is indicative of bone disease, liver disease, bile obstruction. Variation could also be due to feed, collection and handling of blood samples, genetic, environment, sex and age of animals. Higher creatinine values suggests muscular wastage. (Olabanji *et al* 2007; Esonu *et al* 2001)

Abnormally high urea values indicate poor protein quality as well as poor protein utilization in animals. (Daramola *et al.*, 2015), meaning that the birds were free of the above conditions and also the protein in the diets were of high quality and well utilized

The normal cholesterol levels is of interest, since some consumers are becoming more health conscious by checking their cholesterol intake. This non-significance ( $P > 0.05$ ) of total protein, creatinine, cholesterol, alkaline phosphatase and urea tallied with the report of Ayodele *et al* (2021) for pullet chicks fed diets containing single and combined levels of turmeric and clove,

The values for glucose ranged from 180.00 – 190.00 mg/dl and showed slight significance ( $P > 0.05$ ), this was however at variance with that of Ayodele *et al* (2021) who reported non-significance ( $P < 0.05$ ) for glucose but reported significant ( $P > 0.05$ ) values for cholesterol, these discrepancies could be attributed to differences in the diets fed to the birds

**Table 3: Serum Biochemical Profile of Pullet Chicks fed Diets Containing Varying Levels of Maize and Maize Offal**

Parameters	Treatments					SEM
	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	
Total Protein(g/dl)	5.00	5.80	5.10	5.55	5.60	0.81
Glucose (mg/dl)	180.35 <sup>b</sup>	180.41 <sup>b</sup>	180.66 <sup>b</sup>	188.19 <sup>a</sup>	190.00 <sup>a</sup>	2.09
Creatinine(mg/ml)	0.46	0.45	0.45	0.47	0.51	
Cholesterol(mg/dl)	152.00	151.97 <sup>a</sup>	158.15	158.82 <sup>c</sup>	157.00	0.98
Alkaline Phosphate (mg/dl)	28.00	28.29	28.28	28.77	29.00	0.11
Urea (mg/dl)	3.70	3.79	3.72	3.80 <sup>a</sup>	3.48 <sup>b</sup>	0.72

a b, Treatment means on the same row with different superscripts differ significantly ( $p < 0.05$ )  
SEM Standard Error of Means

### CONCLUSION

Twenty five (50%) Maize offal can replace maize in diets for pullet chicks without adverse effects on serum biochemical profile

### RECOMMENDATIONS

Further research should explore other levels of replacement as well as other classes and breeds of poultry

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